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Information and Training Sources Used by Rice Farmers in North Central Nigeria

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Abstract

The study investigated the information and training sources used by rice farmers in North central, Nigeria. A total of 320 respondents were selected and interviewed using structured interview schedule. The respondents were of two categories, the participants and non-participants of the intervention programme. The data were analyzed using frequency, percentages, mean, ranking and chi square. Majority (80.6%) of the non-participants had been cultivating rice for more than 20 years and it was only few (10%) of the participants that had been cultivating rice for more than 20 years, majority (91.3%) of the participants had above 2.5 ha and only about 33.1% of the non-participants had rice farm size above 2.5 ha. Many of the non-participants (57.5%) had up to 3 different plots of rice farm, while the majority of the participants (51.3%) had up to 2 different plots for rice farming. Non-participants and participants claimed that other farmers (93.1%) and USAID/Market field officers (100%) respectively were their main sources of information. Training perception indicates that selection of high yielding varieties with the mean score of 3.95 ranked 1st, selection of healthy seeds with a mean score of 3.92 ranked 2nd and fertilizer use ranked 3rd as the most relevant improved technologies on which training was received. The study also reveals that training was positively associated with adoption, the result of the paired mean difference between the output (35.863) and income (149113.8) of participants and non-participants showed clearly significant mean deference. Implying that training and adoption of improved rice package had a positive and significant effect on output and income. It was recommended that frequent training of the rice farmers in the study area should be given top-most priority so that the farmers can obtain adequate information and, consequently, obtain optimum yield from the adoption of improved rice packages.

Key words: *Information, Training, Rice Farmers.*

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Introduction

Just as the communication environment (the totality and attributes of available information sources) of a farmer influences his information acquisition and utilization of technologies and packages, so, also, the farmers' communication behaviour may directly or indirectly influence his knowledge acquisition (Asiabaka, 2002). Agricultural extension is essentially an activity involving the dissemination of information about improved technologies to the end users (Asiabaka 2002). For any technology to be accepted and adopted the farmers must not only, first of all, know about it but also must have positive perception about it. Information available to farmers may come from different sources (CMMIT, 1993). Ganpat and Sespersad, (1996) emphasized that consistent interaction with an information source influence the adoption behaviour of farmers. Some farmers use limited communication sources, while others lend themselves to being more influenced by peculiar communication channel during different stages of innovation adoption. Agbamu (2006) stressed that adequate information is one of the major pre-requisite for widespread acceptance of agricultural innovation, such information usually abound through a variety of sources.

Training is an act of increasing the knowledge and skills of an employee in doing a particular job, (Filippo 1965 Ogunbameru, 2001).Training is mostly directed at improving the ability of individuals to do vocation more effectively and efficiently. Generally, it involves acquiring information, knowledge and developing abilities or attitudes, which will result in greater competence in the performance of a work. There are two main agents in training viz; the trainee and trainer. The active participation of both agents at every stage of the training programme is very important. A good understanding of the need is therefore fundamental to successful training. FARTA (2001) emphasized that training needs exists anytime an actual condition differs from a desirable conditions in the human or people aspect of organizational performances or more specifically when a change in present knowledge, skill and attitude can bring out the desired performance. Akinsehinde (2007) maintained that training needs, are skills, knowledge and attitude an individual requires in overcoming problems as well as avoiding creating problem situations. Trainers (teachers) are challenged to understand what the trainee (learner) knows from previous training and experience.

Perception is the process by which we receive information or stimuli from our environment and transform it into psychological awareness. It is difficult to understand the complex psychology of farmer's perception, but it is good to appreciate why farmers interpret training on various technologies differently (Van den Ban and Hawkins, 2002). It is also important to note that farmer's perception of improved rice technologies are relative rather than absolute, selective, organized and directional. The specific objectives of this study were to: identify some socio-economic characteristic of the rice farmers, identify rice farmers' sources of information and training, determine rice farmers' perception of the training on various types of improved rice technologies and explain the relationship between training and adoption of improved rice technologies.

