



Agricultural Co-Operatives and Training of Male and Female Farmers on Improved Rice (*Oryza sativa*) Production Techniques in Ini Local Government Area, Akwa Ibom State, Nigeria

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ABSTRACT: This study assessed the extent to which agricultural cooperatives carry out the training of male and female farmers on improved rice (*Oryza sativa*) production techniques in Ini Local Government Area of Akwa Ibom state, Nigeria using research questions for 2,500 (male and female) rice farmer cooperative members in the study Area. Data analysis for 1600 completed questionnaire collected revealed that male and female farmers were not efficiently trained by agricultural cooperatives on improved rice production techniques. Moreover, there were no significant difference on the extent of carrying out the training of male and female farmers by agricultural cooperatives on improved rice production techniques in Ini Local Government Area. It is recommended among others that Agricultural cooperatives should organize periodic training sessions for rice farmers through the use of facilities and demonstration in the farm. The Government, through The Ministry of Agriculture should encourage and support agricultural cooperatives by providing materials and adequate funding to enable them perform their primary assignment creditably.

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Rice (*Oryza sativa*) is a food source in Africa, it ranks among the most important staple food for about half of the human race (Dimelu *et al.*, 2014; Daramola, 2005) and is essential for food security, poverty alleviation, improved livelihood and can enhance the socio-economic status of individuals and families. Today, rice availability and acceptability cut across all cultural boundaries and is a food item that many people count on as regular meals. In Ini Local Government Area of Akwa Ibom State, rice cultivation and production is an important agricultural enterprise, and almost all families own at least a rice farm. The high taste and competition from imported sources have made the locally produced rice not to be in high demands,

compared to the foreign brand. During production of rice, there are certain techniques that the farmer must acquire. These include rice nursery preparation, rice seedlings transplanting, field management, processing and storage. Application of these techniques naturally will lead to improvement in rice production. Rice constitutes the principal food for about half of the world's population (Udo *et al.*, 2005). Rice has a perennial growth habit although it is normally cultivated as an annual crop. Land preparation generally comprises a combination of land clearing, tillage and or the use of herbicides (Kebbeh, *et al.*, 2013). Better yield of rice greatly depends on agronomic and management practices of land

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preparation, sowing date, adequate plant density and spacing, use of appropriate cultivator, water management, application of adequate rate of fertilizers, appropriate height of cutting, control of diseases, insect and weeds (Castillo *et al.*, 2010). Maas (2016), reported that if there is too much salt in the irrigation water, particularly during the early seedling and pollination stage, it will produce salinity stress which may reduce rice growth and yield. Rice cultivation in Ini Local Government Area have not been anchored on modern skills thereby affecting production. The practice is characterized by poor growth and low yield. The current state of affairs where the farmers in the area have small farm holdings and little capital to go into large scale mechanized rice production constitutes limiting factor in production. Moris (2011), explains that for the seedlings, the nursery has to be prepared first before rice seeds are planted. It is the preparation of the nursery that most farmers in Ini Local Government Area, may not be proficient. This deficiency could lead to loss of plants especially when the Swamp rice variety is used. Moris (2011) observed that the traditional method of raising rice nursery is by soaking the rice seeds in water for 48 hours. This will make them ready for transplanting within 40-45 days of sowing. However, improved methods of raising nursery is by using primed seeds which have been treated with Calcium Chloride (CaCl₂) and Potassium Chloride (KCl) for both coarse and fine varieties of rice. The transfer of rice seedlings (germinated seeds) from the nursery to the main field is known as transplanting. Udo *et al.*, (2005) recommended that Swamp rice should be transplanted between 35-40 days. However, the area is rain-fed, the transplanting should be done between July in southern Nigeria where Ini Local Government Area is located. Veramani (2010) explained that direct seeded rice (DRS) is an alternative method to transplanting. In this method, the rice is grown like any other upland crop, the seed is placed in the soil by seed cum fertilizer drill with or without ploughing. Direct seeded crop grows faster, reduce labour and crop matures early by 7-10 days.

