

Women in Agriculture-Introduced Agricultural Processing and Marketing Innovations: The Rural Income Dynamics in Enugu State

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Abstract

This study examines women in agriculture-viewed agricultural processing and marketing innovations as affecting rural women's income in Enugu State. Women's participation in agricultural production can be seen across various subsectors: harvesting, processing, planting, weeding and marketing as well as live stocking. National Council on Agriculture in 1989 in the ADPs created Women-In-Agriculture programme in Enugu State to mobilize women farmers and enhance their socio-economic status. However, the problem facing rural women farmers is the need to transform their agricultural enterprise from depending on traditional inputs with low productivity to one based on modern inputs with higher productivity? The objective of this study to determine the effect of adoption of Women-in-Agriculture(WIA) introduced agricultural processing and marketing innovation on the rural farmers' income. This study adopts the social action theory. The researcher used descriptive survey method, the population of the study comprises of selected registered women farmers in Enugu State. Enugu state has membership strength of twelve thousand (12,000) members. The sample size was 300 members haven used the multi stage sampling technique. The result of the findings show that all innovative marketing and processing methods were effective yet positively affected farmers' income, meaning a slight increase in income generation. Based on the findings it is recommended that WIA should embark on training and re-orientation programme so as to equip farmers with necessary tools to help adopt innovations timely.

Keywords: Women-in-Agriculture, Agricultural processing, Agricultural marketing, Innovation, Farmers' Income.

Introduction

In some developing countries especially in Africa, women contribute significant role in production and processing of agricultural products (Rahaman 2008). Africa's women account for between 60 - 80 per cent of agricultural production (Sabo, 2006; Adisa & Okunade, 2005). In Sub-Saharan Africa, agriculture was still the most important sector for female employment (FAO, 2000). It is noteworthy, that food production and security in rural and urban areas of Nigeria depended largely on the women. Ekong (2003) affirms that the roles of women in agricultural production include land preparation for farming, weeding, harvesting, planting of crops and vegetables, processing of harvested crops and storage, transportation of agricultural produce, fishing, fish processing and marketing of sea foods, processing and sale of dairy products and homestead livestock husbandry.

Soubh (2006) submitted that women make significant impact in agricultural production that cuts across various subsectors like planting, weeding, harvesting, processing, and marketing as well as tending livestock. This led to necessitate their participation and integration into planning processes, policies, and programme formulation for effective and sustainable development of a nation (FAO, 2003).

Consequently, Roy (2006) emphasizes that women constituted nearly half of the population, they could become a great resource in the development process if properly mobilized and organized. Perhaps this admonition together with various problems affecting women farmers led to establishment of programmes like the Women-In-Agriculture (WIA) programme. Women-In-Agriculture programme significant purpose was to contribute to the welfare of women and to strategically place them in the agricultural development industry.

According to Agu, (2001); Adisa and Okunade 2005) the Women-In-Agriculture programme was formed by the National Council on Agriculture in 1989 in the ADPs. The specific objectives were to: (i) develop gender specific programmes and technologies for women farmers in close relationship with research institutions, (ii) promote the use of suitable technologies which would meet the needs of women farmers; (iii) provide assistance in connecting women farmers to sources of credit; (iv) support group and individual women activities intended at increasing the animal protein resources of the country; (v) increase agricultural production and income of women farmers; (vi) improve the skills of women in food processing, utilization and marketing (vii) organize women into cooperative societies for purpose of attaining credit and information; and (viii) encourage women farmers to keep livestock in order to increase the nutritional status of the family.

The Enugu state WIA programme was established under the Enugu state Agricultural Development Project (ENADP) in 1991. The key purpose of WIA still remains to form women group and assist them establish group-farms. In these groups, WIA extension agent transfers recommended technologies to the women for adoption.

However, transforming agricultural enterprise from depending on traditional inputs with low productivity to one based on modern inputs with higher productivity remains the problem facing rural women farmers (Uwegbuonu 2010). Hence, this study which seeks to identify and establish the effect of adoption of Women-in-Agriculture introduced agricultural processing and marketing innovation on the rural farmers' income in Enugu State.