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http://www.ajol.info/index.php/jae

Methodology

This study was conducted in North Central Zone of Nigeria. The area is located between latitude $6^0$30' to $11^0$20' North and longitude $2^0$30' to $10^0$30' East (Shuaib *et al.,* 1997). More than 77% of the people in the region are rural dwellers and are mostly engaged in one form of agricultural activities or the other (Shuaib *et al.,* 1997). Multi-stage sampling technique was used to select a total of 320 rice farmers from two of the rice growing states in the North Central Zone of the Country. First, in Niger State (Lavun and Gbako Local Governments areas), there were 12 and 11 active rice farmers' cooperative societies respectively and in Kwara State (Patigi and Edu Local Government Areas), there were 11 and 10 active rice farmers cooperative societies respectively. From each Local Government Areas 10 rice farmer's cooperative societies were randomly selected from a list that was obtained from USAID/MARKETS Field Officers from the two states. Secondly, four participating rice farmers were randomly selected from each of the cooperative societies, given a total of 40 members from each Local Government Area. Eighty participating rice farmers were selected from each state making a total of 160 participating farmers from the two states. In addition, equal numbers of non- participating farmers were randomly selected from each Local Government Areas from the two states, giving a total number of 160 non-participating rice farmers. The overall sampled respondents (participating and non-participating farmers) from the two states were three hundred and twenty (320).

Data were analyzed through the use of simple descriptive statistics, such as, frequency distribution, percentages, mean, ranking, Likert-type of scale and Chi square to test the relationship between training and adoption of improved rice technologies.

Findings and Discussions

Respondents' socio-economic characteristics

Rice farming experience as shown on Table 1 reveals that majority (80.6%) of the non-participants had been cultivating rice for more than 20 years while it was only few (10%) of the participants that had been cultivating rice for more than 20 years. about 37.6% of the participants had been cultivating rice for less than 11 years, for non-participants however, none had rice farming experience less than 10 years. This finding implies that young rice farmers participated in the programme than the older rice farmers. The findings is in conformity with that of Simonyan (2009) who reported that young farmers with less farming experience tend to participate more in other farming activities and programmes that could fetch them more income.

Journal of Agricultural Extension
Vol.18 (2) December, 2014
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http://www.ajol.info/index.php/jae

Table 1: Distribution of Respondents According to Rice Farming Experience, Rice Farm Size and Number of Rice Plots

Variable	Non-Participants		Participants		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Rice Farming Experience						
<5 Years	-	-	6	3.8	6	1.9
6-10 Years	-	-	54	33.8	54	16.8
11-15 Years	8	5.0	76	47.5	84	26.3
16-20 Years	23	14.4	8	5.0	31	9.7
Above 20 Years	129	80.6	16	10.0	145	45.3
Total	160	100	160	100	320	100
Rice Farm Size (Ha)						
<1.00	5	3.1	2	1.3	7	2.1
1.01-1.50	21	13.1	-	-	21	6.6
1.51-2.00	33	20.6	5	3.1	38	11.9
2.01-2.50	48	30.0	7	4.4	55	17.2
Above 2.50	53	33.1	146	91.3	199	62.2
Total	160	100	160	100	320	100
Number of Rice Plots						
1	-	-	-	-	0	0
2	68	42.5	82	51.3	150	46.9
3	92	57.5	78	48.8	170	53.1
Above 3	-	-	-	-	0	0
Total	160	100	160	100	320	100

Source: Field Survey, 2011

The result on table 1, also, reveals that majority (91.3%) of the participants had above 2.5 ha and only about 33.1% of the non-participants had rice farm size above 2.5 ha. About 30% of the non-participants had rice farm size of between 2.01-2.50 ha and very few (4.4%) of the participants had rice farm size between 2.01-2.50 ha. All other respondents had rice farm sizes of less than 2.01 ha. The result of the study indicates that most of the rice farmers in the study area were small scale farmers. The result agrees with that of Alfred, (2000); Olayide *et al.,* (1980) who opined that smallness of farm size is a characteristic of the peasant farmers. The result in table 1 also showed that none of the respondents both participants and non-participants had only one plot of rice farm. Majority of the non-participants (57.5%) had up to 3 different plots of rice farm, while the majority of the participants (51.3%) had up to 2 different plots for rice farms. The result showed that rice farmers within the study area had between 2-3 different plots of rice farm. This may be attributed to the fact that land tenure systems, which normally results into excessive fragmentation of land is still a problem in the study area. This directly or indirectly affects farmers' efficiency. This finding is in agreement with that of Alene and Hassan (2003), who stated that land tenure system which normally result into excessive land fragmentation affects farmers' efficiency

Journal of Agricultural Extension
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http://www.ajol.info/index.php/jae

Sources of Information and Training

Adequate information is one of the major pre-requisites for widespread acceptance of agricultural technology. Such information usually abounds through a variety of sources. Table 2 shows that non-participants and participants claimed that other farmers (93.1%) and USAID/Market field officers (100%) respectively were their main sources of information, closely followed by extension agents accounting for 69.4% and 79.4% respectively for non-participants and participants.

