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# **SUSTAINABLE AGRONOMIC PRACTICES: TRAINING NEEDED IN SECOND PLANTING SEASON BY WOMEN FARMERS IN IKOT EKEPENE SENATORIAL DISTRICT, AKWA IBOM STATE, NIGERIA**

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## **Abstract**

*At present, second season planting in Akwa Ibom State is mainly practised by women farmers. This farming is facing a lot of drawbacks including low level of technology, disease, pest and weed infestation and low soil fertility. In the light of this, a research was carried out from July 2013 to April, 2014. Six objectives and four research questions guided the study. Descriptive survey design was used for the study. The population of the study was 1200 women farmer. A stratified random sampling technique was used to select 250 women farmers to constitute the sample size. The instrument used for collection of data was questionnaire. Mean was used to answer the research questions. Independent t- test was used to test the hypotheses at 5% probability level. The results showed that both rural and urban women farmers are in need of sustainable agronomic practices in farming systems, tillage, seed treatment, weed control, type and methods of fertilizer application and crop protection. The rural women farmers were the majority (88.0%), while the urban women counterpart constituted 12%. It was recommended that women farmers should be trained and properly informed through seminars and workshops by Women in Agriculture and Agricultural Extension Officers in order to minimize food insecurity in offseason food production.*

**Keywords:** Planting, Second-Season, Training, Women Farmers

Sustainable agronomic practices for food production can be referred to the food production that can be attained and maintained without jeopardizing the future of the ecosystem. The poor agricultural practices constitute a major threat to ecosystem, food security and sustainability (Bello, 2010). Notably, women farmers in Nigeria are not vested with the necessary sustainable agricultural practices that are environmental friendly and enhance steady food production (Ekpo, Ekpo and Ekong 2014). These women form 70% of agricultural workforce and play active role in agriculture and

contributing substantially to both subsistence and commercial rainfed agriculture (Ephraim and Godiya, 2007).

Although the bulk of food production from women in Nigeria depends on early rainfed agriculture; the season could not supply food and income all year round (Afolabi, 2008). Moreover, the problems associated with early planting season include severe water logging, leaching, erosion, pests, diseases, increase in weeding frequency, timing of cereal harvest, wind hazards and rain interference with some agricultural operations (Ekpo, 2002). Crop production during this season is always high resulting in the saturation of the market (Ibekwe and Adescope, 2010).

The second phase of rainfed agriculture (second planting season) begins in August or early September while dry season begins in December. In recent time, on set and cessation of the rains fluctuate because of climate change across sub-saharan Africa (Bello, 2010). However, during this planting season several food crops are produced including cassava, maize, legumes, vegetable and other local food crops. The short duration of rainfall from August to November does not allow the establishment of permanent crops.

This season has the ultimate goal of increasing food production in the state. It is characterized by relatively low rainfall intensity and duration. The production of food in the off season marks second phase of rainfed agriculture very remarkable as it increases farmers income, raise their standard of living and socio-economic life of the farmers (Afolabi, 2010).

However, in second planting season germination of seeds is difficult due to increase in soil hazard and limited sunlight. Pest infestation is common and leaching is also a natural problem. Untimely cultivation always results in poor crops establishment and development resulting in poor yield. Therefore sustainable agronomic practices in any planting season become necessary to maximize yield potential of crops (Obi and Ahmed, 2014).

In the light of the above, this research was carried out to improve upon the farming skills in second planting season and thereby increasing the production capacity of the Women farmers in Ikot Ekpene Senatorial District of Akwa Ibom State, Nigeria.

### **Statement of the Problem**

Second season planting is gradually becoming a way of life of some women farmers in Akwa Ibom State but they have little technology to overcome the problems associated with this planting season. The women require training to increase their

productivity particularly now that the main issue in Nigeria agriculture is that of low productivity.

### **Purpose of the Study**

This study assessed the technological skills needed by women farmers in the study area in second planting season. The training needed covers the farming system, pre-planting, planting and post-planting operations.

### **Significance of the Study**

The findings of this study would be beneficial to the women farmers in the study area vis-à-vis their productivity, acquisition of sustainable crop production technology and improvement upon their standard of living.

