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Extent of Farmers' Awareness and Adoption of Improved Agricultural Innovations in Ebonyi State

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Abstract **– The study focused on the extent of farmers' awareness and adoption of improved agricultural innovations in Ebonyi State. Survey research design was adopted. Two research questions and two null hypotheses guided the study. The population for the study was 367 which comprised 258 registered farmers and 109 extension agents in the three agricultural zones in the State. There was no sampling due to the manageable size of the population. Structured questionnaire containing a total of 17 items was the instrument for data collection. The reliability of the instrument was determined using Cronbach Alpha reliability coefficient method. A correlation of 0.74 was obtained. A total of 367 copies of the questionnaire were distributed by the researcher and three briefed research assistants. Out of 367 copies distributed 354 were properly filled and used for data analysis representing 96.46 percent return rate. It was found out that farmers were not aware of the improved seed used in farming activities and that the extent of adoption of chemical control system in their farming activities was to a low extent. Recommendations made include: that practical demonstration awareness should be conducted to educate the farmers on the use of improved agricultural innovations in seeds planting and that extension agent should encourage the farmers to use chemical in controlling pest, diseases and dressing of the seeds.**

Keywords **– Farmers, Awareness, Adoption, Agricultural Innovations.**

I. INTRODUCTION

The importance of improved agricultural innovation to food production especially in the developing countries is widely recognized. This is predicated on the observed impact of these innovations and its potentials and actual contributions to the development of agriculture. In developing countries like Nigeria where a greater proportion of population lives in rural areas, agricultural innovations and technologies could also provide a potential means of increasing production and subsequently raising incomes of farmers as well as their standard of living. According to Ayoade and Akintonde (2012), the extent of agricultural innovation adoption level is dependent on the awareness, performance of extension agents and level of acceptance by the farming population. To boost food production, economic growth and job creation, the need for the adoption of innovations in agricultural production is paramount as this will also aid in the reduction of drudgery and time spent on agricultural activities which will invariably increase productivity and efficiency.

Agricultural innovation system according to Tugrul and Ajit (2002) is a set of agents that jointly and/or individually contribute to the development, diffusion and use of agricultural-related new technological changes in agriculture. The agents deal with issues relating to agriculture, farming, input supply, processing, marketing, research extension, training, credits, information and policy. Innovations in agriculture help to improve farming practices and productive output. It is imperative to note that innovation may exist but awareness of that innovative mean might not be there, or zero adoption of the innovation may exist. Some of these innovations include organic farming, use of improved seed, use of fertilizer, and mechanized farm operations, use of insecticides, use of herbicides, and use of seed dressing chemical, use of storage chemical etc. Making these

agricultural innovations available are not enough but educating the farmers. Iheanacho (2000) pointed that the rate at which one can assimilate and idealize new knowledge could depend on the educational level of the individual. Thus, low level of education and public awareness tend to foster unfavorable attitude towards the adoption and acceptance of improved farm practices from innovations.

Agricultural innovation in farm mechanization has improved that it is used in planting, clearing of farm land, harvesting, fertilizer application, weeding etc. The utilization of this improved farming system has positive implication as developed countries record output of high quantity. Improved seed is another pointer to their high output. Ani, Ogunnika and Ifah (2004), noted that improved seed yield much better with high resistance to pest and disease. The authors noted that farmers should be provided with improved seeds to increase food production and reduce the rate at which the Nation imports food. Ayoade and Akintonde (2012) noted that new technology as in the case of chemical control system has the potential of achieving food security and controlling the risk of pest and disease outbreak. According to the authors, organic farming may not be used to out-ware the benefits of chemical control system that is environmental friendly. The study became necessary to determine the extent of awareness and adoption of these improved agricultural innovations in boosting food production since most farmers still use the crude farming practices. The awareness of male and female farmers was necessary because farming and use of these improved agricultural innovation is not gender sensitive.

