
**ECONOMIC OF PLANTAIN PRODUCTION UNDER WEED MANAGEMENT STRATEGIES INTEGRATED
WITH ORGANIC MATTER AT AFAHA NSIT, AKWA IBOM STATE, NIGERIA**

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ABSTRACT

The study examined the services of Agricultural Extension among women farmers in the adoption of integrated weed management in Akwa Ibom North-West Senatorial District, Akwa Ibom State. Three research questions and three null hypotheses guided the study. Survey research design was adopted for the study. The population of Agricultural Extension Officers was 196 while the number of registered Women farmers was 2,436. A stratified random sampling was used to sample 41 Agricultural Extension Officers and 487 women farmers. The researchers developed instrument titled Agricultural Extension Services and Adoption of Integrated Weed Management among Women Farmers Questionnaire (AESAIWMWFQ). The questionnaire was used to generate data for the study. Means were used to answer research questions while t - test statistics was used to test null hypotheses at 0.05 level of significance. The results showed that the women farmers needed training in all the components of integrated weed management in order to overcome challenges associated with manual weed control, hence the services of Agricultural Extension among women farmers was insignificant as regards the adoption of integrated weed management in Akwa Ibom North-west Senatorial District. It is recommended among others that women farmers should be trained and informed through seminars and workshops on the appropriate strategies for weed management by the government.

KEYWORDS: Women Farmers, Agricultural Extension Officers, Integrated Weed Management, Training and Adoption.

Introduction

Women farmers play vital roles in food production and food security in Nigeria. They account for 70% of Agricultural workers, 80% of food producers, 100% of food processors and they undertake from 60% to 90% of marketing agricultural produce and products (Ephraim and Godiya, 2007). Among all the farming activities, the level of involvement by women in weed control is alarming since uncontrolled weed causes crop yield losses varying from 5 to 100% (Ekpo, Udosen and Umo-mac, 2019). Chikoye, Manyong, Carsky, Gbehouno and Ahanchede (2002) noted that small holder farmers spend 50-100% of their total available farm labour on

weed control and this is usually carried out by hoe weeding characterized by cumbersomeness, energy wastage, scarcity of labour, drudgery and comparative high cost.

In the rural communities, the burden of weeding heavily rests on shoulders of women farmers. Aster (2015) noted that women being major stakeholders play a significant role in crop production and processing. For instance, women contribute about 90% of the hand weeding, and in some cases where the burden is huge and unbearable, children are withdrawn from schools to assist in hoe weeding, an action that compromises the future of the home (Aster, 2015). In order to minimize the burden and the consequences of hoe weeding, integrated weed management (IWM) has been advocated by many researchers (Ekpo, (2011) and Udosen et.al, (2016)). The integrated weed management describes the combination of two or more weed management strategies at low inputs to obtain a level of weed suppression superior to that obtained when one weed management system is used (Ekpo et al, 2019).

Poor technical knowledge in the adoption of integrated weed management by women farmers makes them to rely almost entirely on their traditional hand-weeding (Ekpo et.al, 2010). The different skills involved in integrated weed management have reached excellent levels beyond traditional approach hence agricultural extension services become necessary to actualize this scientific knowledge in weed suppression. Currently, the services of Agricultural Extension in Akwa Ibom State concentrate on quality and quantity of cash produce and sometimes on yield of arable crops by way of distributing farm inputs. Farmers cannot successfully adopt new skills when awareness and training are not established. Skill involves acquisition of performance of an operation (Osimen and Nwoji, 2005). Women farmers need holistical training in various existing weed management strategies to enable them progress to commercial farmers since weeds are the most serious threat to food production in the tropics (Ekpo,2019). In view of the challenges facing women farmers in the suppression of weeds, this study was undertaken to examine the services of agricultural extension officers and adoption of integrated weed management among women farmers in Akwa Ibom North-west Senatorial District.

Statement of the Problem

The prevalent hand-weeding is cumbersome, strenuous, costly, scarcity of labour and it requires repeated operations. Farmers usually limit large area of land to small size because of weed suppression. Agricultural Extension Officers have been gearing efforts in the distribution of farm inputs and rarely in the training of farmers for effective weed management. Moreover, chemical weed control is very expensive and difficult to use accurately hence, integrated weed management option becomes imperative.

Objectives of the Study

This study examined the services of Agricultural Extension Officers to women farmers vis-à-vis the adoption of integrated weed management (IWM). Specifically, the study sought to determine:

- i. The services of Agricultural Extension Officers and the adoption of cultural practices as component of integrated weed management strategy among women farmers in Akwa Ibom North-west Senatorial District.