Objectives of the Study

To determine the effect of adoption of Women-in-Agriculture (WIA) introduced agricultural processing and marketing innovation on the rural farmers' income.

Research Question

What are the relationships between adoption of Women-in-Agriculture(WIA) introduced agricultural processing and marketing innovation and the rural farmers' income?

Hypothesis of the Study

Ho₁ Adoption of WIA introduced agricultural processing and marketing innovations do not have significant positive relationship with rural income.

REVIEW OF RELATED LITERATURE

Conceptual Review

Women in Agriculture (WIA) Programme

The women in agriculture (WIA) is a sub-component of the Agricultural Development Programme (ADP) and was instituted in 1988 to address precisely gender related agricultural problems. The focus is on food nutrition, storage and utilization of crop, processing and livestock produce in order to raise women's income and living standards through business oriented farming and processing strategies. Akpabio, Etim & Okon (2012) asserts that various efforts have been made to elicit various types and

levels of information on the activities and its effectiveness in specific limited areas or states of Nigeria with the introduction of the WIA programme and current emphasis on participatory extension.

Odunkwe, Matthew-Njoku & Ejiogu-Okereke (2006) contends that the Agricultural Development Projects (ADPs) of different states of the federation of Nigeria had made important advances in incorporating gender in agricultural extension by adapting the system midstream to provide for women farmers through the creation of Women-In-Agriculture (WIA) programme in the department of extension service of the state ADPs with a gender focus.

The WIA programme sought to develop agricultural extension services for women; it also inclines to increase food production, food self-sufficiency and sustained reduction of poverty and malnutrition among women. Female gender led to the retraining of existing home economics agent in agriculture and extension methodologies, placing special emphasis on women's activities (Saito, Gadzame & Odunkwe 2006) which was maintained through the WIA programme in every state of Nigeria is meant to have female extension workers at every level of operation from state headquarters in the capital down to the villages.

At headquarter, the WIA head holds the rank of deputy director within the state ADP and is responsible for the overall planning and implementation of the WIA programme. They are assisted by subject matter specialist who work for WIA at the zonal level, supervising and monitoring the implementation of the WIA programmes in their various zones. These specialists interact with research and technology institutions, participate in problem identification and field training and provide support to WIA Block Extension Agents (BEAs) At the block level, these BEAs agents work directly with women farmers, identifying and organizing women into groups and registering them into women farmers (Odunkwe 2006). They observed that through formation of WIA farmer's groups that the BEAs facilitates the dissemination of agricultural innovation and provides women farmers with better access to farm inputs and credit than they would have as individuals.

Concept of Agricultural Technology Adoption

Mwangi and Kariuki (2015) define technology as the means and methods of producing goods and services, including method of organization as well as physical technique. According to them, new technology is new to a particular place or group of farmers or represents a new use of technology that is already in use within a particular place or amongst a group of farmers. Technology is assumed to mean a new, scientifically derived, often complex input supplied to farmers by organizations with deep technical expertise Parvan (2011). To him, the majority of existing literature on agricultural technology adoption is focused on Green Revolution (GR) technologies such as irrigation, fertilizer use and adoption patterns of High Yield Variety (HYV) seeds.

According to (Lavison, 2013), technology can be defined as the information that licenses some tasks to be accomplished more easily, some service to be rendered or the manufacture of a product. Effective technologies obligation is to aim at improving a given situation. It can assist the applicant or the user to do work easier and faster than he would have in the absence of it.

Several attempts have been made from authors of various disciplines in conceptualizing adoption. Of all the efforts, (Onyeze, 2012) observed that they tend to show that adoption process follows the same general pattern regardless of the means of communication and the cultural setting. According to (Bonabana-Wabbi, 2002), adoption is a mental process an individual passes through from the first hearing about innovation to the final utilization of it. To Onyeze, it is the decision to use a new idea or practice on a continuous basis. Mwangi & Kariuki(2015) define adoption as the integration of a new technology into existing practice and usually proceeded by a period of trying and some degree of adoption. They classified adoption into two categories; rate of adoption and intensity of adoption. The former is the relative speed with which farmers adopt an innovation, has as one of its pillars the element of 'time'. On the other hand, intensity of adoption refers to the level of usage of a given technology in any period (Bonabana-Wabbi 2002).