Furher, Ani, Ogunnika and Ifah (2004) opined that awareness of agricultural innovation or technology, interest in it and even trial of it do not automatically guarantee adoption. Farmers may be desirous of adopting new practices but may be constrained by inadequate information about that particular innovation, which may in part be caused by inability of the extension personnel to reach the farmers. It has been reported that why most farmers stick to old practice may be as a result of economic inability on the part of the farmers to afford the cost of innovations, risk involved, ignorance of existence of innovations plus their conservative attitude (Dimelu & Emodi, 2012). The productive/utilization system of agricultural innovation is dependent on the farmers and farm. The agricultural innovation transfer sub-system (delivery extension/advisory services, actors and agencies etc) facilitate rural development programmes and provide information on the socio-economic and cultural environment of the farmers which are fed into the technology generating sub-systems for modification and to guide decisions on research priorities.

Furthermore, it has been observed that farmers have been blamed for poor adoption on the ground that they are conservative. The level of adoption should not always be used in measuring success or failure of agricultural innovation because awareness or education delivery mechanism is to a large extent responsible for sources or failure of farmers' adoption and utilization of innovative farming procedures. Awareness is the consciousness and level of enlightenment which an individual or group possess about a particular concept. The creation of agricultural programmes and innovation awareness is done by the extension agents. The extension agents according to Agbarevo (2013) are charged with the responsibility of ensuring that farming practices and other agricultural innovation are delivered to the rural farmers. Adoption of the innovation focuses on behavioral changes in the farmers farming practices and perception, while learning situations focus on extension personnel and their activities. The effectiveness of extension personnel in conducting its activities can be used to assess success of extension programme. This is because if appropriate teaching/learning situation is provided, it follows that learning or relatively permanent and positive change in behavior of the farmers would take place an

-d consequently lead to adoption to real life situation.

In Ebonyi State, it is seen that the extent to which the extension workers are going in educating the farmers are not enough. This is evidenced on the use of crude tools and negative attitude towards use of some rural farmers in Ebonyi State. This has resulted to poor control of pest, insects, low crops yield and negative attitude to improve seeds in farming (Dimelu & Emodi, 2012). Against this background the study tends to determine the extent of farmers awareness and adoption of improved agricultural innovation in Ebonyi State.

1.1 *Statement of the Problem*

Agricultural development is driven by the dynamics of supply and demand of farm knowledge among farmers. This developmental efforts have largely emphasized investment in science and technology; projecting research as the sole source of innovations and technological change as a panacea for social and economic development. Educating the farmers to be aware and adopt these research finding and innovation in farming practices has become necessary for proper agricultural development. Ideally, it is the function of interaction and linkages among extension workers, the improved agricultural innovations instead of blaming the farmers on their conservative attitude. The problem of the study is to determine the extent of farmers' awareness and adoption of improved agricultural innovations in Ebonyi State.

1.2 *Purpose of Study*

The main purpose of the study was to determine the extent of awareness and adoption of improved agricultural innovations in Ebonyi State. Specifically, the study sought to determine:

1. The extent of farmers' awareness of improved seeds in their farming activities in Ebonyi State.
2. The extent of farmers' adoption of chemical control system in their farming activities in Ebonyi State.

1.3 *Research Questions*

The following research questions guided the study:

1. To what extent were farmers' aware of improved seeds in their farming activities in Ebonyi State?
2. To what extent did the farmers' adopt chemical control system in their farming activities in Ebonyi State?

1.4 *Hypotheses*

The following null hypotheses were tested at 0.05 level of significant:

Ho_1: There is no significant difference between the mean responses of registered farmers and extension agents on the extent of farmers' awareness of the use of improved seeds in their farming activities in Ebonyi State.

Ho_2: There is no significant difference between the mean responses of registered farmers and extension agents on the extent of farmers' adoption of chemical control system in their farming activities in Ebonyi State.

1.5 *Method*

The study adopted a survey research design. A survey research design according to Alio (2008) and Nworgu (2015) is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The design was used to elicit information

from farmers and extension agents on the extent of farmers' awareness and adoption of improved agricultural innovations in Ebonyi State. The population for the study was 367 which comprised 258 registered farmers and 109 extension agents in the three agricultural zones of the State. There was no sampling due to the manageable size of the population.