Table 2: Distribution of Respondents According to Sources of Information and Training

Sources of Information/ training	Non-Participants	Participants
Extension Agent	111(69.4)	127(79.4)
USAID/ Market Field Officers	2(1.3)	160(100.0)
Other Farmers	149(93.1)	147(91.9)
Parents/ Relative/ Friends	67(41.9)	48(30.0)
Farmers Groups	123(76.9)	156(97.5)
Progressive/ Contact Farmers	78(48.8)	39(24.4)
Land Owners	46(28.8)	17(10.6)
Mass/ Print Media	141(88.1)	146(91.3)
Field Days/ Agric Showed	99(61.9)	145(90.6)
Demonstration	133(83.1)	153(95.6)

**Multiple responses.*
Source: Field Survey, 2011

In the Training the Trainers programmes, there are usually chains of information flow and it continues to trickled down until the target population are covered. The results agree with that of Agbamu *et al.* (1996) who found that it is the village extension workers that farmers in Ogun State of Nigeria use most as source information.

Perception of Information and Training Sources

The result in table 3 shows that the respondents perceived all information sources as important in exception of progressive/contact farmers and land owners. Demonstration and other farmers ranked 1st and 2nd information sources they perceived as most important. This is closely followed by extension agents and USAID/MARKET Field Officers as 3rd and 4th information sources they perceived as important, this directly affect their rate of adoption.

Journal of Agricultural Extension
Vol.18 (2) December, 2014
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http://www.ajol.info/index.php/jae

Table 3: Distribution of Respondents According to Perception of Information and Training Sources

	Weighted Mean	Overall Perception	Rank
Extension Agent	3.23	Important	3rd
USAID/ Market Field Offic	3.07	Important	4th
Other Farmers	3.27	Important	2nd
Parents/ Relatives/ Friend	2.61	Important	7th
Progress/ Contact Farmer	2.35	Not Important	8th
Land Owners	1.92	Not Important	9th
Mass/ Print Media	2.78	Important	6th
Field Days/ Agric Showed	2.82	Important	5th
Demonstration Plots (SPA	3.47	Important	1st

Figures in parenthesis are percentages

The respondents indicate varying degrees of perception about the relevance of training on different practices. Table 4 reveals that selection of high yielding varieties with the mean of 3.95 ranked 1st, selection of healthy seeds with a mean of 3.92 ranked 2nd and fertilizer use ranked 3rd. It is possible to use high yielding varieties and select healthy seeds but without the availability of the required nutrient in the soil, the crop cannot give its optimal yield. This findings is in agreement with that of Negeu and Parikh (1999) and Gould *et al. (*1989*)* who stated that any practice that is not perceived as relevant by the farmers will not be accepted or adopted because they felt it is not relevant and or compatible with the existing practices.

Perception on Training Received on Various types of Improved Rice Technologies

Table 4 revealed that selection of high yielding varieties with the mean of 3.95 ranked 1st, selection of healthy seeds with a mean of 3.92 ranked 2nd and fertilizer use ranked 3rd. It is possible to use high yielding varieties and select healthy seeds but without the availability of the required nutrient in the soil, the crop cannot give its optimal yield. Adding up ranked 4th as the most relevant technology, it is possible to use fertilizer to enhance plant growth and to increase productivity but without optimum plant population the farmer cannot obtain optimum yield.

Respondents indicate also that other technologies were relevant for example, timely harvesting (3.57), bird control (3.44) and herbicide use (3.28). It is important to note however, that the respondents do not perceived training on some practices as relevant, because their mean scores were below 2.50: insect control (1.66), hand weeding (1.91), recommended land preparation (2.32) and iron toxicity control (2.37) which ranked 16th, 15th, 14th and 13th respectively. Any practice that is not perceived as relevant by the farmers will not be accepted or adopted because they felt it is not relevant and or compatible with their existing practices. This is in agreement with the finding of van dan Ban and Hawkins, (2002) who find that farmer's perception of

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Vol.18 (2) December, 2014
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http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae

improved rice technologies are relative rather than absolute, as such affect the rate of adoption significantly.