After harvesting, rice has to be processed before it can be eaten. Seeds of rice plant are first milled using rice huller to remove the chaff (the center husks of the grain). At this point in the process the product is called brown rice (Rajendran, 2015). The milling may be continued by removing the bran (the rest of the husk and the germ) thereby creating white rice. White rice which keeps longer lack some important nutrients. Ezedimma (2018), reported that paddy is the output of rice production at the field after harvesting, threshing and winnowing. In traditional methods Udo *et al.*, (2005) explained that rice is shelled by hand by heating

and winnowed by throwing into the air and blowing. Today, the entire activities are mechanized and tediousness eliminated. Almost all rice producing households in Nigeria store rice in some form and for various purpose. Logan (2014) asserted that the most common purpose for storage among subsistence farmers is to sustain the seed for subsequent planting season. Otti (2012), stressed that storage is needed to allow a smooth and as far as possible uninterrupted flow of the product into the market. Farmers may be forced to sell all products at harvest at whatever price because of lack of storage facilities. The training farmers programme will undoubtedly enable them to improve the skills of getting rice products with adequate moisture content, devoid of all foreign matter, and with acceptable appearance as well as attractive packaging in order to boost the market value.

Rice cultivation in Ini Local Government Area have not been anchored on modern skills thereby affecting production. The practice is characterized by poor growth and low yield. The current state of affairs where the farmers in the area have small farm holdings and little capital to go into large scale mechanized rice production constitutes limiting factor in production.

Hence, agricultural cooperative society training of rice farmers is very important to acquaint them with modern rice production techniques. Therefore, the objective of this paper is to assess the extent to which agricultural cooperatives carry out the training of male and female farmers on improved rice (*Oryza sativa*) production techniques in Ini Local Government Area of Akwa Ibom state, Nigeria.

MATERIALS AND METHODS

Design of the Study: A survey design was used for the study with structured questionnaire and personal and group interviews.

Area of the Study: The study was conducted in Ini Local Government Area of Akwa Ibom State, and covered all the 5 clans that constitute the Local Government Area.

Population of the Study: The population consisted of all male and female rice farmers in Ini Local Government Area. Population sizes of 2,500 farmers were involved in the study (AKADEP, Ini Local Government Area chapter 2018).

Sample and Sampling Technique: Stratified random sampling technique was used to select respondents for the study. Equal numbers of male and female rice farmers (800 males and 800 females) were used. The

sample size consisted of 1,600 rice farmers (64% of the population).

Table 1: Population and Sampling Frame of the Study

| S/N | Clans | Population | Sample |
|-----|-------------|-------------|-------------|
| 1 | Itu Mbonuso | 529 | 339 |
| 2 | Ikpe | 638 | 408 |
| 3 | Nkari | 514 | 329 |
| 4 | Iwere | 457 | 292 |
| 5 | Odoro Ikono | 362 | 232 |
| | | 2500 | 1600 |

Source: AKADEP, Ini Chapter 2018

Instrumentation: The instrument titled Agricultural cooperatives and Training of Male and Female farmers questionnaire (ACTMFQ) was developed. The questionnaire was used to generate data for the study. The value attached to the response scale of the questionnaire was very high extent, high extent, low extent, and very low extent.

Validation of the Instrument: The instrument (ACTAFQ) was validated by three research experts in the department of Educational Foundation, College of Education, Afaha Nsit. The comments and inputs of the research experts were used to correct, modify and amend the instrument.

Reliability of the Instrument: The reliability of the instrument was determined using the spilt-half

method. This method required that the instrument be administered only once on a group of 100 farmers who are not part of the main study, but has similar characteristics with those in the study area. The reliability coefficient was calculated using Cronbach Alpha coefficient and co-efficient index of 0.70 was obtained.

Administration of the Instrument: Eight hundred (800) copies of questionnaire were administered to male farmers and 800 to female farmers. Completed copies of the instrument collected were used for data analysis.

Statistical Analysis: Data were analyzed using mean to address the research questions, while independent t-test statistics was employed in testing the null hypotheses at 0.05 level of significance.

RESULTS AND DISCUSSION

Results are presented based on the outcome of the Research Question and Hypothesis of the study.

Research Question 1: To what extent do agricultural cooperative carry-out training of male and female farmers on nursery preparation techniques for improved rice production in Ini Local Government Area? The data used in addressing research question 1 are presented in Table 2.