The instrument for data collection was a questionnaire developed by the researcher after an extensive literature review. The questionnaire contained 17 items grouped into two sections according to the research questions that guided the study. The instrument was structured in four point rating scale of Very Much Aware (VMA), Much Aware (MA), Aware (A) and Not Aware (NA) and Very High Extent (VHE), High Extent (HE), Low Extent (LE), and Very Low Extent (VLE) with numerical values of 4, 3, 2 and 1 respectively. The instrument was validated by three experts, two in Agricultural Education of Department of Technology and Vocational Education and one from Measurement and Evaluation of Department of Science and Computer Education Enugu State University of Science and Technology, Enugu. Their corrections and contributions guided the researcher in producing the final instrument used for data collection. The reliability of the instrument was determined using Cronbach Alpha which yielded 0.74 indicating that the instrument was good for data collection.

A total of 367 copies of the questionnaire were distributed by the researcher and three briefed research assistants. Out of 367 copies distributed 354 were properly filled and used for data analysis representing 96.46 percent return rate. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significant. The decision was based on the principle of upper and lower limit of;

Very Much Aware (VMA);	Very High Extent (VHE)	3.50 – 4.00
Much Aware (MA);	High Extent (HE)	2.50 – 3.49
Aware (A);	Low Extent (LE)	1.50 – 2.49
Not Aware (NA);	Very Low Extent (VLE)	1.00 – 1.49

1.6 *Results*

The result of the study is presented according to the research questions and hypothesis that guided the study.

II. Research Question 1

To what extent were farmers' aware of improved seeds in their farming activities in Ebonyi State.

Table 1. Mean Rating and Standard Deviation on the Extent of Farmers Awareness of Improved Seeds in their Farming Activities in Ebonyi State.

S/N	Extent of farmers' awareness of improved seed	Registered farmers		Extension Agents		Overall		Decision
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
1	Improved seeds are resistance to disease	2.00	1.09	1.34	0.79	1.69	0.94	Aware
2	They produce more yield	1.23	0.47	1.35	0.56	1.30	0.52	Not Aware
3	They are adaptable to all kinds of soil	1.09	0.73	1.39	0.91	1.24	0.82	Not Aware

4	They are in multiples of varieties to the farmers choice	1.96	0.99	2.13	1.07	2.05	1.03	Aware
5	Some improved seed are seasonal compatible for all year round farming	1.48	1.01	1.39	1.00	1.44	1.01	Not Aware
6	Improved seeds are in all crops	1.33	1.03	1.69	0.98	1.49	1.01	Not Aware
7	Improved seeds are available in their locality	1.40	0.89	1.59	1.07	1.49	0.98	Not Aware
8	Improved seeds are cheap and affordable	1.73	1.05	2.49	1.01	2.11	1.03	Aware
9	Improved seeds are resistance to disease	1.55	0.98	1.69	0.87	1.82	0.79	Aware
Grand mean/SD		**1.53**	**0.92**	**1.67**	**0.92**	**1.63**	**0.90**	**Aware**

The result of data analysis shows that the mean rating 1.30, 1.24, 1.44, 1.49 and 1.49 were obtained for items 2, 3, 5, 6 and 7 indicating not aware. While item 1, 4, 8 and 9 have mean rating of 1.69, 2.05, 2.11 and 1.82 showing that the respondents are aware of improved seeds in their farming activities in Ebonyi State. The overall are just aware of improved seeds in their farming activities in Ebonyi State. The low standard deviation shows that the respondents have consensus opinion in their responses.

2.1 *Hypothesis 1*

There is no significant difference between the mean responses of registered farmers and extension agents on the extent of farmers' awareness of improved seeds in their farming activities in Ebonyi State.

Table 2. T-Test Statistics on the Mean Rating of Registered Farmers and Extension Agents on the Extent of Farmers' Awareness of Improved Seeds in their Farming Activities in Ebonyi State.

Variable	$\bar{X}$	SD	N	Df	P	t-cal	t-tab	Decision
Farmers	1.53	0.92	251	352	0.05	1.247	1.96	Not Significant
Extension agents	1.67	0.92	103					

The result of null hypothesis tested shows that the t-calculated value of 1.247 is less than the critical level of 1.96. Since the t-calculated is less the null, hypothesis is therefore not significant. The implication is that there is no statistical difference between the mean rating of registered farmers and extension agents on the extent of farmers' awareness of improved seeds in their farming activities in Ebonyi State.