Table 4: Distribution of Respondents According to their Perception on Training Received on Various Types of Improved Rice Technologies

Technologies	Rating				Weighted Sum	Weighted Mean	Overall Perception	Rank
	Not Relevant	Slightly Relevant	Relevant	Very Relevant				
Selection of High Yielding varieties	-	2(1.3)	4(2.5)	154(96.3)	632	3.95	Relevant	1st
Selection of Healthy seed	-	-	13(8.1)	147(91.9)	627	3.92	Relevant	2nd
Recommended Land Preparation	54(33.8)	46(28.8)	15(9.4)	45(28.1)	371	2.32	Not Relevant	14th
Direct Seeding	2(1.3)	8(5.0)	96(60.0)	54(33.8)	522	3.26	Relevant	8th
Adding Up	5(3.1)	7(4.4)	26(16.3)	122(76.3)	588	3.66	Relevant	4th
Herbicide Use	1(0.6)	12(7.5)	88(55.0)	59(36.9)	525	3.28	Relevant	7th
Fertilizer Use	1(0.6)	8(5.0)	10(6.3)	141(88.1)	611	3.82	Relevant	3rd
Insect Control	11(6.9)	31(19.4)	7(46.9)	43(26.9)	266	1.66	Not Relevant	16th
Rodent Control	13(8.1)	56(35.0)	30(18.8)	61(38.1)	459	2.87	Relevant	11th
Disease Control	3(1.9)	23(14.4)	90(56.3)	44(27.5)	495	3.09	Relevant	10th
Birds Control	1(0.6)	47(29.4)	56(35.0)	56(35.0)	487	3.44	Relevant	6th
Iron Toxicity Control	56(35.0)	20(12.5)	53(33.1)	31(19.4)	379	2.37	Not Relevant	13th
Improved Nursery Practices	18(11.3)	54(33.8)	34(21.3)	54(33.8)	444	2.78	Relevant	12th
Hand Weeding	7(4.4)	22(13.8)	85(53.1)	46(28.8)	306	1.91	Not Relevant	15th
Timely Harvesting	2(1.3)	12(7.5)	39(24.4)	107(66.9)	571	3.57	Relevant	5th
Improved Threshing Floor	6(5.0)	10(6.3)	76(47.5)	66(41.3)	518	3.24	Relevant	9th

Figures in parenthesis are Percentage
Source: Field Survey, 2011.

Respondents Access to Training

Farmers received training basically from two sources, either from government or non-governmental organisations (NGOs). Training equips the farmers with the necessary skills to carry out their farm operations and build their self confidence in the technology. 100% of the participants claimed they had received training on the adoption of improved rice packages as indicated in table 5, It has a significant mean deference at $P<0.01$. The table also indicates that participants had more training on technology adoption than the non-participants which implies that training is positively associated with adoption.

Journal of Agricultural Extension
Vol.18 (2) December, 2014
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http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae

Table 5: Result of x^2 on Rice Package Training and Adoption

Training	No Participants (N=160)	Participants (N=160)	Total	X^2
Yes	81(50.6)	160(100.0)	241(75.3)	31.958***
No	79(49.4)	-	79(24.7)	
Total	160(100)	160(100)	320(100)	

***significant at 1%*
Source: Field Survey, 2011.

Output and income of participants and non-participants

Table 6 shows the result of the paired mean difference between the output (35.863) and income (₦149113.8) of participants and non-participants showed clearly significant mean deference. Implying that training and adoption of improved rice package had a positive and significant effect on output and income.

Table 6: Paired Mean Difference between Output and income of Participants and Non-participants in the Training Programme

Variables	Mean	t-value	Significance
Paired difference in participant and non-participant output	35.863	14.292	.000
Paired difference in participant and non-participant income	₦149113.8	9.949	.000

Source: Field Survey,

Adoption of improved rice package increase the participants output and income drastically, this was revealed in the mean difference of 35.863 and t-value of 14.292 between participants and non-participants, which is significant at 1%. The mean difference in income (₦149,113.80) and the t-value 9.949*** also revealed that training and adoption of improved rice packages had a positive and significant effect on the farmers' output, income and consequently on the household livelihood. Similar results were observed by Tsado and Zakari (2007), who stated that there is significant mean difference in output between beneficiaries and non-beneficiaries of intervention programmes

