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ABSTRACT

A study examined factors influencing female cassava processors' intentions regarding participation in an extension education program on cassava processing in rural Nigeria. Interviews were conducted with 224 women who were purposely selected from areas of zone 3 of Ondo State, Nigeria, which has large concentrations of cassava processors. Descriptive statistics, factor analysis, and discriminant analysis were used to identify relationships between demographic characteristics and respondents' individual characteristics and their intention to participate in extension education. The cassava processors were found to be educationally and economically disadvantaged and to have considerable experience and indigenous knowledge about cassava processing. It was concluded that those rural cassava processors most likely to participate in a cassava processing extension program were women who perceive a high need for training, want to cooperate, are willing to share information, want evening programs, and have farmed for longer periods of time. Women who had lower attitudes toward innovation or were unmarried were least likely to attend extension programs. Most (200) of the women interviewed intended to participate in a cassava processing extension program. Twelve recommendations regarding future research were made. (Contains 25 references.) (MN)

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# Summary of Research

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## FACTORS INFLUENCING RURAL WOMEN CASSAVA PROCESSORS' INTENTION TO PARTICIPATE IN AN AGRICULTURAL EXTENSION EDUCATION PROGRAM

Christian O. Ojomo and N. L. McCaslin

During the past decade, the standard of living has deteriorated for the majority of Nigerian people with the intensification of poverty in rural areas (World Bank, 1990). The standards of living are expected to get worse unless something is done to improve it (United Nations, 1990).

According to Saito and Weidemann (1990), African women provide most of the labor and make the key decisions for many agricultural activities such as cash cropping, animal husbandry, marketing and food processing. The World Bank (1989) reported that women were responsible for at least 70% of staple food production in Africa. Another estimate by the International Labor Organization stated that 78% of females were economically active in African agriculture (Buvinic & Lycette, 1988). Similarly, Africare (1990) indicated that women provide as much as 80% of the food supply in Africa. Ohuegbe (1989) also indicated that approximately 95% of the rural women were small scale subsistence farmers.

Women have the sole responsibility for planting and harvesting compound farms and gardens. These farms and gardens use continuous cropping to produce crops such as yam, cocoyam and cassava (*Manihot esculenta*). Cock (1985) found that cassava was grown and processed mainly by small rural women farmers with labor-intensive methods. Although

consumption is highest in rural areas, cassava is not purely a subsistence crop because most cassava is sold outside the farm where it is planted, harvested or processed (Cock, 1985). Cassava is one of the most important staple food crops grown in tropical Africa. Cassava represents the primary root crop of the Nigerian rural women farmers and accounts for over 50% of the carbohydrate intake when processed into various foods (Adjebeng-Asem, 1990; Food and Agricultural Organization, 1989, 1984).

Rural women cassava processors are ignored, not recognized or reflected in agricultural development programs and are seen as reproducers rather than producers by administrators and policy makers (Uphoff, Cohen, & Goldsmith, 1979). Yet, women are important in agricultural development because they play a significant role in economic and social activities.

Several factors appear to have limited women's efforts to participate and increase agricultural production and hence improve rural development. For example, competing demands for their time, intensive labor requirements and inadequate technologies have not been seriously addressed by research and development programs (Food and Agricultural Organization, 1984). The lack of participation of rural women cassava processors in agricul-

tural Extension education programs also may have contributed to a serious lack of exchange of technology for women farmers. Exchange of technology greatly increases labor efficiency and productivity, raises incomes and standards of living for cassava farmers, and helps the urban poor (Eggleston, et al., 1989).

Miller (1990) identified four factors related to participation in a community development educational program. These factors included:

- (a) demographics and environmental factors,
- (b) felt needs,
- (c) action orientation, and
- (d) motivators.

Kitinoja and Miller (1991) developed an assessment technique called "readiness assessment" which goes beyond the common needs assessment by including components related to action orientation, motivations and constraints. According to Kitinoja and Miller, "the assessment technique determines not only whether there is a felt need for a program, but whether factors such as attitude toward change, ownership of the problem, confidence level, external factors, or perceived benefits/costs are present and act in favor or against readiness for participation in a given Extension education program" (p. 2).