Women's Contribution to Household Economy, Food Production and Food Security.

Rural women in Ondo State of Nigeria are very resilient pillars of the economy in the State (Afolabi, 2008). Working in ordered groups, engaging in more than one economic activity are suppliers to food production; have successfully managed human and economic resources to achieve optimum results; became employers of labour, thereby reducing unemployment; these rural women's farms have contributed to reduction in food shortage crisis and contributing noticeably to national agricultural output, maintenance of the environment and family food security (Todaro, 1994). In Sub-Saharan Africa, women contribute 60-80% of the labour used to produce food, where agriculture accounts for approximately 21% of the continent's GDP (FAO, 2003). Proportion of the economically active labour force in agriculture ranges from 48% in Burkina Faso to 73% in the Congo and 80% in the traditional sector in Sudan while estimate of women's contribution to the production of food crops range from 30% in the Sudan to 80% in the Congo. Available data support the trend throughout Africa that: smallholder subsistence women farmers substantially contribute to national agricultural production and food security and are primarily responsible for food crops (FAO, 2003). The responsibility for the production of household food supply lies with women in most of SSA. As providers of food and nurturers of children, women ought to play a role in any attempt to increase food production and food security (Kotze, 2003). Women carry out a variety of agricultural labour aside from household duties,

performing almost all tasks and activities associated with subsistence production, up to 70% of food consumed by families in rural areas and produce more than 74% of household food in African countries (Todar 2015, Geier, 2014 and Melamed, 2016). The gender division of labour and social responsibilities in the household is to a large extent the deciding factor in women's commitment to subsistence production and to fulfill their responsibility to feed the family and ensure food security for the household. Women in the Low-Income Food-Deficit Countries (**LIFDCs**) in rural areas, are therefore over-burdened with tasks in agriculture, animal husbandry and with a wide range of activities in the household (Gueye, 2003). Belonging to disadvantaged groups in most rural communities in LIFDCs they are main poultry owners in LIFDCs, though there are variations within and between countries.

More than the 70% of chicken owners in rural areas of SSA are women (Gueye, 2003). On the whole, women's involvement in poultry farming tends to decrease with increased levels of intensification. Any serious attempt to eradicate poverty must address the role of women in policy and decision-making, as producers of food and as income earning capacity for women (Yemisi & Aisha, 2009). Any program to increase food security among the poor, particularly the rural poor, must ensure not just representation but full participation of women. (Kotze, 2005) concluded that the role of women in the household economy and their contribution towards food production and food security as a matter of urgency need to be acknowledged in any policy, program and project aimed at promoting food security and rural and agricultural development.

Empowerment of Women

A key factor in the concept of women empowerment is that gender empowerment relates to the ability of women to accomplish with their lives. While empowerment has been described as both a process and a state in the literature. World Bank Institute, (2007); Duflo, 2005, & Kabeer (2005) views empowerment to involve an improvement in women's ability to manage their own lives obtained through increased access to key resources and activities. The understanding of women's empowerment gives a direct link between equality of opportunities and empowerment. The process of empowering women will improve their access to agricultural inputs, education, access to formal sector employment, access to entrepreneurship, access to finance, control over fertility which entails an expansion of women's opportunities in the direction of equal prospects compare to men.