### **Research Questions**

The following research questions guided the study

- (i) What are the women farmers training needs in farming system to raise soil fertility level and conserve soil moisture?
- (ii) What are the women farmers training needs in pre-planting observations to achieve timely cultivation and maintain crop establishment?
- (iii) What are the women farmers training needs in planting operations to maintain uniform seed germination?
- (iv) What are the women farmers training needs in post-planting operations to achieve proper fertilizer management and to maintain healthy crop stands?

### **Research Hypotheses**

The following null hypotheses guided the study and were tested at 0.05 level of significance.

**HO<sub>1</sub>:** There is no significant difference in the skills acquired on sustainable agronomic practices in farming system between the Urban and rural women farmers in second planting season in Ikot Ekpene senatorial district, Akwa Ibom State, Nigeria.

**HO<sub>2</sub>:** There is no significant difference in the skills acquired on sustainable agronomic practices in pre-planting operations between the urban and rural women farmers in second planting season in Ikot Ekpene senatorial district Akwa Ibom State, Nigeria.

**HO<sub>3</sub>:** There is no significant difference in the skills acquired on sustainable agronomic practices in planting operations between the urban and rural women farmers in second planting season in Ikot Ekpene senatorial district, Akwa Ibom State, Nigeria.

**HO<sub>4</sub>:** There is no significant difference in the skills acquired on sustainable agronomic practices in post planting operations between the urban and rural women farmers in second planting season in Ikot Ekpene senatorial district, Akwa Ibom State, Nigeria.

### **Research Method**

**Design and Area of the Study:** The study was a descriptive survey involving registered women in Agriculture in Ikot Ekpene, senatorial district, Akwa Ibom State.

**Population of the Study/Sample Size:** The population of the study consisted of 1200 viable registered women in Agriculture in July, 2013. Stratified random sampling technique was used. The approach was by sampling one member in every five members plus all the ten women executive. The sample size was 250.

**Instrumentation:** A questionnaire comprising closed ended structured items with a four point rating response options was used except section A (socio-economic status of the women farmers). In sections B, C, D and E the values attached to the response scale of the questionnaire were very great extent (4) great extent (3) low extent D(2) not at all SD (1).

The mean value was 2.50; this was calculated from the values attached to the response scale  $(4 + 3 + 2 + 1) = 10 \div 4 = 2.50$ . The data collected were analysed using the item mean for determining the skills acquired or not acquired; that is low extent using a criterion mean of 2.50. The t-test was used in testing the hypotheses. All the hypotheses were tested at 0.05% level of significance.

**Administration of Instrument:** The questionnaire was interpreted in the local dialect and administered by Agricultural extension workers with the cooperation of local leaders in Agricultural Association called 'Women in Agriculture. Two hundred and fifty questionnaires were distributed, monitored and retrieved. This instrument was found reliable with a coefficient or index of 0.96 using Cronbach alpha approach.

**Method of Data Analysis:** The data were analysed using frequency counts and percentages for section A. The criterion mean scale was used to answer the research questions. A t- test analysis was used to test the hypotheses.

The socio-economic characteristics of respondents in Table I below shows that the women farmers with First School Leaving Certificate (FSLC) formed the majority with 39.2% followed by 33.2% who could not have their FSLC and some were illiterates. The farm size ranged from less than 0.5 to 1.5 hectare indicating that the majority practised subsistent farming (90.4%). The Majority of the respondents were married (88.4%) and 88% lived in rural communities. They adopted intercropping mostly cassava/ maize (56.4%). The majority of the respondents involved in the early rainfed agriculture (58.4%). The age ranged from 41-50 (79.20%) formed the highest population. Generally, the respondents had insufficient income with majority (85.6%) with income level of ₦50,000 to ₦99,000/annum.