Lewin (1947) indicated that an individual's participation in education activities was dependent upon personal need within the context of positive and negative external forces affecting the individual. Rogers (1983) and Love (1985) identified felt need as a pre-requisite for learning. The situational characteristics under which learning takes place and personal characteristics such as physical, socio-cultural and psychological characteristics have been described as essential to an individual's readiness to learn (Cross, 1981). Factors related to individual readiness to learn cited by Cross (1979) were age, educational level, region of residence, and proximity to the learning activity. Rothman (1974) and Klevins (1978) identified income as influencing adult readiness to learn. Long (1967) listed distance sponsors, method and topic as important for the

participation of officials in the educational activities.

## Problem

Extension education programs often are offered to help improve the economic and social conditions of rural farmers. However, a lack of participation by rural women farmers in these educational programs is problematic. Very little has been written about why rural women cassava processors decide to participate or not in agricultural Extension programs. Furthermore, it is unclear what factors would lead rural women to participate in Extension education programs on cassava processing. If Extension is to offer programs to rural women cassava processors, information is needed regarding what might influence them to participate.

## Purpose and Objectives

The purpose of this study was to identify factors influencing rural women cassava processors' perceived intention to participate in an agricultural Extension education program on cassava processing. The following research objectives were developed to guide the study:

1. To identify the demographic characteristics of rural women cassava processors (i.e., age, years of schooling, income status, marital status, farming status, years processed cassava, dependent children, years in farming, size of cassava farm, processing location and market location).
2. To identify the factors contributing to the readiness of rural women cassava processors to participate in an agricultural Extension education program on cassava processing.
3. To determine the proportion of rural women cassava processors who intend to participate in an agricultural Extension education program on cassava processing.
4. To examine the relationship between selected demographic characteristics of rural women cassava processors and their readiness and intention to participate in an agricultural Extension education program on cassava processing.

5. To determine the proportion of rural women cassava processors who can be correctly classified as intending to participate in an agricultural Extension education program on cassava processing.

## Methodology

The target population for this study was rural women cassava processors in Zone III of Ondo State, Nigeria. No list of cassava processors was available from the Extension Service. Therefore, a sample of 224 individuals were purposively selected from areas with large concentrations of rural women cassava processors to participate in this study.

The research utilized descriptive and correlational methods. The study was conducted as a one shot case study. An interview guide was developed by the researcher and used as the measurement instrument. The interview guide consisted of two parts. The first part measured readiness factors of the rural women cassava processors and their intention to participate in an agricultural Extension education program. The second part gathered demographic information of cassava processors. The instrument was validated cooperatively by a panel of experts consisting of 4 faculty, 5 doctoral graduate students at The Ohio State University, 14 Nigerian Yoruba and English speaking experts, and 5 Extension personnel and community leaders in Nigeria. Based on the input from the panel of experts, minor modifications in wording were made to the instrument.

A pilot study, with 24 women cassava processors from Zone I of Ondo State Agricultural Development Project who were assumed to be similar to those in Zone III, was conducted to determine the reliability of the instrument. The internal consistency of the instrument using a Cronbach's Alpha coefficient was .81.

The data for the study was collected by face-to-face interviews between November 24 and December 11, 1992. All interviews were arranged to take place at the farm or processing location where the rural women processors operated.

Descriptive statistics, factor analysis, and discriminant analysis were used to analyze the data using the Statistical Package for Social Sciences (SPSS/PC+V3.0). Descriptive statistics were used to describe and summarize the demographic characteristics. Correlation coefficients were used to identify the inter-relationships among the characteristics being investigated. Factor analysis was used to identify and group or cluster a larger number of characteristics into a smaller number of homogenous sets and creating a new characteristic--a factor. Discriminant analysis was used to classify the rural women processors into two groups based on their values on various predictor characteristics.

## Findings

The following section summarizes the findings of the study. These findings are presented in order of the objectives and include: demographic characteristics, readiness factors, intention to participate in an agricultural Extension education program, relationship of individual characteristics with intention to participate, and proportion of rural women cassava processors who could be correctly classified.