Empirical Review

There have been various researches on the on the participation of women farmers in Agricultural production programme. Women in Agriculture (WIA) is a branch of Agricultural Development Project (ADP). The WIA was established in 1989 to put into efficient use, the full potentials of women farmers into agricultural production (ENADP, 1995). WIA provides vital information to women farmers in relation to crop production, livestock production, pest and disease control, processing, storage and marketing programme of ADP. This is to increase the agricultural production capacities of these women farmers, hence helping these women farmers to build better lives for themselves, their families and their communities (World Bank Institute, 2007; Duflo, 2005, & Kabeer 2005

Ovwigho and Ifie (2014) in their study sought to determine the effects of the Women-In- Agriculture programme on the welfare of the participants. Simple random sampling was used in selecting the respondents who were involved in the WIA programme in 2007. The sample was made up of 32 WIA participants consisting Barracks cell (9), Ekpan cell (6), Ukpologposo (5), Ugbomro cell (7), and PTI cell (5). Data were collected by the use of structured interview schedule. Data were measured by a four-point rating scale and socio-economic status indicators. Data were analyzed by use of simple percentage, mean, Chi square and t-tests. The age distributions were 26-35 years (6.25%), 36-45 years (15.63%) and over 45 years (78.13%). The participants agreed that the programme was beneficial because it enhances access to new technologies and group learning ($M=3.56$), increase access to credit ($M=3.47$), access to land ($M=2.88$), and boost production ($M=3.71$). There was a significant relationship ($P < 0.05$) between memberships of group society, and access to land ($\chi^2 = 7.036$, $r = 0.47$), and credit facilities ($\chi^2 = 20.401$, $r = 0.80$). There was a significant difference ($p < 0.05$) in the welfare of participants before and after participating in the WIA programme ($t = -6.941$). Similar programmes should be established and more women should be encouraged to join the WIA programme so that they could reap the gains of agricultural production through involvement in group farming.

Ifenkwe (2012) highlights organizational barriers limiting women's participation in Women-in-Agriculture (WIA) program in Abia State, Nigeria. Multi-stage random sampling technique was adopted in selecting one hundred and twenty women farmers studied. Simple statistical tools (frequencies and percentages) were used in data analysis. The results showed that agency-related and organizational problems accounted for over 80% of the constraints limiting participation in the program. They also differ significantly from client or farmer-related problems. Considering the huge financial investments in the agricultural sector, and the Federal Government's policy thrust on food security, the paper recommends involvement of all stakeholders who must contribute their quota towards sustainable food security in Nigeria.

Ajah (2010) conducted a study to evaluate the impact of the programme on women farmers' yield, income and decision-making power. Multi-stage sampling technique was adopted for sample selection while semi-structured questionnaires were used for data collection. Data collected from 225 contact women farmers were analyzed using Analysis of Variance (ANOVA) and tested at 5% level. Mean separation was equally done with Fisher Least Significant Difference (FLSD). Generally, the grand mean perception value (4.21) indicated that women farmers perceived positive changes in their farm yields, income and decision-making power because of the influence of WIA Programme. Analysis of Variance on pooled data indicated that women farmers perceived significant differences ($P < 0.05$) in the changes in yield, income and decision-making power. The result, as well, showed that women farmers in the different State's agricultural zones in South-eastern Nigeria perceived significant differences ($P < 0.05$) in the changes in yield, income and decision-making power. Mean separation results showed that women farmers perceived the impact more on yield with perceptual mean value of 4.38a. It also revealed that women farmers in Oji agricultural zone in Enugu State had the highest impact in the Southeastern Nigeria with mean perceptual value of 4.61a. Based on the results, the paper strongly recommended that the implementers of the programme should be highly motivated in order to guarantee the sustainability of the programme for agricultural development.

Sabo (2007) compared the performance of the Women-In-Agriculture (WIA) programme in Borno State, Nigeria during and after World Bank funding, 1989-1995 and 1996-2003, respectively. Structured questionnaires were administered to 20 randomly selected WIA agents of Borno State Agricultural Development Programme. Data collected were analyzed using descriptive and inferential statistics. The analysis revealed that most of the WIA activities during the World Bank funding period recorded a high performance index, such as establishment of Small Plot Adoption Techniques (SPAT) (73.10%), establishment of cottage industries (75%) and number of field visits made by the WIA agents (68%). However, after the World Bank funding period, most target set were not achieved, recording (0) achievement rate in (5) activities, such as establishment of cottage industries and equipment of the fortnightly training centers. Based on these findings, it is recommended that funding of the WIA project by the World Bank, Federal, State and Local government should be reactivated. The government should ensure access of women farmers to extension services, inputs and training opportunities.