Journal of Agricultural Extension
Vol.18 (2) December, 2014
ISSN 1119-944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae

Difference between the output and income of the participants and non-participants

The result on table 7 showed a significant difference between the mean yield and income of participants and non-participants. A positive mean difference in yield of participants (65.39) and non-participants (30.45) implies that there was impact of the programme on the participants. A positive mean difference in income of participants (₦308, 235.65) and non-participants (₦152, 420.63) implies that there was impact of the training on the participant's income. On the basis of the above the null hypothesis which states that there is no significant difference between the output and income of the participants and non-participants before and after training is hereby rejected.

Table 7: Difference between the Output and Income of the Participants and Non-participants in the Training Programme

Variables	Mean	t-value	Decision
Output of participants	65.39	14.606	H_0 rejected
Versus			
Output of non-participants	30.45		
Income of participants	₦308,235.65	11.144	H_0 rejected
Versus			
Income of non-participants	₦152,420.63		

Source: field survey, 2011

Implying that there was a significant difference between participants and non-participants output and income before and after training. Similar results were observed by (Simonyan 2009 and Tsado and Zakari, 2007), who stated that there is significant mean difference in output between beneficiaries and non-beneficiaries of intervention programmes.

Relationship between respondents' perception about training and adoption of improved rice packages

The result of the chi-square on table 8 indicates that there was a significant and positive relationship (X^2 =31.958; P<0.01) between rice farmers' perception of the relevance of training and adoption of improve rice package. The hypothesis which states that there is no significant relationship between rice farmers' perception of training relevance and there adoption of improved rice packages, is hereby rejected, implying that there was a significant and positive relationship between training

Journal of Agricultural Extension
Vol.18 (2) December, 2014
ISSN 1119-944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae

perception of the respondents and adoption of improved rice packages. According to Pretty (1995), productivity abounds only when farmers use technologies in combination, that is, adopt package of practices. This result agrees with that of Shiferaw and Holder (1998) who stated that farmers' perception about training influence adoption of a technology significantly and positively.

Table 8: Respondents' Perception about Training and Adoption of Improved Rice Packages

Training perception	Non-participant	Participant	Total	X^2
Relevant	81(50.6)	160(100)	241(73.5)	31.958***
Not relevant	79(49.4)	0(0)	79(24.7)	
Total	160(100)	160(100)	320(100)	

Source: field survey, 2011
****significant at 1%*

Conclusion and Recommendations

Training of rice farmers and their positive perception about various improved technologies enhance their knowledge and skills, and influenced their adoption level. This eventually increased their rice output, income and consequently uplift their standards of living. It is recommended that:

1. Frequent training of the rice farmers in the study area should be given a top-most priority, so that the farmers can obtain optimum yield from the adoption of improved rice packages. Emphasis should be placed on the series of training at different levels for farmers.
2. Farmer-to-farmer extension network should be reinvigorated so that the target population can be covered. Arranging sufficient number of training, field days and demonstration will go along well to equip farmers with production and management skills.
3. There was significant mean difference between the output and income of participants and non-participants in the intervention programme, as such rice farmers should be encouraged and persuaded to take advantage and participate actively in such intervention programmes in order to increase their output and income.

Journal of Agricultural Extension
Vol.18 (2) December, 2014
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Journal of Agricultural Extension
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ADOPTION OF IMPROVED RICE PROCESSING TECHNOLOGIES AMONG WOMEN IN NIGER STATE, NIGERIA

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ABSTRACT
The study was conducted in Niger State, Nigeria. The study evaluates the adoption of improved rice processing technologies among women rice processors. Data for the study were collected through a structured interview schedule and analyzed using descriptive statistics such as frequency, percentages and means, the hypothesis was tested using Chi-square (χ^2). The result revealed that majority of the respondent were still in their active age, with the mean age of 42 years and majority (92.5%) had one form education or the other. Large proportion 90% and 77.5% of the respondents were married and had moderate house hold sizes respectively, majority 97.5% were members of various cooperative societies, while 90% had been in rice processing business for over 5 years. 85% and 30% claimed they had access to training and credit facilities respectively. The awareness level of the respondents about various technologies were very high, adoption levels were however, very low. The study revealed that age, marital status, cooperative membership, level of education, access to credit and level of awareness had significant relationship with adoption at 5% level of probability. The study further revealed that high cost of processing machines, inadequate extension visit and nature of local rice were the major constraints faced by the farmers in the study area. The study recommended that processors should be encouraged to participate more actively in cooperative activities so that they could benefit from assistance usually rendered by Non Governmental Organizations, government organization and donor/development agencies.