## Results

**Table I: Socio-Economic Characteristics of Respondents**

Variable	Frequency	Percentage
<b>Educational Background</b>		
First School Leaving Certificate (FSLC)	98	39.2
Below FSLC and illiterate	83	33.2
Secondary School Leavers	40	16.0
Secondary School Certificate Examination (SSCE)and Above	29	11.6
Total	250	
<b>Age Range</b>		
30 - 40	30	12.0
41 - 50	198	79.2
51 - 60	22	9.8
Total	250	
<b>Main Occupation</b>		
Subsistent farming	226	90.4
Commercial Farming	24	9.6
Total	250	
<b>Marital Status</b>		
Married	221	88.4
Single	29	11.6
Total	250	
<b>Farm size (Ha)</b>		
<0.5	10	4.0
0.6 - 1.0	98	39.2
1.1 - 1.5	118	47.2
>1.5	24	9.6
Total	250	

<b>Location</b>		
Rural	220	88.0
Urban	24	12.0
Total	250	
<b>Main Crop Combination</b>		
Maize/fluted pumpkin (Telfaria)	69	27.6
Cassava/maize	141	56.4
Okro/fluted pumpkin	40	16.0
Total	250	
<b>Seasonal Planting</b>		
Both Early and Second Planting	85	34.0
Only the Early Planting	146	58.4
Only the Second Planting	Nil	
Early planting/Dry season/Fadama Farming	19	7.6
Total	250	-
<b>Farm Income per Annum</b>		
100,000 – 150,000 (High)	24	9.6
50,000 – 99,000 (Medium)	214	85.6
10,000 – 49,000 (Low)	12	4.8
Total	250	

### Research Question I

What are the women farmers training needs in farming system to raise soil fertility level and conserve soil moisture?

**Table 2: The Farming Systems Training Needs in Second Planting Season**

S/N	Items	$\bar{x}$	Remark
1	The practice of crop rotation maintains soil fertility, suppress weeds and provides income all year round	2.09	TN
2	The practice of crop rotation enhances economic use of land.	2.18	TN
3	Alley cropping has the potential of conserving soil moisture and improve upon soil texture, structure and fertility	2.21	TN
4	The practice of mixed farming maintains soil fertility and increases income.	1.26	TN
	Average mean response	1.94	



#### **TN= Training Needed**

Table 1 shows that the mean responses for item number one to four are less than the average rating point of 2.50 hence the women farmers in the study area need training in the adoption of sustainable farming systems that would be compatible with the second planting season.

#### **Research Question 2**

What are the women farmers training needs in pre-planting operations to achieve timely cultivation and maintain crop establishment?

**Table 3: Training Needs in Agronomy Practices at Pre-Planting Operations in Second Planting season.**

S/N	Items	$\bar{x}$	Remark
1	Early preparation of land awaiting the rain break in August or early September for actual planting	2.00	TN
2	Deep tillage skill to produce mounds for root crops particularly in swampy cultivation	2.11	TNN
3	Proper tillage of the soil for rapid rooting of the seedling, control of pests and weeds	2.07	TN
4	Procure viable seeds from the nearest agricultural extension offices to minimize seed replacement after germination	1.06	TN
5	Seed treatment against pests and soil borne fungi before planting using local substance or conventional approach	1.07	TN
6	Raised bed cultivation to minimize water logging.	2.90	TN
	Average mean response	1.86	

#### **TN= Training Needed: TNN = Training Not Needed**

Data analyses in table 2 revealed that all the six items required training by the women farmers except item number 2. The average mean response of 1.86 was less than 2.50 indicating that women farmers in the study area needed agronomic training in pre-planting operations.

#### **Research Question 3**

What are the women farmers training needs in planting operations to maintain uniform germination of seeds and sprouting of cassava stem?



**Table 4: Training Needs in Agronomic Practices at Planting Operations in Second Planting Season.**

S/N	Items	$\bar{x}$	Remark
1	Planting depths in second season planting are relatively shallower than the conventional depth in the early planting season.	2.15	TN
2	Seeds removed from pulp need partial drying before planting.	2.87	TNN
3	Seed germination test is very important to predict crop establishment since replacement is always risky.	1.07	TN
4	Planting of legumes and highly valued crops second season is very important.	2.23	TN
5	Planting of early maturing crop in swampy cultivation to escape flooding.	2.12	TN
Average mean response		2.08	

TN= Training Needed

In Table 3, all the items required training by the women farmers except item number 2. The average mean response of 2.08 is less than the criterion scale of 2.50 indicating that training is needed in most of the planting operations.