- ii. The services of Agricultural Extension Officers and the adoption of accurate cover crops population as component of integrated weed management strategy among women farmers in Akwa Ibom North-west Senatorial District.
- iii. The opinion of Akwa Ibom Agricultural Development Programme (AKADEP) Staff (Extension Agents, Women in Agriculture (WIA) personnel and subject matter specialists) and the adoption of integrated weed control as component of integrated weed management strategy among women farmers in Akwa Ibom North-west Senatorial District.

Research Questions

The following research questions guided the study.

- i. To what extent do Agricultural Extension Officers train women farmers in the adoption of cultural practices as component of integrated weed management (IWM) strategy?
- ii. How do Agricultural Extension Officers train women farmers in the adoption of accurate cover crop population as component of integrated weed management strategy?
- iii. What are the opinions of (AKADEP), Staff, (Extension Agents, (WIA) personnels and subject matter specialists) and the adoption of integrated weed control as component of integrated weed management strategy among women farmers in Akwa Ibom North-west Senatorial District?

Research Hypotheses

Hypothesis 1: There is no significant difference in the mean responses of women farmers in the rural and the urban locations in Akwa Ibom North-west Senatorial District as regards their adoption of cultural practices as component of integrated weed management strategy.

Hypothesis 2: There is no significant difference in the mean responses of women farmers in the rural and urban locations in Akwa Ibom North-west Senatorial District as regards their adoption of accurate cover crop population as component of integrated weed management strategy.

Hypothesis 3: There is no significant difference in the mean responses of AKADEP Staff in the rural and urban locations in Akwa Ibom North-west Senatorial District as regards the adoption of integrated weed control as component of integrated weed management strategy by women farmers.

Research Methodology

Design of the study

The study used survey research design. Responses of women farmers and Agricultural Extension Officers on weed management were recorded.

Area of the Study

The study covered ten Local Government Areas that constitute Akwa Ibom North-west Senatorial District.

Population of the Study

The population of the study was 2,436 registered women farmers in Akwa Ibom North-west Senatorial District of Akwa Ibom State. A total population of 989 women farmers from the urban area and 1,447 from the rural area (Membership register, AKADEP, 2017) a total population of 196 Agricultural Extension Officers was used for the study.

Sample and Sampling Technique

Stratified random sampling technique based on location was used to select 480 women farmers as sample for the study, 289 from rural area and 191 women from the urban. A total of 41 Agricultural Extension Officers were sampled for the study.

Instrumentation

The researchers designed instrument titled "Agricultural Extension Services and adoption of Integrated Weed Management among Women Farmers Questionnaire (AESAIWMEFQ)". The values attached to the response scale of the questionnaire were Strongly Agreed, Agreed, Disagreed and Strongly Disagreed.

Validation of Instrument

The instrument (AESAIWMEFQ) was subjected to face and content validation by three research experts in the area of the study.

Reliability of the Instrument

The suitability of the instrument was further strengthened, when (AESAIWMEFQ) was administered once on a group of 30 farmers who were not participants but were equivalent to the research subject in all respects. The data obtained from the administration were analyzed using split-half, the scores obtained were subjected to Cronbach Alpha and a reliability index of .79 was obtained.

Data Analyses

Mean statistics were used to answer the research questions, while independent t-test was employed in testing the null hypotheses at .05 level of significance.

Decision Rule: In rating of the responses of the instrument, the perceived services of the agricultural extension officers in integrated weed management for women farmers were considered as options of the adoption of skills in weed suppression "Strongly Agreed" (SA) response was rated 4, "Agreed was rated (A) 3, "Disagreed (D) as 2 and "Strongly Disagreed" (SD) was rated 1. The decision was taken because of the responses spanned from positive to negative. "Strongly Agreed" and "Agreed" responses constituted the weed management training needed by the women farmers. "Disagreed" and "Strongly Disagreed" responses

implied no training is needed. In order to answer the research questions, the following ranges guided the decision.

- (i) Items whose means scores range from 2.50 or above was accepted as agreed while any item with a mean below 2.50 was regarded as disagreed.
- (ii) If the calculated - t is greater than the critical t at 0.05 alpha level, the null hypothesis is rejected,
- (iii) If the calculated -t is less than the critical -t at 0.05 alpha level the null hypothesis is retained.

Administration of Instrument

Forty-one (41) copies of questionnaire were administered to the Agricultural Extension Officers, while 487 copies of questionnaire were administered to the women farmers.

Results

Research Question One: To what extent do Agricultural Extension Officers train women farmers in the adoption of cultural practices as component of integrated weed management (IWM) strategy?