III. Research Question 2

To what extent did farmers' adopt chemical control system in farming activities in Ebonyi State?

Table 3. Mean Rating and Standard Deviation on the Extent Farmers Adopt Chemical Control System in Farming Activities in Ebonyi State.

S/N	Extent of adoption of chemical control system	Registered Farmers		Extension Agents		Overall		Decision
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
1	Use of seed dressing chemical	1.47	1.09	1.39	1.01	1.43	1.05	Very Low Extent
2	Use of storage chemical	2.35	1.03	2.52	0.96	2.44	1.00	Low Extent
3	Use of herbicides	2.31	0.89	2.47	0.84	2.39	0.87	Low Extent
4	Use of insecticides	2.41	0.97	2.56	0.89	2.49	0.93	Low Extent
5	Use of chemicals in disease control	2.51	0.76	2.46	0.81	2.48	0.79	Low Extent

6	Fertilizer application	2.64	0.90	2.73	0.69	2.69	0.80	High Extent
7	Use chemical in clearing the farm	2.63	0.88	2.79	0.83	2.71	0.86	High Extent
8	Use of seed dressing chemical	2.35	0.98	2.42	0.89	2.41	0.83	Low Extent
	Grand mean/SD	**2.33**	**0.94**	**2.42**	**0.86**	**2.38**	**0.89**	**Low Extent**

The result presented in **Table 3** shows that item 10 has 1.43 indicating that chemicals are used to a very low extent in dressing seeds. Items 10, 11, 12, 13, 14 and 17 have mean rating of 1.43, 2.44, 2.39, 2.49, 2.48, and 2.41 showing that chemical control system are used to a low extent on the items and item 15 and 16 have mean rating of 2.69 and 2.71 respectively indicating that fertilizer application and chemical in clearing the farm have been adopted by the farmers in their farming activities.

3.1 *Hypothesis 2*

There is no significant difference between the mean responses of registered farmers and extension agents on the extent of farmers' adoption of chemical control system in farming activities in Ebonyi State.

Table 4. T-test Statistics on the Mean Rating of Registered Farmers and Extension Agents on the Extent of Farmers' Adoption of Chemical Control System in Farming Activities in Ebonyi State.

Variable	$\bar{X}$	SD	N	Df	P	t-cal	t-tab	Decision
Farmers	2.33	0.94	251	352	0.05	0.82	1.96	Not Significant
Extension agents	2.43	0.86	103					

The result of null hypothesis tested shows that the t-calculated value of 0.82 is less than the critical level of 1.96. Since the t-calculated is less the null, hypothesis is therefore not significant. This depicts that there is no statistical significant difference between the mean rating of registered farmers and extension agents on the extent of farmers' adoption of chemical control system in farming activities in Ebonyi State.

IV. Major Findings of the Study

Based on the result of data analysis, the following findings were made:

1. The findings of the study showed that the farmers' are just aware of the use of improved seeds in their farming activities. The items include; improved seed are adaptable to all kinds of soil, improved seed are in all crops, improved seeds produce more yields etc.
2. The hypothesis showed that there is no significant difference between the mean rating of farmers and extension agents on the extent of farmers' awareness of improved seeds in their farming activities in Ebonyi State.
3. The findings also showed that the farmers' adopted the use of storage chemical, herbicides, insecticide etc to a low extent. Also, the adoption of the use of seed dressing chemical was to low extend while fertilizer application and use of chemical in clearing the farm was adopted by farmers' to a high extend.
4. The hypothesis showed that there is no significant difference between the mean rating of farmers' and extension agents on the extent of farmers' adoption of chemical control system in farming activities in Ebonyi State.

