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Sustainable Weed Management in Arable Crop Production and Training Needs of Women Farmers in Ikot Ekpene Senatorial District of Akwa Ibom State, Nigeria

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Abstract

Currently hoe-weeding is the major weed control adopted by women farmers who formed the bulk of farming population in Africa. This measure is costly, very cumbersome, drudgery, less attractive and may require several operations. In view of this it became necessary to carry out a study on Sustainable Weed management and Training Needs of Women Farmers in Ikot Ekpene Senatorial District of Akwa Ibom State, Nigeria in 2013. Five objectives, five research questions and five null hypotheses guided the study. Descriptive survey design was used for the study. The population of the study was 2,436 women farmers in Ikot Ekpene Senatorial district of Akwa Ibom State. A stratified random sampling technique was used to select 480 women farmers to constitute

the sample size. The researchers developed instrument titled, "Women Farmers Training Needs for Weed Management in Arable Crop production Questionnaire (WOFTWAPQ)" and this was used to generate data for the study. The instrument was validated by three experts. The reliability of the instrument was established using Cronbach alpha and the reliability coefficient was 0.93. Mean was used to answer the research questions. The findings of the study revealed that women farmers are in need of training in soil tillage, cropping system, determining crop population; crop spacing and integrated weed control as weed management strategies. It was recommended among others that women farmers should be trained and informed through seminars and workshops on the appropriate strategies for weed management to boost arable crop production in Africa.

Arable crop production in the tropics is associated with annual and perennial weeds growth which are sometimes difficult to control. Hence, weed infestation and shortage of labour for weed control are major crop production constraints in Africa.

The losses caused by weed exceed any other category of agricultural pest in Africa for instance of the total annual losses of agricultural produce weed accounts for 45%, insects 30%, diseases 20% and other pests 2% (TNAU, 2008). Consequently, Chikoye, Manyong, Carsky, Gbehounou and Ahanchede (2002) that small holder farmers spend 50-100% of their total available farm labour on weed control.

At present much is not achieved in the technology of weed control by rural farmers despite several research reports by weed scientists (Buhler, 2002). Hoe-weeding stands out very prominent as the major method of controlling weeds in Africa. Two or three timely hoe-weeding is recommended for arable crop production depending on the crop maturity and weed species (Ekpo and Ndaeyo, 2011). This manual weeding is now very costly, scarce, slow, cumbersome, drudgery, less attractive and may require several operations. Consequently the African youths of both sexes prefer other job opportunities to farming with its attendance drudgery.

However, the dominant farming groups involved in weeding in rural communities in Africa are women (Afolabi, 2006). They have not fully acquired technological skills in agricultural production (Okon, 2008). In Nigeria women account for 70% of agricultural workers, 80% of food producers, 100% of food processors and they undertake from 60% to 90% in marketing agricultural produce and products while in Zimbabwe crops such as sweet potatoes, groundnut and millet are classified as

women's crops (Ephraim and Godiya, 2007). All these crops fall under arable crops that may require two or three hand weedings before harvesting.

Hence, training need for African women to acquire skills in sustainable weed management for the production of arable crops becomes necessary. Such training needs include soil tillage, cropping system, crop population, crop spacing and integrated weed management. The significance of training has long been recognized; considering our today's business ultimate and the exponential growth in technology with its effect in the economy and society at large hence the need for training should be more pronounced than ever.

On the basic of this background this study was undertaken to assess the training needs of women farmers for sustainable weed management in arable crop production in Ikot Ekpene senatorial district, Akwa Ibom State, Nigeria.

Statement of the Problem

Arable crops have a slow rate of initial growth and this gives them poor weed competition. They are susceptible to severe weed competition at their early stages of growth. In African environment where rainfall, humidity and other favourable weed growth factors are available in abundance, weeds grow fast and become well established before the establishment of the crops.

The arable crops mostly being cultivated by the African women are characterized by poor growth rate and low level of technology resulting in low yield of the economic products. The African women require training and education on integrated weed management practices that is sustainable in African environment, particularly now that the main issue in Nigeria agriculture like other African countries is that of low productivity as a result of low level of technological inputs.

Purpose of the Study

This study assessed the training needs of women farmers' as a weed management strategy in arable crop production in Ikot Ekpene senatorial district of Akwa Ibom State, Nigeria. Specifically, the study determined the women farmers training needs in soil tillage, cropping system, crop population, crop spacing and integrated weed management.