### Demographic Characteristics

The characteristics of the rural women cassava processors are summarized in Tables 1 and 2. Table 1 presents the means and standard deviation for the demographic characteristics that were measured using ratio scales. The mean age of the rural women cassava processors was 41. The youngest respondent was 16 years of age and the oldest was 75 years of age. The mean length of time they had attended school was 4.1 years, with the maximum being 16 years and the minimum being 0 years. The average annual cassava processing income was ₦3772.0 (Nigerian naira) and ranged from ₦1,000 to ₦2,999. The mean years of processing cassava experience was 13.1. However, experience ranged from 1 to 40 years. The mean number of children that these rural women had was 4.7. They had farmed for an average of 17.7 years. They farmed an average of 2.2 hectares of cassava. The mean distance to the cassava processing

Characteristics	M	SD
Age	41.0	9.3
Years of Schooling	4.1	.3
Annual Cassava Processing Income (Nigerian naira)	3772.0	3261.7
Years of Experience in Processing Cassava	13.1	9.2
Number of Children	4.7	2.0
Years of Farming Experience	17.7	11.3
Number of Hectares of Cassava	2.2	2.0
Distance to Cassava Processing Activity (km)	4.0	2.8
Distance to Nearest Market (km)	7.2	16.7

location was 4.0 kilometers. The mean distance to the nearest cassava market was 7.2 kilometers.

Table 2 presents the frequency and percentages of the background characteristics of the respondents that were measured using nominal scales. The major source of income for 93.3% of these rural women cassava processors was from farming. Married rural women processors represented 89% of the processors'

population. A total of 61.2% of the respondents reported petty trading as their largest source of other income. The vast majority (87.1%) of the rural women processors processed their cassava at home.

### Readiness Factors

In conducting this study, the researcher assumed that each measured characteristic item could be decomposed into: 1) common and

Characteristics	f	%
Major Source of Income		
Farming	209	93.3
Other	12	5.4
Unavailable	3	1.3
Marital Status		
Married	200	89.3
Unmarried	22	9.9
Unavailable	2	0.9
Other Sources of Income		
Petty Trading	137	61.2
Fishing	1	0.4
None	27	12.1
Unavailable	59	26.3
Location of Cassava Processing Activity		
Home	195	87.1
Other	24	10.7
Unavailable	5	2.2

2) unique portions. Additionally, a sample of rural women cassava processors was studied rather than a population. Therefore, a maximum likelihood (common factors) factor analysis was conducted. This approach was recommended by Ford, MacCallum, and Tait (1986) when the measured variables (items) were assumed to be a linear function of unmeasured (latent) characteristics.

Two guidelines were selected for use in determining the number of factors to include in the analysis. First, only factors with eigen values greater than 1.0 were considered. Second, a scree plot of the eigen values was used to identify breaks or discontinuity in the factors. These two guidelines resulted in the identification of six factors underlying the rural women processors' readiness to participate in agricultural Extension education programs.

Based on the analysis described above, a second maximum likelihood factor model analysis was conducted using only the six factors identified above. Ford et al. (1986) indicated that if the factors are not thought to be orthogonal, they should be rotated using an oblique process.

An examination of items in the factor loading pattern matrix (Table 3) was used to understand the nature of the six factors. These factor loadings indicated the correlation between each item and the derived factors. As shown in Table 3, only items with factor loadings of .4 or higher were considered for labeling the factors. The factors were labeled by a panel of African graduate students as felt need, cooperation, sharing information, awareness, attitude toward innovation, and empowerment. The six factors accounted for approximately 40.3% of the variance in the rural women cassava processors' readiness to participate in an agricultural Extension education program. The interfactor correlations for the oblique rotated factors indicated low to negligible associations (Davis, 1971) ranging from .21 to .01, between factors. Therefore, those factors appear to be relatively independent in explaining the rural women processors' readiness to participate in agricultural Extension education programs.