Keywords: adoption, rice, processing technologies, women.

INTRODUCTION

Rice is one of the oldest, celebrated and primary foods for more than half of the population of the world and the only cereal that is grown across most regions of the world (Issaka, *et al.* , 1997; Tran, 2003), also it is among the world's leading staple food crops and sixth major crop cultivated after sorghum, millet, maize, cowpea and wheat in Nigeria (Singh et al1997; Misari *et al.*, 1997) but rice is now ranking first position on a social scale of the staple food that are used in most festivals in urban and rural homes (Langtau, 2003).

Rice processing that has to do mainly with parboiling and milling. Parboiling is the hydrothermal treatment of paddy before milling. During this processing starch is gelatinized in the rice kernel. Gelatinous jelly

form, filling the rice voids and cementing the fissure of the grain. During the process an irreversible swelling and fusion of starch granules occur that changes the starch from a crystalline (a clear transparent form) to an amorphous one (FSNB 2011).

A survey conducted by National Cereal Research Institute (NCRI) (2008) revealed that Nigerian consumers show preference to quality rice. The institute has developed improved technologies for processing rice such as

i. Rice thresher: it dislodges rice seed from the particle and has the capacity of 3000kg.
ii. Reciprocator winnower: this equipment performs the function of cleaning the threshed seed.
iii. Wet cleaners: it is used in separating lighter impurities that float on water form rice.
iv. Rice parboiled: it is used to heat-treat rice in order to properly gelatinize the starch in the kernels.
v. Rotary steam dryer: it dries about 1.5 tonnes of parboiled rice per day. It also has provision for condensation discharge and sets of screens that permits exit of moist air from the drying rice.
vi. Rice mills: it has a capacity to mill 3.5-4.0 tonnes of the paddy to 2.5-2.8 tonnes of paddy. It is made up of a frustum hopper, milling chamber, husk aspiration spout and power unit.
vii. Pneumatic cleaner: this machine cleans milled rice to ensure that fine sand and bran that still accompanies the rice after the initial winnowing and wet cleaning operations are removed.

Post harvest handling and processing of rice involves operation during when rice is properly prepared for further processing before it can be consumed, studies conducted shows that most Nigerian has preference for imported rice owning to the fact that it is of better

grade, better taste, polished, not broken and is free of debris (Bamidele *et al.*, 2010). Rice quality is a major concern for the consumers and for the future of rice sector. The non competiveness of local rice could be as a result of poor processing resulting in the final product with high percentage of broken rice, stone and debris resulting from traditional methods of processing (FAO, 2002). Nigerian government has not been intervening in rice processing sub-sector as expected; rice processing in Nigeria is predominantly in the hands of unskilled rural Women using traditional methods. According to Akpokoje *et al.*, (2001), 85 % of Nigerian rice is being processed through small rice mills, which normally result into poor quality processed rice, hence there is need to increase the level of training and adoption of improved rice processing technologies.

Objectives of the study

The general objective of the study is to determine the extent of adoption of improved rice processing technologies.

The specific objective includes:

i. Examine socio-economic characteristics of women processors
ii. determine the rice processors access to training
iii. determine level of awareness and adoption of improved technologies
iv. describe the problems associated with the adoption of improved rice processing technologies.

METHODOLOGY

Agricultural Zone 1 of Niger State Agricultural Development project was purposively selected for the study owing to large scale rice production and processing activities taking place in the Zone. Four local Governments Areas were randomly selected. 20 rice processors were also randomly selected from each of the four local Government Areas, giving a total sample size of 80 respondents. Primary data were mainly used for this study. Structured interview schedule consisting of both open and close ended questions was used for eliciting relevant information from the respondents.

Descriptive statistics was used in achieving all the objectives, Likert type of scale was used to determine the level of rice processors adoption of improved technologies. 3 points Likert scale of aware, tried and adopted were used to determine the [illegible]. The cut off mean equals to 2, any [illegible] mean score of 2 and above was regarded as high adoption and mean score of less than 2 was regarded as low adoption.