Table 2: The Extent to which Agricultural Cooperatives carry out Training of Adult Farmers on Rice Nursery Preparation Techniques

| S/N | Training of male and female Farmers on Rice Nursery Preparation Skills | \bar{X} | Remarks |
|---------------------|---|--------------|---------|
| 1. | Teaching farmers in site selection skills (level land, well drained and organic type of soil for the nursery) | 2.45 | LE |
| 2. | Exposing farmers to the techniques of rice Nursery seed preparation. | 2.48 | LE |
| 3. | Enlightening the farmers on the different seed bed preparation for rice cultivation | 2.36 | LE |
| 4. | Assisting farmers in the broadcasting of pre-geminated rice seeds. | 2.42 | LE |
| 5. | Exposing the farmers to the techniques of rice seed soaking, before nursery broadcasting. | 2.41 | LE |
| 6. | Training the farmers on different methods of manure and fertilizer application to the rice plants. | 2.36 | LE |
| 7. | Assisting the farmers in the control of diseases and pest on the rice field. | 2.38 | LE |
| Average Mean | | 2.405 | |

LE = Low Extent

The analysis from table 2 indicates that the mean values for items no. 1-7 are less than the average rating point of 2.50. This implies that the rating of the training of male and female farmers on nursery preparation techniques for improved rice production by Agricultural Cooperatives is low. Therefore it can be deduced that male and female farmers were properly not trained by the Agricultural Cooperatives on nursery preparation techniques for improved rice production in Ini Local Government Area.

Testing of the Null Hypotheses for Hypothesis 1: There is no significant difference in the extent of training of

male and female agricultural cooperators by agricultural cooperatives on nursery preparation techniques for improved rice production in Ini Local Government Area. The data required for testing the hypothesis below were computed from the male and female farmers during nursery preparation. Independent t-test was used in testing the hypothesis (Table 3). The Table 3 shows that the calculated t-value (0.5) is less than the critical t-value (1.96) at df of 1598 and 0.05 level of significance. Hence, the null hypothesis is retained. Thus, there is no significant difference in the extent of training of both male and female farmers on nursery preparation techniques for

improved rice production in Ini Local Government Area. The results of data analyses on Influence of Agricultural Cooperative Training of Male and Female Farmers on Rice Nursery Preparation Techniques reveals that adult farmers were not properly trained in Ini Local Government Area. Results also revealed that there is no significant difference in the extent of training of male and female farmers on nursery preparation techniques for improved rice production in

Ini Local Government Area. These findings are in line with the report of Morris (2011) who asserted that the nursery has to be prepared prior to planting the rice seeds. It is undoubtedly that it is the preparation of the nursery that most farmers in Ini Local Government Area may not be acquainted with Morris (2011) also added that the lack of knowledge tends to lead to loss of plants especially when swamp rice variety is used.

Table 3: The Extent of Training of Male and Female Farmers by Agricultural Cooperatives on Nursery Preparation Techniques

| Variable | N | \bar{X} | S.D | DF | t-cal. | t-crit. | Decisions at P <0.05 |
|----------|-----|-----------|------|------|--------|---------|----------------------|
| Male | 800 | 14.46 | 5.05 | | | | |
| Female | 800 | 14.34 | 4.93 | 1598 | 50* | 1.96 | NS |

NS = Not significant at $p < 0.05$

He argued that the traditional method of raising rice nursery is by soaking the rice seeds in water while the improved method of raising nursery is by using primed seed which have been treated with $CaCl_2$ and KCL for both coarse and fine varieties of rice. This treatment helps to improve growth, yield and quality of the seedlings when transplanted. Vivaktamath and Singh (2016) are of the opinion that rice which is to be transplanted into puddle soil must first be nursed on seed beds. They noted that using nursery is to prove on seedlings as substantial head start on weeds.

Agricultural Cooperatives need to invite extension officers and other personnel to teach the farmers as a group on these methods. This would go a long way to boost rice production.

Research Question 2: To what extent do agricultural cooperatives carry out the training of male and female farmers on rice seedling transplanting techniques for improved production in Ini Local Government? The data for answering research question 2 are presented in Table 4.