V. Discussion of Findings of the Study

The study revealed that the farmers' are aware of the use of improved seeds in their farming activities in Ebonyi State. The findings among others include that the farmers' are not aware that improved seeds are resistant to disease, produce more yield, adaptable to all kinds of soil and improved seeds are in multiples of varieties to the farmers' choice. The study further revealed that effort needs to be increased in educating farmers on the use of improved seeds that can improve yield, resistant to diseases, adaptable to soil condition and ability to be planted in all the seasons. This is supported by Agbarevo (2013) that extension agents should be encouraged to increase their education of farmers'. Proper motivation of extension agents will ensure that farming practices and other agricultural innovations are delivered to the farmers. The farmers' and extension agents agreed to a low extent that farmers' and agents have adopted the use of chemical control system. Low extent of adoption was due to poor awareness and traditional believes of the farmers. The findings showed that there is no significant difference between the mean rating of registered farmers and extension agents on the extent of farmers' awareness of improved seeds in their farming activities in Ebonyi State.

Further, the study found among others that farmers' adopted the use of storage chemical, herbicides, insecticides, chemical in disease control to a low extent. Also, the adoption of the use of seed dressing chemical is to a very low extent. Fertilizer application and the use of chemical in clearing the farm are adopted by farmers to a high extent. The result of the study depicted that educational programme for awareness is needed by the farmers on the use of chemical control system in their farming activities to increase food production and boost the economic condition of the farmers. The findings are in agreement with Dimela and Emodi (2012) that farmers are yet to adopt the use of chemical control system in their farming activities. Dimela and Emodi (2012) further noted that non-adoption of this chemical control system has resulted to high attack from insects and pest that destroy the agricultural farm produce. The test of hypothesis showed that there is no statistical significant difference between the mean rating of registered farmers and extension agents on the extent of farmers' adoption of chemical control system in their farming activities in Ebonyi State.

VI. Conclusion

Based on the findings of the study, the following conclusions are made: farmers were not aware of the improved seeds and their chemicals adoption was to a low extent used in farming activities. This showed that adoption of improved farming activities and innovation is dependent on the level of awareness. There is need to create awareness among the farmers on the adoption of innovative farming practices to ensure improved production. Some of the improved agricultural innovations include organic farming, improved seed, seed dressing chemical, storage chemical, use of fertilizer and other mechanized operation. Effort needs to be geared towards practical and demonstration awareness in creation by the extension agents.

VII. Recommendations

Based on the findings, the following recommendations were made:

1. Increased practical demonstration awareness should be conducted to educate the farmers on the use of improved agricultural innovations in seeds planting.
2. Extension agent should be encouraged so as to increase in educating the farmers on how to use chemical in

controlling pest, diseases and dressing of the seeds.

3. Improved seeds should be made available and affordable to the farmers by the government and extension agents to encourage the farmers use.

REFERENCES

[1] A.C. Iheanacho, 'Economics of Millet Production under Different Cropping Systems in Borno State of Nigeria. PhD Thesis, Ahmadu Bello University Zaria, 2000, Unpublished.
[2] A.N. Alio, 'Fundamental of Educational Research,' Enugu. Samireen Nigeria Ltd. 2008, pp. 35-50
[3] A.R. Ayoade and J.O. Akintonde, 'Constraints to Adoption of Agricultural Innovations among Women Farmers in Isokan Local Government Area of Osun State. International Journal of Humanities and Social Science, 2012, 2nd ed. Vol. 8, pp. 57-61.
[4] B.G. Nworgu, *Educational Research, Basic Issues and Methodology*. Nsukka University Trust publisher, pp. 15-40.
[5] M.N.B. Agbarevo, 'Farmers' Perception of effectiveness of agricultural Extension delivery in Cross-River State, Nigeria,' Journal of Agriculture and Veterinary Science, 2013, 2nd ed. Vol. 6, pp. 1.7.
[6] M.U. Dimelu and A.I. Emodi, 'Strategies for Enhancing Linkage in the Agricultural Innovation Transfer sub-system in South-Eastern Nigeria.' Journal of Agricultural Science, 2012, 3rd ed. Vol. 1, pp. 35-44.
[7] O. Ogunnika and S.S. Ifah, 'Relationship between Socio-Economic Characteristics of Rural Women Farmers and their Adoption of Farm Technologies in Southern Ebonyi State Nigeria.' International Journal of Agriculture and Biology, 2004, 6th ed. Vol. 5, pp. 2-9.
[8] T. Tugrul and M. Ajit, 'The Agricultural Innovation System of Azerbaijani; Functions, Linkages and Constraints.' Discussion paper, Hague, Netherland.

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