Odunkwe, Mathews & Okereke (2000) in a research study investigated the impact of the Women in Agriculture (WIA) extension programme on women's live in Imo State. The finding revealed that women farmers take part in almost all the phases of agricultural crop production, livestock production, pest and disease control, processing, storage and marketing activities.

Ukonze, (2001) carried a research on strategies for improving the participation of women farmers in rural production systems in Njikoka Local Government Area of Anambra State. Her findings showed that women farmers take part in the production of yam, cassava, maize, vegetable, coconut and fruits. The women farmers also practice goat and sheep production.

Fabiyi, Danladi, Ahande and Mahmood (2007) examined the role of women in agricultural development and their constraints: A case study of Biliri Local Government Area, Gombe State, Nigeria. Finding reviewed that Men alone cannot achieve success in farming without women. therefore; there is the need to encourage women farmers, by making available all that is necessary for successful farming. Findings revealed that women farmers were found to have more access to technologies of controlling of pests and disease in improved livestock housing unit and cassava processing than their male counterparts.

Theoretical Framework

This study adopts the social action theory. This theory was led by Max Weber in 1932. The social action theory is a communal oriented model that is used to surge the problem solving ability of entire communities through achieving tangible changes towards social justice. That is, when group of people within communities come together to restore the inequity of power or privileges, between a deprived groups and society at large. Although this community-organization model is applicable to many social issues, that are disproportionately affecting certain communities. The social action theory applies key concepts and tents that are used within many community-buildings models. As described in the literature (Minkler, Wallerstein and Wilson, 2008; Glanz,2008) these key concept include empowerment, social capital, issue selection and critical consciousness, community capacity, participation and relevance, which are defined below.

1) **Empowerment** is any social process that allows people to gain mastery over their lives and their community. In doing so, empowerment aims to transform power relations between communities may feel more endowed when they work collected to strengthen their cultural identity and their community possessions.

2) **Critical Consciousness** is a psychological state by which members in a community identify the need for social change and are ready to work to achieve those changes. It is completely necessary in achieving community involvement although this process is not obvious. We can raise critical

consciousness by engaging individuals in forums, dialogues, and discussions that clearly tell how difficulties and their root cause can be resolved through social action.

3) **Community Capacity** is characteristics of a community that affect their ability to identify, solve, mobilize and social problems. These characteristics include the presence of leadership, skills, participation, sense of community, and more. Community capacity can be enhanced in many ways, such as through skill-building workshops that allow members of the community to become more effective leaders.

4) **Social Capital** is community possessions that exist through relationships formed between community members. Social possessions such as reciprocity, trust and civic engagement can connect to individuals in a fragmented community across social boundaries and power hierarchies, facilitating community building and organization. Social networking techniques and enhancing social support are important method that builds social capital.

5) **Issue selection** is the process by which communities identify winnable, specific goals that unify and build community strength. In this process, individuals work together to select issues they feel are relevant to the entire community.

Relevance of Social Action Theory

The relevance of social action theory to this study, individuals may feel more empowered without discernment when they work collectively as a group to reinforce their business thereby improving their economic position. There is no discrimination in joining cooperative. So, joining cooperative praises critical consciousness in an individual.

RESEARCH METHODOLOGY

Research Design

The researcher used descriptive survey method which involves gathering and relating the characteristics of the population because it is the most appropriate.

Area of Study

The study area is Enugu State and is one of the five (5) states that made up South Eastern Geopolitical zone of the Federal Republic of Nigeria. There are seventeen (17) Local Governments Areas and two hundred and one (201) communities in Enugu State.

Population of the Study

The population of the study comprises of selected registered women farmers in Enugu State. Enugu state has membership strength of twelve thousand (12,000) members according to data from Enugu State Agricultural Development Programme ENADP (2015).