#### Research Question 4

What are the women farmers training needs in post-planting operations to achieve proper fertilizer management and to maintain healthy crop stands?

**Table 5: Training Needs In Agronomic Practices At Post-Planting Operations In Second Planting Season.**

S/N	Items	$\bar{x}$	Remark
1	Use of pesticide on growing crops to control pest infestation particularly on vegetables.	2.08	TN
2	Timely application of fertilizer when the soil is moist and when the rain is receding.	1.87	TN
3	Application of a mixture of compost manure and compound fertilizer or a mixture of poultry droppings and compound fertilizer or straight fertilizer.	1.25	TN
4	Split application of fertilizer to minimize losses due to leaching.	2.11	TN
5	Use of organic mulching materials at rain recession to conserve soil moisture.	1.08	TN
6	Practice of integrated weed management to reduce weeding cost and increase productivity	1.01	TN
Average mean response.		1.57	

*Sustainable Agronomic Practices: Training Needed In Second Planting Season By Women Farmers In Ikot Ekepene Senatorial District, Akwa Ibom State, Nigeria*-**Timothy Udo Udo Ekpo (Ph.D)**

**TN = Training needed**

In table 4, the average mean response is 1.57 less than 2.50. This indicates that the women farmers required training in post-planting operations listed from item number 1-6.

**Hypothesis I**

**Table 6:** Independent t-test Analysis of Urban and Rural Women Farmers on the Skills Acquired on Sustainable Farming Systems in Second Planting Season in Ikot Ekpene Senatorial District, Akwa Ibom State

Location of women farmers	N	$\bar{x}$	SD	DF	t-cal	t-crit	Decision
Urban -based	30	3.12	0.95				
Rural -based	220	3.19	1.03	248	0.87	1.96	Ho is upheld

P= 0.05

In table 6 the t-calculated (0.87) is less than the t-critical (1.96) at 0.05 level of significance and 248 degree of freedom (df) since the calculated value of t is less than the therefore not rejected. This indicates that there is no significant difference between the mean response scores of urban and rural -based women farmers vis-a-vis the skills acquired on sustainable farming systems.

**Hypothesis II**

**Table 7:** Independent t-test Analysis of Urban and Rural Women Farmers on the skills Acquired on Sustainable Agronomic Practices in Planting Operations in Second Planting Season in Ikot Ekpene Senatorial District, Akwa Ibom State

Location of women farmers	N	$\bar{x}$	SD	DF	t-cal	t-crit	Decision
Urban -based	30	2.81	0.89				
Rural -based	220	2.90	1.07	248	0.66	1.96	Ho is upheld

P= 0.05

Table 7 shows that the t-calculated (0.66) is less than the t-critical value at 0.05 level of significance and 248 df. This indicates that location did not influence the practice of sustainable agronomic practices in pre-planting operations during second season planting in the study area.

### Hypothesis III

**Table 8:** Independent t-test Analysis of Urban and Rural Women Farmers on the skills Acquired on Sustainable Agronomic Practices in Planting Operations in Second Planting Season in Ikot Ekpene Senatorial District, Akwa Ibom State

Location of Women Farmers	N	$\bar{x}$	SD	DF	t-cal	t-crit	Decision
Urban -based	30	2.61	0.84				
Rural –based	220	2.64	1.01	248	0.82	1.96	Ho is upheld

P= 0.05

Table 8 shows that the t-calculated (0.82) is less than the t- critical value (1.96) at 0.05 level of significance and 248 df. This indicates that there is no significant difference between the mean response score of urban and rural women farmers on the skill acquired on sustainable planting operations in the study area.

### Hypothesis IV

**Table 9:** Independent t-test Analysis of Urban and Rural Women Farmers on the skills Acquired on Sustainable Agronomic practices in Post- Planting Operations in Ikot Ekpene Senatorial District, Akwa Ibom State

Location of Women Farmers	N	$\bar{x}$	SD	DF	t-cal	t-crit	Decision
Urban -based	30	3.01	0.97				
Rural –based	220	3.05	1.12	248	1.01	1.96	Ho is upheld

P= 0.05

Table 9 shows that the t-calculated (1.01) is less than the t- critical value hence the null hypothesis is not rejected. This indicates that location was not a factor to the skill acquired by women farmers at second season planting in the study area.