Results of research question 1 are presented on table 1

Table 1: Agricultural Extension Officers and the adoption of cultural practices as weed management strategy by women farmers in Akwa Ibom North-west Senatorial District. N = 480

S/N	Items	Mean	Remark
1	The practice of crop rotation for weed suppression introduction of early maturing, early branching and the use of broad leaf crop	2.71	Agreed
2	The selection of crops to escape weed infestation and minimize seed weed germination and rigorous growth of weed seedlings	3.00	Agreed
3	The practice of introducing leguminous cover crop or any edible cover crop into the rotation to check weeds and/or also maintains soil fertility.	3.10	Agreed
4	The practice of fallowing land with non-edible cover crops to check multiple springing up of weed species in the ecosystem	2.61	Agreed
5	The practice of mixed cropping to minimize the establishment of weed community.	2.73	Agreed
	Average Mean Response	2.83	Agreed

Field Study, 2021

Result in Table 1 reveals that the mean responses for item number 1-5 is greater than the average rating point of 2.50. Also, the average mean response of 2.83 indicates that women farmers in Akwa Ibom North-west Senatorial District require training in cultural practices as means of weed suppression.

Research Question Two: How do Agricultural Extension Officers train women farmers in the adoption of accurate cover crops population as component of IWM strategy?

Results of research question 2 are presented on table 2

Table 2: Agricultural Extension Officers and the adoption of accurate cover crop population by women farmers in the study area. N = 480

S/N	Items	Mean	Remark
6.	Utilization of seed rate to determine the cover crop population for weed suppression	3.25	Agreed
7.	Supply of adequate number of cover crop seeds to maintain, recommended crop population	2.85	Agreed
8.	Supply of adequate number of cover crop seedlings to maintain recommended crop population	2.70	Agreed
9.	Efficient crop combination to determine the accurate population of cover crops to enhance weed suppression as component of IWM strategy	2.65	Agreed
	Average Mean Response	2.86	Agreed

Field work, 2021

Results in Table 2 shows that the mean responses for item number 15-18 are greater than 2.50. The average mean response of 2.86 indicates that women farmers in Akwa Ibom North-west Senatorial District require training in accurate cover crops population as a component of IWM strategy.

Research Question Three: What are the opinions of AKADEP staff and the adoption of integrated weed control as component of integrated weed management strategy among women farmers in Akwa Ibom North-west Senatorial District?

Results of research question 3 are presented on table 3

Table 3: Mean Responses of AKADEP Staff and the adoption of integrated weed control as component of integrated weed management strategy. N = 480

S/N	Items	Mean	Remark
10	Selection of weed control based on cropping system	2.80	Agreed
11	Selection of two or more control methods as weed management strategy	3.74	Agreed
12	Selection of weed control based on method of soil Tillage	3.83	Agreed
13	Selection of crops based on quick maturity to minimize weed infestation	2.90	Agreed
14	Selection of weed control based on crop competitiveness and canopy development	3.17	Agreed
15	Selection of weed control based on ability to smother weeds	2.70	Agreed
16	Selection of weed control based on sustainability	2.90	Agreed
17	Selection of weed control based on the technological level of farmers	3.20	Agreed

18	Selection of weed control method based on popular cover crops in the locality	3.00	Agreed
19	Selection of weed control based on the characteristics of the weed species	3.25	Agreed
	Average Mean Response	3.13	Agreed

Field work, 2021

Results in Table 3 reveals that the mean responses for item 19-28 are greater than the average rating point of 2.50. The average mean response of 3.15 indicates that the women farmers in Akwa Ibom North-west Senatorial District require training in integrated weed control.

Hypothesis One: There is no significant difference in the mean responses of women farmers in the rural and urban locations of Akwa Ibom North-west Senatorial District as regards their adoption of cultural practices as component of integrated weed management strategy

Table 4: t-test Analysis on the mean responses of women farmers in the rural and urban locations of Akwa Ibom North-west Senatorial District as regard their adoption of cultural practices. N = 480

Variables	N	\bar{x}	SD	df	t-cal	t-cri	Decision
Rural	289	3.05	1.06	478	1.81	1.96	NS
Urban	191	2.88	1.04				

NS = not significant at $p < 0.05$ alpha level

Table 4 shows that the mean response for rural women is 3.05 while that of urban women is 2.8. The calculated $t(1.81)$ is less than the critical $t(1.96)$ at df of 478 and 05 level of significance. Hence, the null hypothesis is retained. Therefore, there is no significant difference in the rural and urban locations of Akwa Ibom North-west Senatorial District as regards their training and adoption of cultural practices as component of IWM strategy.