Chi-square was used for [illegible] testing. $\chi^2 = \frac{\Sigma(O-E)^2}{E}$

Test of hypothesis

Null Hypothesis (Ho): there is no significant relationship between respondent's level of [illegible] improved rice processing technologies and [illegible] selected socio-economic characteristics such as [illegible] marital status, cooperative membership, level of education, access to training, access to credit and awareness level of the respondents.

RESULT AND DISCUSSIONS

Age: The result in Table 1 revealed that majority of the respondents were still in their active age with mean age of 42 years and only 8.75 were 51 years and above, this implies that majority of the women rice processors in the study area were still strong and energetic to diversified into other income generating activities to supplement their income from rice processing. This finding is in agreement with that of Kau (1994), who stated that young women spend lot of time in many activities particularly in processing activities.

Education: The result in Table 1 also indicated that majority (92.5%) of the respondents had one form of education or the other. This implies that dissemination of new or improved rice processing technology to the women rice processors in the study area will be done with relative ease, since education is positively and significantly related to acceptance and addition of improved rice processing technologies. This finding is in line with those of Tadese (2008), who reported that education facilitate farmers access to information and enhances adoption.

Marital status: As evident in Table 1, majority (90%) of the respondents were married and were still with their spouse, the singles and the widows were 7.5% and 2.5% respectively. this implies that majority of the women rice processor in the study area had traditional responsibility of catering for their families, this directly or indirectly will motivate them to accept and adopt improved rice processing technologies to enable them generate more income to cater for their families.

Table 1.Personal characteristics of re spondents

Variables	Frequency	Percentage
Age range		
Below 21 years	10	12.5
21 – 30	10	12.5
31 – 40	33	41.25
41 – 50	20	25.00
51 and above	7	8.75
Education status		
Primary school	20	25.00
Secondary school	31	38.75
Tertiary Education	15	18.75
No formal Education	6	7.5
Adult Mass literacy	8	10.00
Marital status		
Single	6	7.5
Married	72	90
Delivered	0	0.0
Widowed	2	2.5
Household Size	F	
Less than 6 people	10	12.5
6 – 10 people	62	77.5
11 – 15	8	10.00
Above 15 people	0	0.0
Total	80	100
Primary occupation		
Processing/Trading	70	87.5
Farming	0	0.0
Civil Servants	10	12.5

Source: Field Survey, 2014

Household size: The result in Table 1 shows that majority (77.5%) of the respondents had moderate household size of between 6-10 people. 12.5% and 10% had household sizes of less than 6 people and between 11-15 people respectively. It is important to note that none of the respondent had above 15 people in their household. this implies that majority of the rice processors in the study area were saddled with more responsibility of providing for their families, this will however, influence their decision in accepting and adopting rice processing technologies to earn more income to be able to provide for their immediate family.

Primary occupation: Table 1 reveals that majority (87.5%) of the respondents had rice processing/trading as their primary occupations and only few (12.5%) were civil servants. None of the respondents however, had farming as their major occupation. This implies that majority of the women in the study area were mainly involved in post harvest activities like processing and trading of agricultural products. This finding is also in conformity with that of Tedesse (1986), who reported that Women participate actively in post harvest activities.

Training: Table 2 shows that majority (85%) had access to training on the use of improved rice processing technologies.. This implies that women rice processor in the study area had access to one form of training or the other. This finding is in line with that of Tsado (2013), who pointed out that training positively and significantly influence adoption.

Access to credit: Table 2 shows that majority of the respondents (70%) had no access to credit, it was only 30% who claimed that they had access to credit, access to credit had significant and positive relationship with adoption. This finding is in line with that of Tadese (2008) who stated that access to credit was positively and significantly related to adoption.

Table 2. Distribution of respondents according to their access to training, Credit and membership of cooperative association.

Variables	Frequency	Percentage
Received training		
Yes	68	85
No	12	15
Access to credit		
Yes	24	30
No	56	70
Co-operative membership		
Yes	78	97.5
No	2	2.5
Total	80	100

Source: Field Survey, 2014

Cooperative membership: As evident in Table 2 over whelming proportion (97.5%) of the respondents belongs to one cooperative society or the other. This implies that majority of the women particularly rice processors in the study area stands a better chance of benefiting from NGOs, donor agencies and other organizations that assist farmers, for the present trends of receiving assistance from any of these organizations is usually through their cooperative societies or organizations.