## **Intention to Participate in an Agricultural Extension Education Program**

The rural women cassava processors were asked to indicate their level of agreement or disagreement with a statement indicating their intention to participate in an agricultural Extension education program on cassava processing. Since the statement on the interview guide was stated negatively, it was restated positively for the analysis and the responses were recoded as follows: 1=4, 2=3, 3=2, and 4=1. A score of one or two indicated the processors did not intend to participate in an agricultural Extension education program; a score of three or four indicated the processors did intend to participate.

The respondents' intention to participate in the cassava processing program is presented in Table 4. Two hundred (89.3%) of the respondents either strongly agreed or agreed with the statement. Twenty-four (10.7%) of the respondents disagreed or strongly disagreed. These findings indicated that a majority of the respondents intended to participate in an agricultural Extension education program on cassava processing.

## **Relationship of Individual Characteristics with Intention to Participate**

The discriminant analysis procedure was used to determine if a linear combination of the independent characteristics could be used to distinguish between those rural women who indicated they would participate and those who would not participate in an agricultural Extension education program on cassava processing. The independent characteristics included the six readiness factors identified by the factor analysis reported earlier and the demographic characteristics.

The pooled within groups correlation coefficients were examined to determine the relationship between characteristics and group (Table 5). The scale suggested by Davis (1971)

Table 3

## ROTATED FACTOR PATTERN MATRIX LOADINGS ORDER OF THE 25 ITEMS ON OBLIQUE FACTORS (N=224)

Items	Factor Loadings					
	1 <sup>a</sup>	2 <sup>b</sup>	3 <sup>c</sup>	4 <sup>d</sup>	5 <sup>e</sup>	6 <sup>f</sup>
Q6	.75					
Q5	.67					
Q21	.65					
Q9	.61					
Q16	.59					
Q29	.53					
Q30	.50					
Q15		.80				
Q22		.68				
Q12		.49				
Q24		.42				
Q4			-.79			
Q37			-.62			
Q20				.68		
Q35				.56		
Q23				.51		
Q32				.60		
Q33				.59		
Q10				.51		
Q28				.50		
Q2				.49		
Q11				.45		
Q8					.59	
Q13					.52	
Q18					.52	
Q38					.42	

Note: <sup>a</sup>Felt Need, <sup>b</sup>Cooperation, <sup>c</sup>Sharing Information, <sup>d</sup>Awareness, <sup>e</sup>Attitude Toward Innovation, <sup>f</sup>Empowerment

was used to describe the magnitude of the relationships between the discriminating characteristics.

The pooled within groups correlation matrix showed negligible to very strong relationships among the discriminating characteristics. As shown in Table 5, the correlation coefficient for years rural women have been processing cassava and years rural women have been farming indicated a very strong positive relationship (.83). Factor score 3 (sharing of information) and factor score 6 (empowerment) indicated a positive substantial relationship between sharing information among rural women processors and empowerment (.59). A negative substantial relationship existed between awareness of extension education programs on cassava processing (-.53). Also, a positive substantial relationship existed between years of processing cassava and processors age (.58) as well as a positive substantial relationship between years of farming and processors' age (.63).

A negative moderate relationship occurred between annual cassava processing income and factor score 1--felt need--(-.33) and factor score 2--cooperation--(-.33). Moderate positive and negative relationships were found between factor 3--sharing information among processors--and marital status (.37) and sharing information with years of farming (-.43). Also, factor score 4--awareness--and other sources of income had a positive moderate relationship

(.45). A negative moderate relationship occurred between factor score 4--awareness--and distance to nearest market (-.39). Also, there was a negatively moderate correlation between factor 6--empowerment--and years of school (-.35).

Moderate positive relationships were found between age of processors and major source of income (.30), number of children (.44), and distance to nearest processing location (.40). Likewise, annual cassava processing income had a positive moderate relationship to years processing cassava (.31), distance to cassava processing location (.30), and number of children (.30). A negative moderate relationship was found between rural women's marital status and years processing cassava (-.36). Additionally, other sources of income had a negative and moderate relationship with distance to nearest market (-.33).