Table 4: The Extent to which Agricultural Cooperatives carry out Training of Male and Female Farmers on Rice Seedlings Transplanting Techniques

| S/N | Training of Male and Female Farmers on Rice Seedlings Transplanting Techniques | \bar{X} | Remarks |
|---------------------|--|-------------|---------|
| 8. | Exposing the farmers to the techniques of seedling uprooting from the nursery. | 2.34 | LE |
| 9. | Training the farmers on the techniques of seedling handling while moving to the field. | 2.47 | LE |
| 10. | Enlightening the farmers on the recommended rice seedling spacing on the field. | 2.42 | LE |
| 11. | Enlightening the farmers on the appropriate date for transplanting of rice seedlings to the field of rice. | 2.43 | LE |
| 12. | Exposing the farmers to the correct implements used for seedling transplanting into the plant. | 2.31 | LE |
| Average Mean | | 2.39 | |

LE = Low Extent

Data in Table 4 shows that the mean values for items no. 8-12 are less than the average rating point of 2.50. This indicates that training of male and female farmers on seedling transplanting techniques for improved rice production by Agricultural Cooperatives is rated low. This reveals that male and female farmers were not efficiently trained by Agricultural Cooperatives on rice seedlings transplanting techniques for improved production in Ini Local Government Area.

Hypothesis 2: There is no significant difference in the extent of training of male and female agricultural cooperators by agricultural cooperatives on seedling transplanting techniques for improved rice production in Ini Local Government Area. Data required for

testing the hypothesis below were computed from the male and female farmers during seedlings transplanting. Independent t-test was used in testing the hypothesis (Table 5). Based on Table 5 it shows that the calculated t-value (1.54) is less than the critical t-value (1.96) at df of 1598 and 0.05 level of significant. Hence, the null hypothesis is retained. Thus, there is no significant difference in the extent of training of male and female farmers on seedlings transplanting techniques for improved rice production in Ini Local Government Area. Findings of the study reveal that Adult farmers were not adequately trained by Agricultural Cooperatives on rice seedlings transplanting techniques for improved production in Ini Local Government Area. Analysis of data also

revealed that there is no significant difference in the extent of training of male and female farmers on rice seedlings transplanting techniques for improved production in the Area. In support this results have been corroborated by, Veramani (2010). He holds that in the rice intensification system (SRI) of rice cultivation, proper spacing in the planting of seedling is one of the most essential principles. He agrees that a spacing of 25 x 25cm in a uniform square pattern is the recommended practice. However, practical adaptability of planting single seedling in square method becomes much reduced under field conditions and farmers often find it difficult to mark the recommended spacing with the conventional method of using rope as marker. Based on the above it is suggestive that Agricultural cooperatives can recruit qualified personnel to train their members in the techniques required in effective transplanting of rice seedlings. Where upland rice is cultivated, the effective methods of direct seed cultivation can also be presented to them. The farmers would improve on rice seedlings transplanting techniques by practicing the methods for the experts to observe and make corrections where necessary.

Research Question 3: To what extent do agricultural cooperatives carry out training of male and female farmers on rice field management techniques for improved production in Ini Local Government Area? The data for answering research question 2 are presented in Table 6.

Table 6 shows that the mean values for items no. 13-18 are less than the average rating point of 2.50. This indicates that the rate of training of male and female farmers on field management techniques for improved rice production by agricultural cooperatives is low. Thus, revealing that male and female farmers were inadequately trained by Agricultural Cooperatives on Rice field management techniques for improved production in Ini Local Government Area.

Hypothesis 3: There is no significant difference in the extent of male and female rice farmers cooperators by agricultural cooperatives on field management techniques for improved rice production in Ini Local Government Area. Results of testing the null hypothesis 3 are presented in Table 6 during the training of male and female farmers on field management.