Sample Size Determination

To determine the same size, for the purpose of questionnaire distribution, the multi-stage sampling technique was used. The first stage comprise of selecting agricultural zones from the senatorial zones of the state. In the second stage, a sub-sampling also called a two-stage sampling was carried out by judgmentally selecting two Local Government Area (LGAs) each from the agricultural zones making a total of six. In the third stage otherwise called the three-stage sampling, the simple random sampling technique was used to select two towns each from each of the six selected local governments in the agricultural zone. The fourth stage was a random selection of two women groups from each of the two communities. Finally, the total membership size of the six women groups which is three hundred (300) was selected for the study.

Method of Data Collection

The researcher used both primary and secondary source of data collection. Primary data were sourced through the structured questionnaire which was administrated to the women farmers, while secondary data were obtained from reviews of relevant textbooks, journals, seminar papers, articles and web pages on the internet were extensively used.

Reliability of Research Instrument

The reliability of research instrument was established using test-re-test method. Copies of the questionnaire for the study were administered to respondents who are participants in the present study. The same instrument was administered to the same respondents after two weeks. Data were collated and tested for reliability using Pearson Correlation. The coefficient of their responses was 0.846 which is adequate.

Table 1: Correlations to test reliability of the instrument

| | A | B |
|---------------------|-------|-------|
| A | | |
| Pearson Correlation | 1 | .846* |
| Sig. (2-tailed) | | .029 |
| N | 40 | 40 |
| B | | |
| Pearson Correlation | .846* | 1 |
| Sig. (2-tailed) | .029 | |
| N | 40 | 40 |

*. Correlation is significant at the 0.05 level (2-tailed).

Method of Data Analysis

Data collected were analyzed using descriptive statistic such as frequency, tables and percentages were used. Correlation and Likert scale model were used for further analysis. The Likert rating scale was as follows:

Strongly Agree

(SA) 5 points

| | |
|----------------------------|-----------------|
| Agree | (A) 4 points |
| Neither agree nor Disagree | (NAND) 3 points |
| Disagree | (D) 2 points |
| Strongly Disagree | (SD) 1 point |

DATA PRESENTATION AND ANALYSIS

Table 2. Distribution of respondent according to Socio-Economic Characteristics

| 1. Sex | Frequency | Percentage |
|---|-----------|------------|
| Male | - | - |
| Female | 300 | 100 |
| Total | 300 | 100 |
| 2. Marital Status | | |
| Single | 100 | 33.33 |
| Married | 200 | 66.66 |
| Total | 300 | 100 |
| 3. Age (years) | | |
| 18- 30 | 170 | 56.66 |
| 31 - 50 | 100 | 33.33 |
| 51 - 70 | 30 | 10 |
| Total | 300 | 100 |
| 4. Farm Experience (in years) | | |
| 1-2yrs | - | - |
| 3 -5yrs | 125 | 41.66 |
| 6 - 10yrs | 100 | 33.33 |
| Above 10yrs | 75 | 25 |
| Total | 300 | 100 |
| 5. Highest Educational qualification | | |
| No formal education | 100 | 33.33 |
| FSLC (primary) | 80 | 26.66 |
| SSCE (secondary) | 100 | 33.33 |
| OND/NCE | 20 | 6.66 |
| B.Sc/HND | - | - |
| Total | 300 | 100 |
| 6. Occupation | | |
| Farming | 180 | 60 |
| Trading | 90 | 30 |
| Civil service | 20 | 6.66 |
| Pension | 5 | 1.66 |
| Others (crafts) | 5 | 1.66 |

| | | |
|---|------------|------------|
| Total | 300 | 100 |
| 7 Annual Income (₦) | | |
| 10,000 - 100, 000 | 150 | 50 |
| 101,000 - 200,000 | 100 | 33.33 |
| 201,000 - 300,000 | 50 | 16.66 |
| Total | 300 | 100 |
| 8 Household Size (children/dependents) | | |
| 0-4 | 50 | 16.66 |
| 5 -8 | 150 | 50 |
| 9 - 10 | 100 | 33.33 |
| Above 10 | - | - |
| Total | 300 | 100 |
| 9 Year Experience | | |
| 1 -3 | 80 | 26.66 |
| 4 – 6 | 170 | 56.66 |
| 7 and Above | 50 | 16.66 |
| Total | 300 | 100 |

Source: Field Survey data, July 2016.