A positive moderate relationship was found between the best time of the day for processors to work with Extension workers and years processors have been processing cassava (.32). Positive moderate relationships were also found between years processing cassava and number of children (.36) and between years processing cassava and distance to the nearest cassava processing location (.41). The data indicated that there were positive moderate relationships between number of children and years of farming (.43), number of children and size of farm (.38), and number of children and distance

Table 4

EXTENT TO WHICH RURAL WOMEN CASSAVA PROCESSORS INDICATED THEIR WILLINGNESS TO PARTICIPATE IN A CASSAVA PROCESSING EXTENSION EDUCATION PROGRAM (N=224)

Extent of Agreement	f	%
Strongly Agree	117	52.2
Agree	83	37.1
Disagree	11	4.9
Strongly Disagree	13	5.8

Note: Mean 3.4, SD .8



to the nearest cassava processing location (.41). A negative moderate relationships was observed between the number of children and the distance to the nearest market (-.30). Positive moderate relationships were found between years of farming and size of cassava farm (.30) and distance from processors' farm to the nearest processing location (.44). Finally, there was a positive moderate relationship between total size of cassava farm and the distance to the nearest cassava processing location (.40).

A summary table for the discriminant analysis is presented in Table 6. The standardized canonical discriminant function coefficients were examined to determine the relative importance of the discriminating characteristics in determining their contribution on the

discriminant function. Warmbrod (1993) indicated that only standardized structure coefficients whose absolute values are not less than one-half the largest value should be considered. Therefore, only structure coefficients greater than .36 were considered meaningful.

From an examination of the standardized discriminant function coefficients, it can be concluded that the most distinguishing (discriminating) attributes of those rural women processors who do not intend to participate had higher scores on attitude toward innovation and were married. Those rural women cassava processors who intended to participate had higher scores on felt need, cooperation, sharing information, had farmed for longer periods of time, and preferred evening meetings with the

Table 6  
SUMMARY DATA FOR DISCRIMINANT ANALYSIS (N=224)

Discriminant Function 1				
	b	S	Group	Centroids
Felt need	.62	.41	Do Not Intend to Participate	-.318
Cooperation	.52	.28		
Sharing information	.72	.05	Intend to Participate	2.452
Awareness	.21	-.10		
Attitude towards innovation	-.61	-.37		
Empowerment	.20	.33		
Age	-.29	.13		
Years of schooling	-.12	-.25		
Major source of income	-.05	.12		
Annual processing income	-.02	-.23		
Marital status	-.35	-.24		
Other occupation	.01	.16		
Best time of day	.33	.21		
Years processing cassava	-.10	.19		
Number of children	-.07	-.03		
Years farming	.64	.19		
Total size of cassava farm	.11	-.08		
Where process cassava	.16	.14		
Distance to processing location	.16	.08		
Distance to market	-.09	-.14		
Eigen Value	$R_c$	Wilks' Lambda	P	
.799	.6665	.556	<.002	
Note:	b = Standardized discriminant function coefficient			
	S = Within group structure coefficient			
	$R_c$ = Canonical correlation coefficient			

### Extension workers.

The significance test indicated that the two scores (centroids) were significantly different ( $p < .002$ ). The null hypothesis, that in the population from which the sample was drawn the mean discriminant centroids were equal, was rejected. The group centroids differed significantly on the discriminant function. This decision was based on the Wilks' lambda. The significance of Wilks' lambda was tested by converting it to a characteristic that had approximately a chi-square test ( $p < .001$ ) and the alpha level was less than .05.

The discriminant function explained approximately 44% ( $R_c = .666$ ) of the variance in the discriminant score. The proportion of variance not explained in the discriminant function was about 56% (Wilks' lambda). The eigen value was .80, which indicated that this function explained .80 times more than was not being explained.

### Proportion of Rural Women Cassava Processors Who Could Be Correctly Classified

The classification of cases is summarized in Table 7. Approximately 91% of the cases were correctly classified. Further examination of Table 7 revealed that 94% of the rural women processors who intend to participate

and 67% of the rural women processors who do not intend to participate were correctly classified. The tau statistic indicated that the classifications based on the discriminating characteristics resulted in 81% fewer errors than would be expected by random classification or by chance alone.