Hypothesis Two: There is no significant difference in the mean response of women farmers in Akwa Ibom North-west Senatorial District as regards the adoption of accurate cover crop population as component of integrated weed management strategy.

Table 5: t-test Analysis on the mean responses of women farmers in the Rural and Urban locations of Akwa Ibom North-west Senatorial District as regard their adoption of accurate cover crop population.

Variables	N	\bar{x}	SD	df	t-cal	t-cri	Decision
Rural	289	3.75	1.44	478	1.07	1.96	NS
Urban	191	3.60	1.51				

NS = not significant at $p < 0.05$ alpha level

Table 5 reveals that the mean response for rural women farmers is 3.75 while that of urban women farmer is 3.0. The calculated $t(1.07)$ is less than the critical- $t(1.96)$ at df of 478 and .05 level of significance. Hence, the null hypothesis is retained. Therefore, there is no

significant difference in the mean responses of women farmers in the rural and urban locations of Akwa Ibom North-west Senatorial District as regards their training in accurate cover crop population as a component of integrated weed management strategy.

Hypothesis Three: There is no significant difference in the mean responses of AKADEP staff in the rural and urban locations in Akwa Ibom North-west Senatorial District as regards the adoption of Integrated Weed control as component of integrated weed management strategy by women farmers.

Table 6: One Way ANOVA for AKADEP Staff (Extension Agents, WIA personnels, subject matter specialist) opinion and the adoption of integrated weed control.

Sources of Variation	Sum of Squares	df	Mean Square	F
Between Groups	4624,87	2	1629.118	2.01*
Within Groups	3607.70	96	91.509	
Total	8232	98		

*= Not significant at 95% probability

The F- ratio at 2.01 is less than the critical value of 3.19 in Table 6 at degrees of freedom of 2 and 96 at 0.05 level of significance, the null hypothesis is retained, it is therefore concluded that there are no significant differences between the three groups of AKADEP Staff, and the mean rating of their responses on women farmers adoption of integrated weed management strategy.

Discussion of Results

The average mean responses in research question one, 2.83 indicated that women farmers in Akwa Ibom North-west Senatorial District require training in the adoption of cultural practices as component of weed suppression. The inference is that the women farmers agreed to be trained in the adoption of cultural practices as component of integrated weed management strategy. The finding is in line with the findings of Youdeowei, Kaigama, Ogbazi and Adesina (2009) that cultural practices such as soil tillage helps to eliminate competition of weed growth and improvement of the physical condition of the soil.

The average mean responses in research question two, 2.86 indicated that women farmer in Akwa Ibom North-west Senatorial District require training in the adoption of accurate cover crops population. This showed that the women farmers agreed to be trained in the adoption of accurate cover crops population as component of integrated weed management strategy. This finding is in agreement with Ekpo et,al (2019) who reported that the use of egusi-melon (*Colocynthes citrillus*), at 10,000 plants/ha in the plantain plots suppressed weed effectively.

The average mean responses in research question three, 3.13 indicated that women farmers in Akwa Ibom North-west Senatorial District require training in the adoption of integrated weed control. This indicated that the women farmers agreed to be trained in the adoption of integrated weed control. This finding collaborate with that of Njoku (1996) who reported that an appropriate integrated weed management is one that economically combine two or more weed management strategies at low input to obtain a level of weed suppression superior to that obtained when one weed management system is used.

Results of the hypotheses showed no significant difference (0.05) for adoption of cultural practices, accurate cover crops population and integrated weed control as components of integrated weed management strategies in both urban and rural locations. The finding is in agreement with the finding of Nwagwu (2005), reported that increasing melon densities per hectare would help check weeds by suppressing them. In support of the findings, Ekpo, et.al (2019), reported that integrated weed control involves an interaction of selected control practices for the different weeds based on the interaction between all pests and diseases with various control measures on the economies and other considerations for the total system.

Conclusion

Training needs of the women farmers in integrated weed management components have been identified such as cultural practices, adoption of accurate cover crop population, and the opinions of AKADEP staff on the training of urban and rural women farmers to adopt integrated weed control as component in integrated weed management. Consequently, Services of Agricultural Extension Officers were insignificant in the adoption of integrated weed management by women farmers in Akwa Ibom North-West Senatorial District.

Recommendations

- 1 Workshop, seminars and on farm visits on the adoption of IWM should be organized by AKADEP personnel for women farmers in Akwa Ibom North-West Senatorial District.
2. The Government of Akwa Ibom State should provide incentives for the AKADEP staff to enhance the training on IWM for women farmers in rural areas.
- 3 Associations and groups should be formed by women farmers to ensure cooperation and en-masse turn out for their training.

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