Table 2 shows Marital status of the respondents shows that 33.33% of them are single and 66.66% are married, the table also shows that 56.66% are between 18-30 years, 33.33% are between 31 - 50, while 10% are between 51 -70. The farm experience of the respondent are 0% between 1-2years, 41.66% between 3-5years, 33.33% between 6 - 10years and 25% above 10years. Their educational qualification shows that some of the respondent that did not go to school are 33.33%, those that attended primary school are 26.66%, secondary school 33.33%, 6.66% have OND/NCE certificate and 0% have B.sc/HND. On the occupation of the respondents, 60% of them are farmers, 30% of them are traders, 6.66% of them are civil servants, 5% of them are pensioners and 5% are others (craft). The annual income of the respondents states that 50% have ₦ 10,000 - ₦100,000 annually, 33.33% have between ₦101, 000- ₦200, 000 annually, while 16.66% have between ₦201,000- ₦300,000 annually. On the family size (children/dependents) of the respondents, 16.66% have between 0-4 children/dependents, 50% have between 5 -8 children/dependents, 33.33% have between 9 - 10 children/respondents. The analysis revealed that none of the respondent have above 10 children/dependents. The table also showed that the experience of respondent on group experience are 26.66% of them have 1-3 years of experience, 56.66% have 4-6 years experience while 16.66% have 7 and above years experiences.

Table 3 Mean Responses to effectiveness of Marketing and Processing Innovations in Output disposal.

| S/N | Factors | N | Mean | | Decision |
|-------------------|---|------------|---------------|---------------|------------------|
| 1 | Grading and packaging of produce | 300 | 3.5833 | .63593 | Effective |
| 2 | Bulking and selling to processing firms | 300 | 3.5300 | .58616 | Effective |
| 3 | Semi processing of produce before disposal | 300 | 3.4533 | .63443 | Effective |
| 4 | Exploring markets outside the local community | 300 | 3.3667 | .73985 | Effective |
| 5 | Collaborating with local cooperatives on produce disposal | 300 | 3.1567 | .83333 | Effective |
| 6 | Producing according to the needs of processors | 300 | 3.4900 | .73373 | Effective |
| Grand mean | | 300 | 3.4180 | .36182 | Effective |

Source: Field Survey data July, 2016.

Table 3 displays the mean responses to effectiveness of marketing and processing innovation in output disposal. The factors such as grading and packaging of produce, bulking and selling to processing firms, Semi processing of produce before disposal, Exploring markets outside the local community, Collaborating with local cooperatives on produce disposal, Producing according to the needs of processors obtained at three (3) units respectively. It implies that all the factors for marketing and processing innovations are effective.

Test of Hypotheses

Table 4: Correlations to Test Hypothesis

| | | Marketing/ processing | Annual Income |
|--------------------------|---------------------|--------------------------|---------------|
| Marketing/proc essing | Pearson Correlation | 1 | .200** |
| | Sig. (2-tailed) | | .000 |
| | N | 300 | 300 |
| Income | Pearson Correlation | .200** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 300 | 300 |

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4 displays a weak and positive relationship between marketing/processing innovations introduced to farmers. It implies that their participation in marketing/processing weakly correlate with farmers' income. Therefore, it would be stated that WIA introduced marketing and processing

innovation's weak but positive relationship with farmers' income means that as the farmers adopt these innovations there is slight increase in income generation, which could be described as weak.

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

Summary of Findings

From the analysis of the study, WIA introduced marketing and processing innovation's weak but positive relationship with farmers' income means that as the farmers adopt these innovations there is slight increase in income generation, which could be described as weak. This is in line with the findings of Onwuka, Otaokpukpu, and Okonkwo (2017), to which women farmers' access to land will help them to adopt the new innovations.

Conclusion

The findings of this study can conclusively state that adopting Women-in-Agriculture (WIA) introduced agricultural processing and marketing innovation has affected the rural farmers' income positively.