Significance of the Study

It is anticipated that the findings of this study would be appreciated by the women in the study area and other parts of Africa with low level of crop production technology with a view to improving productivity. Most importantly, the study would provide data and information to extension agents who will incorporate relevant

instructional strategies to enhance meaningful acquisition of training skills to minimize weed competition in arable crop production.

Research Questions

The following research questions guided the study.

1. What are the women farmers training needs in soil tillage as a weed management strategy in Ikot Ekpene senatorial district?
2. What are the women farmers training needs in cropping system as a weed management strategy in Ikot Ekpene senatorial district.
3. What are the women farmers training needs in integrated weed management strategies as a weed management option in Ikot Ekpene senatorial District of Akwa Ibom State.

Research Method

Design and Area of the Study: The study was a survey research design involving women in agriculture in Ikot Ekpene senatorial district in Akwa Ibom State, Nigeria.

Population of the Study: The population of the study consisted of 2436 registered women farmers in Ikot Ekpene senatorial district.

Sample and Sampling Technique: Stratified random sampling technique was used to select 480 women farmers as sample for the study. This sample size was adequate as 10% of the population is acceptable as minimum.

Instrumentation

A Questionnaire comprising of closed ended structured items with a four point rating response options was used.

The questionnaire was segmented from A and B and constructed towards improving the current weed management strategies adopted by the respondents.

The values attached to the response scale of the questionnaire were strongly agreed SA (4) Agreed (A) (3), Disagreed D (2) and Strongly Disagreed (SD)(1).

The mean value was 2.50, this was calculated from the values attached to the response scale $(4+3+2+1) = 10/4 = 2.50$.

Decision Rule

Any value of weighted mean of or above 2.50 needs training. This is used as criterion for rejection or acceptance.

Administration of Instrument

The questionnaire was administered by Agricultural extension workers with the cooperation of local leaders in Agricultural association called women in Agriculture. Four hundred and eighty questionnaire were administered and retrieved. This instrument was found reliable since the reliability coefficient or index was 0.93 using Cronbach alpha approach.

Method of Data Analysis

The research questions were answered using mean statistics.

Results

Research Question 1

What is the women farmer's training needs in soil tillage as a weed management in Ikot Ekpene senatorial district of Akwa Ibom State?

Table 1: Training Needs in Soil Tillage as a Weed Management Strategy (n = 480)

S/N	Item	X	Remark
1.	The use of spade in light tillage	3.15	Training Needed
2.	Mound construction	3.11	Training Needed
3.	Conventional tillage	2.94	Training Needed
4.	The use of hand trowel for tilling around the crop for the application of fertilizer and or manure	2.98	Training Needed
5.	Ridge construction	3.07	Training Needed
	Average mean response	3.09	

Data analyses in table one indicates that the mean responses for item number 1-5 are greater than the average rating point of 2.50. Besides the average mean response of 3.09 showed that the women farmers in Ikot Ekpene senatorial district need training in soil tillage for weed management in arable crop production. They require training in the use of spade in light tillage, conventional tillage, ridges and mounds construction and the use of hand trowel for tilling around the crop during fertilization.

Research Question 2

What is the women farmer's training needs in cropping system as a weed management strategy in Ikot Ekpene senatorial district of Akwa Ibom State?

Table 2: Training Needs in Cropping System as a Weed Management Strategy
(n= 480)

S/N	Item	X	Remark
1.	The practice of a 3-year course in rotation to suppress weed in arable crop production.	3.01	Training Needed
2.	The practice of a 4-year course in crop rotation to suppress weeds in arable crop-production.	3.16	Training Needed
3.	The practice of planting recommended crops in alternative row to suppress weeds in arable crop-production.	3.11	Training Needed
4.	The planting of crop in sequence to enhance weed management.	3.19	Training Needed
5.	The practices of introducing smother creeping leguminous cover crops into crop rotation to suppress weed.	3.12	Training Needed
6.	Fallowing of land to regain lost nutrients as well as minimizing weed growth	3.01	Training Needed
	Average mean response	3.11	

Data analyses in table two revealed that the mean responses for all the six items ranged from 3.01 – 3.19 and were greater than 2.50. The average mean response of 3.11 revealed that women in the study area needed training in cropping system for weed management in arable crop production.

The areas of training cover the practice of crop rotation, fallowing, introduction of leguminous cover crops and planting of more than one type of crop in alternate row for weed suppression.

Research Question 3

What are the women farmers training need in determining crop production as a weed management strategy in Ikot Ekpene senatorial district of Akwa Ibom State?