Table 5: The Extent of Training of Male and Female Farmers by Agricultural Cooperatives on Rice Seedlings Transplanting Techniques.

| Variable | N | \bar{X} | S.D | DF | t-cal. | t-cri. | Decisions at P <0.05 |
|----------|-----|-----------|------|------|--------|--------|----------------------|
| Male | 800 | 12.15 | 4.47 | | | | |
| Female | 800 | 11.80 | 4.65 | 1598 | 1.54* | 1.96 | NS |

NS = Not significant at p<0.05

Table 6: The Extent to which Agricultural Cooperatives carry out Training of Male and Female Farmers on Rice Field Management Techniques

| S/N | Training of Male and female Farmers on Rice field management Techniques | \bar{X} | Remarks |
|---------------------|--|-------------|---------|
| 13. | Exposing the farmers to different water management techniques for rice production. | 2.34 | LE |
| 14. | Enlightening the farmers to appropriate height of cutting of rice while harvesting. | 2.34 | LE |
| 15. | Enlightening the farmers on the proper rate of fertilizer application on rice field. | 2.49 | LE |
| 16. | Assisting the farmers in the techniques of thinning of rice seedling. | 2.29 | LE |
| 17. | Training the farmers on the different methods of weed control on the field. | 1.99 | LE |
| 18. | Enlightening farmers on the control of pests/diseases on rice field. | 2.22 | LE |
| Average Mean | | 2.28 | |

LE = Low Extent

Table 7: The Extent of Training of Male and Female Farmers on Field Management Techniques.

| Variable | N | \bar{X} | S.D | DF | t-cal. | t-cri. | Decisions at P <0.05 |
|----------|-----|-----------|------|------|--------|--------|----------------------|
| Male | 800 | 11.60 | 4.92 | | | | |
| Female | 800 | 14.30 | 4.70 | 1598 | 1.25* | 1.96 | NS |

NS = Not significant at p<.05

Based on Table 7 it obvious that the calculated t-value (1.25) is less than the critical t (1.96) at df of 1598 and 0.05 level of significant. Hence, the null hypothesis is retained. This therefore shows that, there is no significant difference on the extent of training male and female farmers on field management techniques for improved rice production in Ini Local Government Area. The results obtained revealed that adult farmers were inadequately trained by Agricultural Cooperative on rice field management techniques for improved rice

production in Ini Local Government Area. Besides, Agricultural Cooperatives have no significant difference in the extent of training of male and female farmers on rice field management techniques for improve production in Ini Local Government Area. These findings agree with the work of Kebbeh, *et al.*, (2013). They hold that shows that only a fraction of farmers in Nigeria were reported to make use of herbicides (gramoxoneparaquat) at the time of land preparation. Land preparation practice is thus,

dependent on the rice ecology. In upland rice system, farmers primarily use zero tillage systems with manual land clearing (42% of upland rice plots) or manual tillage system (40% of upland rice plots). The author added that a much lesser degree of mechanized tillage is used for upland rice plots (18%). Rehman, *et al.*, (2017) affirms the present results, by revealing that methods of growing rice differ greatly in different localities but in most developing countries, the traditional hand methods of cultivating and harvesting rice are still practiced. The fields are prepared by ploughing and fertilizer is applied usually with animal dung or compost. The study also agrees with the findings of Castilo, *et al* (2012) which holds that one of the most important, yet most expensive input on rice farming after labour is fertilizer. Although the use of fertilizer by farmers is often inefficient. The authors explained that inefficient use of fertilizer can result from the application of nutrients in amount and at times not well matched to the requirement of the crop. Hence, this can lower profit for farmers and excess application of fertilizer can have harmful effects on the environment. The study reveals that Agricultural Cooperatives are well placed to help farmers learn relevant techniques in field management by experts in the field.

Implications of the findings: This study has implications for agricultural cooperatives that should be involved in training of agricultural cooperators. When the extent of training by agricultural cooperatives is high it is expected that the processes will be highly effective and as such will bring about improved techniques in rice production. Improved techniques acquired by cooperators will improve the production of rice by the cooperators.

Conclusion: Based on findings, it is concluded that agricultural cooperatives do contributed to the low extent of training of adult farmers on rice nursery preparation techniques, rice seedlings transplanting techniques, and rice field management techniques, in Ini Local Government Area. Moreso, there is no significant difference in the extent of training of male and female farmers by agricultural cooperatives on rice nursery preparation techniques, rice seedlings transplanting techniques and field management techniques in Ini Local Government Area. These may be part of the reasons for poor performance in rice production in Ini Local Government Area. Cooperatives societies should organize training sessions for their members so that they acquire basic techniques relevant for rice production.

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