### Conclusions

This study sought to identify factors that influence rural women cassava processors' intention to participate in an agricultural Extension education program. The following conclusions were drawn based on the findings of the study:

1. The rural women cassava processors were educationally and economically disadvantaged.
2. The cassava processors had considerable experience and indigenous knowledge about cassava processing.
3. The majority of the rural women processors were married and had several children thus placing many competing domestic requirements on them, in addition to processing cassava.
4. Rural women processors had to transport the cassava several kilometers in getting it to the market.
5. The best time of the day to offer cassava processing Extension education programs was the evening.

Actual Group	Number of Cases	Predicted Group	
		Intend to Participate	Do Not Intend to Participate
Intend to participate	200	187 93.5%	13 6.5%
Do not intend to participate	24	8 33.3%	16 66.7%
Percent of Cases Correctly Classified: 90.6%			

6. Six factors were identified as influencing the readiness of the rural women cassava processors to participate in an agricultural Extension education program on cassava processing: felt need, cooperation, sharing information, awareness, attitude towards innovation, and empowerment.
7. The vast majority of the rural women processors indicated that they intended to participate in a cassava processing Extension education program.
8. The rural women processors who were most likely to attend agricultural Extension education programs on cassava processing were those having high felt needs, wanting to cooperate, willing to share information, wanting evening programs and farming for longer periods of time.
9. The rural women processors who were least likely to attend agricultural Extension education programs were those having lower attitude towards innovation and unmarried.
10. The rural women processors could be classified as to whether they intended to participate in cassava Extension education programs or not.

### Recommendations

The recommendations were based upon the findings and conclusions presented above. They include recommendations for future research, practice and theory.

### Future Research

1. Assessments of rural women cassava processors' needs for educational program planning should be conducted.
2. Efforts should be made by Extension educators and development experts to make rural women cassava processors more aware of educational opportunities.
3. This study should be replicated in the four remaining zones of Ondo State with high concentrations of cassava processors to verify the stability of the six factors in different contexts.
4. This study should be replicated in other developing countries with high concentra-

tions of cassava to verify if the factors that influenced Nigerian rural women cassava processors are the same in different contexts.

5. A follow-up study should be conducted to determine if the factors influencing rural women cassava processors change.

### Practice

6. Extension personnel should receive training on the six factors influencing rural women cassava processors to participate in an Extension education program on cassava processing.
7. The Ministry of Agriculture in Ondo State should initiate cassava Extension education programs since the rural women cassava processors indicated they intend to participate.
8. Representatives of rural women cassava processors should be invited by Extension personnel to assist in planning education programs on cassava processing since they indicated a willingness to assist in these efforts.

### Theory

9. It is recommended that other types of research (e.g., case studies, pre-experimental studies, and longitudinal studies) be implemented to investigate participation in Extension education programs.
10. Researchers should identify additional factors that could be used to help explain intended participation in Extension education programs.
11. Additional study should be conducted on the relationship of intended participation to actual participation.
12. The conceptual framework for future studies should be revised based on the results of this study.

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## SUMMARY OF RESEARCH SERIES

Extension education programs often are offered in Nigeria to help improve the economic and social conditions of rural farmers. However, a lack of participation by rural women farmers in these educational programs is problematic. This study identifies factors influencing rural women cassava processors' perceived intention to participate in an agricultural extension education program on cassava processing. It should be of interest to educators encountering similar problems in other countries.

This summary is based on a dissertation by Christian O. Ojomo under the direction of N. L. McCaslin. Christian Ojomo was a graduate student in the Department of Agricultural Education at The Ohio State University. He is currently Director of Education and Training, Atterbury Job Corps Center, Edinburg, Indiana. Dr. McCaslin is an Associate Professor, Agricultural Education, The Ohio State University. Special appreciation is due to David L. Doerfert, Iowa State University and Jamie Cano, The Ohio State University for their critical review of this manuscript prior to its publication.

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