Table 3: Training Needs in Determining Crop Population as a Weed Management Strategy (n = 480)

S/N	Item	X	Remark
1.	Utilization of seed rate to determine the population of crop for suppression of weed	3.25	Training Needed
2.	Determining planting distance of different crops for optimum crop population and weed suppression.	3.02	Training Needed
3.	Reducing excess crop seedlings to determine the population of crops for weed suppression.	3.18	Training Needed
4.	Efficient crop combination to determine the population of crops enhance weed suppression.	3.15	Training Needed
	Average mean response	3.15	

Data analyses in table three show that the average mean response for all the items (1-4) was 3.15 indicating that the women farmers in Ikot Ekpene senatorial district require training in crop population for weed management in arable crop population. They need training in seed rate utilization, determining of planting distance, reduction in excess crop seedlings and efficient crop combination to determine the optimum crop population that could enhance weed suppression.

Findings of the Study

The women farmers needed to be trained in cropping system for weed management to include the practice of 3-year and 4-year course in crop rotation for weed suppression in arable crop production.

Further more they also needed the planting of crops in sequence, introduction of leguminous cover crops, planting of more than one type of arable crop on a piece of land, fallowing of land and planting of crops on row such that the inter and intra spacing contribute to enhance weed suppression.

In addition, the women farmers require training in soil tillage as a weed management strategy. Proper tillage, mound making, making of ridges before planting is better than zero tillage because it would help to suppress weeds and hence reduce the frequency of weeding.

Women farmers require training in cropping system including determination of crop population, proper crop rotation, proper selection of arable crops that have the tendency to cover the soil and thereby minimize weeding frequency and at the same

time provides food in addition to the main crop. Competitive crop types, and smother crops and quick maturing cultivars will enable better weed management hence they need training in crop maturing rate and morphotypes to enable them control weeds meaningfully at relatively low cost.

Most importantly, the women farmers require training in integrated weed management which is the key to sustainable weed management in contemporary agriculture. The integrated weed management includes prevention of weed infestation, crop rotation, proper tillage, cropping system, cover crops, and proper crop spacing among others.

Discussion of Findings

The results of this study revealed that women farmers require training in soil tillage, cropping system cum crop population and integrated weed management. Soil tillage helps to eliminate competition of weed growth and improvement of the physical condition of the soil. The finding of the study also go in line with the work of Akpan et al (2010) that soil tillage control weeds, improve soil physical conditions and consequently increase crop yield.

The results also reveal that the women farmers require training in cropping system as a weed management strategy. This is supported by Buhler (2002) that crop rotation is useful to destabilize the colony of weed species and it is very effective in weed suppression. Mixture of crop provides a more complete cover for the soil and therefore shades weeds and prevents their growth (Nwagwu, 2002).

Intercropping prevents the usurpation of space by weeds and rather substitutes a profitable crop and reduces the need for frequent weeding (Imebuogu, 2000). Similarly Unamma et al (2006) reported that intercropping kept weed population lower than sole cropping. Ekpo and Ndacyo (2011), Ekpo, Ndaeyo, and Udosen (2010) maintained that increasing the population of crop checked weed population in *egusi*-melon and vegetable cowpea by suppressing and smothering them.

Most importantly, the farmers require training in integrated weed management in the studying area. The study reported by Buhler (2002) supported the findings in this direction that integrated weed management is the key to the development of alternative weed management system in the short and long run. Good tillage combined with proper cropping, good crop population, cover crops in intercropping system definitely presents integrated weed management as a key to sustainable weed management in the tropics (Chikoye, 2000).

Educational Implication of the Findings

The implication of the findings to educators is that women farmers lack the knowledge and skills relating to weed management in arable crop production due to lack or inadequate training of women farmers popularly called Women in Agriculture in Nigeria by Agricultural extension agents. Hence, if women farmers are trained effectively on weed management strategies, crop yield and productivity will increase because weed is the most problematic pest which the African farmers must overcome to improve crop production.

Conclusion

Base on the findings, it is concluded that women farmers are in need of training in soil tillage, cropping system, optimum crop population, and integrated weed management in Ikot Ekpene senatorial district of Akwa Ibom State.

Recommendations

Base on the findings of the study, the following recommendations were necessary.

1. Associations and groups should be formed by women farmers to ensure cooperation and en masse training by either association or government.
2. Workshops and seminars should be organized for women in Ikot Ekpene senatorial district to be informed and trained in the appropriate weed management.
3. Government should provide basic amenities for the extension workers to encourage them visit the rural areas regularly so that they can help train the women farmers on sustainable weed management.

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