Table 3 showed that the respondent's rates of adoption of the following improved rice technologies were high: medium/small millers(2.0) and soaking/steeping (2.0). The adoption of other improved rice processing technologies by the processors in the study area were low. This implies that the processors only adopted those technologies that were compatible with their existing practices. This also implies that despite the high rate of awareness, adoption rate of various improved rice processing technologies were still very low

Table 3. Distribution of respondents according to adoption level of the various improved rice processing technologies

Technologies	Mean	Level of Adoption
Medium/small millers machines	2.0	High
Improved paddy drying	1.0	Low
Use of uniform raw rice	1.1	Low
Soaking (Steeping)	2.0	High
Improved fire wood par boiler	1.1	Low
Improved steam firewood par boiler	1.1	Low
Electrical rice par boiler	1.0	Low
Threshing	1.0	Low
Cleaning	1.7	Low

Source: Field Survey, 2014

Table 4: revealed that rice processors were faced with several constraints in adopting improved technologies, such major constraints' includes; High cost of processing machine (95.5%), inadequate extension visit (95%), Nature of local grains (mixed shot and long grains) (73.75%) and insufficient fund to buy paddy's in bulk (72.5%). This implies that rice processors in the study area were faced with multi-dimensional problems which hinder their uptake of the improved rice processing technologies. This finding is in conformity with that of FAO (1990), who reported that Women faced many constraints in trying to adopt new technologies in order to earn extra income.

Table 4. Distribution of respondents based on the constraints hindering their adoption of improved rice processing technologies

Constraints	Frequency	Percentage
Inadequate information/training	46	57.5
Lack of credit facilities	56	70.0
Inadequate extension visit	76	95.0
Low price of locally processed rice	80	100
High cost of processing machines	78	97.5
Nature of local rice grain (short)	75	93.75
Insufficient fund to buy paddy in bulk	58	93.75

Source: Field Survey, 2014
Multiple responses

HYPOTHESIS TESTING

Null Hypothesis: there no significant relationship between the socio-economic characteristics of the respondents and their level of adoption of improved rice processing technologies.

Result in Table 5 indicates that all the socio-economic variables under consideration had significant and positive relationship with adoption of improved rice processing technologies at 5% level of probability. This implies that all the socio-economic variables identified significantly and positively affect the levels of adoption. Similar research finding has been conducted and the finding were in agreement with the result of this study, such research works includes: Tedese, (2008), Rahmeto (2007), Leggesse, (1992) Lelissa and Mulet (2002) and Adeniyi (2009), that socio-economic characteristics significantly affect adoption of improved technologies either positively or negatively.

Table 5. Relationship between the [illegible] characteristics of the respondents and [illegible] adoption of improved rice [illegible]

Socio-economic variables	χ^2 calculated	χ^2 critical	df	Sig.	Remark
Age	61.953	[illegible]	[illegible]	[illegible]	[illegible]
Marital status	57.038	[illegible]	[illegible]	[illegible]	[illegible]
Cooperative membership	59.825	[illegible]	[illegible]	[illegible]	[illegible]
Level of education	44.604	[illegible]	[illegible]	[illegible]	[illegible]
Access to training	43.605	[illegible]	[illegible]	[illegible]	[illegible]
Access to Credit	51.341	[illegible]	[illegible]	[illegible]	[illegible]
Awareness level	61.287	[illegible]	[illegible]	[illegible]	[illegible]

*S – Significant
Source: Computed from survey data, 2014.

CONCLUSION AND RECOMMENDATIONS

The result from this study showed that the adoption of the various improved rice processing technologies by the processor were very low. The result of the hypothesis tested revealed that there was a significant relationship between the following socio-economic characteristics: age, marital status, co-operative membership, level of education, access to training, access to credit, awareness level and level of adoption of improved rice processing technologies. The processors however, identified the following as major constraints to adoption; high cost of rice processing machines, nature of local rain grains and insufficient funds to buy paddy in bulk for processing.

Based on the findings of this study, the following recommendations were made:

1. Credit facilities should be provided to rice processors in the study area, since most of them claimed that they had no access to credit facilities that will enable them buy paddy in bulk.
2. Fabrication of local rice processing machines that could be affordable by the processors should be developed since the available machines are too expensive and out of reach of the small scale processors.

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