Recommendations

Based on the findings it is recommended that WIA should embark on training and re-orientation programme so as to equip farmers with necessary tools to help adopt innovations timely. Also, WIA should provide adequate storage facilities and free land through the help of the government to enable them avoid waste and also ensure food security, as well as ensure increase productivity and adaptation of innovation in the study area just recommended by Onwuka, et. al. (2017).

REFERENCES

- Adisa, B, Okunade, E.Q & Sabo, E (2006) *"Participatory assessment of the impact of women in agriculture programme of Borno state Nigeria Journal of tropical Agriculture"*.
- Afolabi, M. M (2008) *"Women as pillars of national economy in Nigeria: A study of economic activities of rural women in Ondo State"*.
- Agu, V.O. (2001) The Nigeria women in agriculture programme: Projects coordinating units perspective. *A paper presented at the Nigeria women in Agriculture review workshop organized by the work bank FA CU and ADPS.*
- Akpabio, I.A., Etim, N.A & Okon, S. (2012). "Perceptions of constraints affecting adoption of women-in-Agriculture programme technologies in the Niger Delta, Nigeria". *International journal of Agricultural Management & Development.*

- Bonabana-Wabbi, J. (2002). "Assessing factors affecting adoption of agricultural technologies: The case of integrated pest management (IPM) in Kumi District".
- Ekong, E.E. (2003) *An Introduction to rural Sociology* Uyo. *Dore Educational Publishers*.
- FAO (2000) "*Filling the data gap: gender sensitive statistics for agricultural development Rome*"
- FAO (2015). "Women in Agriculture in Pakistan". Islamabad Report, 1-136. Doc No: 14330E/1/01/15.
- Gueye, E.F. (2003) "Gender issues in family poultry production system in low-income food-deficit counties. *American journal of Alternative Agriculture*"
- Kotze, D.A. (2003) "Role of women in the household economy, food production and food security: *policy guidelines outlook on agriculture*".
- Lavison, R. (2013). "Factors influencing the adoption of organic fertilizers in vegetable production in Accra, Ghana". Msc Thesis, University of Agriculture, Accra.
- Mwangi, M & Kariuki, S. (2015). "Factors determining adoption of new agricultural technology by smallholder farmers in developing countries". *Journal of Economics & Sustainable Development*.
- Odunkwe, S.N., E.C. Mathew-Njoku & N. Ejioku-Okereke, (2006) *impact of women in Agriculture (WIA) extension programme on women's lives: Implications for subsistence agriculture production of women in Imo State Nigeria*.
- Odurukwe S. N, Matthews-Njoku E. C & Ejiogu-Okereke N. (2013). Impacts of the women cooperative on the lives of women in Imo State Nigeria. Department of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria.
- Onwuka, Franca Ndidiamaka, Otaokpukpu, Justina Njideka & Okonkwo, Chukwudi Joseph (2017), Effectiveness of Extension Services in Enhancing the Productivity, Income and Welfare of Women Farmers Cooperatives in Kajuru Local Government Area of Kaduna State. *IIARD International Journal of Economics and Business Management* ISSN 2489-0065 Vol. 3 No. 8 2017 www.iiardpub.org
- Onyeze, C.N. (2012). "Adoption of Agricultural innovation by women-in-Agriculture (WIA) group in Enugu State, Nigeria". Unpublished Ph.D Dissertation, Nnamdi Azikiwe University, Awka.
- Parvan.A. (2011). "Agricultural technology adoption: Issues for consideration when scaling-up". *Journal of the cornell Institute for Public Affairs*.
- Rahaman, S.A. (2008) "*Women's Involvement in agriculture in Northern and Southern Kaduna State*". *Journal of Gender Studies*.
- Wikipedia, (2016). "Enugu State". Retrieved from https://en.wikipedia.org/wiki/Enugu_State
- YemisiI. O. & Aisha A. M.(2009). Gender Issues in Agriculture and Rural Development in Nigeria: the role of women *Humanity & Social Sciences Journal* 4(1):19–30.