### Discussion

The socio- economic characteristics of the respondents indicated low academic background among others this could be attributed to the general low educational background of the middle aged women in the study area. This confirms the report by Peters and Akpan (2014) that many women from local homes did not have access to education in Nigeria because of traditional ideology.

The majority of the respondents (90.4%) were subsistent farmers which indicates that the farmers had small farm size and low level of technology. This confirms the report by Ayayi and Nwalieji (2010) that there are low inputs supply and low level of technology among small holder farmers in Nigeria.



The study reveals that 88.4% and 88% of the farmers were married and lived in rural communities respectively. The married life had a positive effect on farm labour while their location enhances direct access to available land and farm inputs. This supports the assertion that over 70% of food production in sub-Saharan Africa come from rural communities (Bello, 2010).

The majority of farmers preferred first planting season to second planting season probably the season is suitable for all tree and food crops adapted to the study area. This is in line with the report by Afolabi (2008) that the mainstay of Nigerian agriculture is the early rain fed cultivation. The practice of intercropping is to reduce risk, increase income and maximize land productivity as reported by Ayawale and Alimi (2004). The cultivation of Telfaria by majority of the farmers is a clear indication that it is the preferred vegetable of the south-south and south – eastern Nigerians. This vegetable is currently becoming very popular, lucrative and assumes national reckoning (Dam, 2012). Generally, the income level of the farmers was inadequate to meet family challenges. This is in support of the report by Ajibade (2006) that majority of the rural women in Nigeria do not generate income enough to support their family and they have little access to production inputs such as land, credit facilities and labour saving devices. The low extent of practising sustainable farming system in the study area has adverse impact on the farmers income and their productivity. The practice of mixed farming and crop rotation normally increase productivity and welfare among small holder farmers and maintain soil fertility (Obi and Ahmed, 2014). Alley farming would address the increasing ecological stress imposed by population pressure as reported by Audi, Abakura and Daniel (2009).

Similarly, the respondents had low extent approach in the practice of sustainable soil preparation for planting. Appropriate soil preparation and methods are soil and crop specific. Agede and Ojeniyi (2003) reported that planting of root crops on mounds increase yields of roots and tuber crops than planting on flat. Deep tillage gave lower soil temperature, bulk density, higher porosity and good crop growth (Adeleye and Ojeniji 2006).

Planting of early maturing crops in second planting season would enhance early maturity before the onset of dry season; why high value crops in the off season would increase the profitability of the cropping enterprise as reported by Ekpo (2002). Seed germination test selects viable seeds that would maintain the healthy crop stands since replacement of seeds stands to increase risk knowing very well that the planting season is critical and absolutely marginal. Partial drying of seeds would enhance germination and minimize effect of soil hazards on the germination of the seeds. Intercropping with legumes would not only increase productivity but also fix nitrogen in the soil (Ojeniyi, 2010).

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The application of organic manure by the women farmers falls below expectation. Generally the farmers depend on chemical fertilizer which is currently very costly and most cases not available. In Nigeria, about 63% of agricultural soils are low in productivity and over 90% are low in organic matter and active clays; furthermore soils of Nigeria need to be replenished with organic manure since crop yield declines with years of cultivation even when fertilizers are used (Oyeniyi 2010).

Mulching and planting of edible cover crops would enhance soil moisture conservation particularly in the dry season since second season planting exposes crops to raining season and partly to dry season. So far, the traditional hoe-weeding adopted by the farmers is cumbersome, costly and drudgery. The practice of integrated weed management as reported by Ekpo, Ekpo and Ekong (2014) usually reduces weeding cost, makes farming enterprise profitable and also addresses the issues of drawbacks associated with hoe-weeding.

### **Conclusion**

It is concluded that the women farmers in Ikot Ekpene Senatorial District, Akwa Ibom State, Nigeria are in need of training in sustainable agronomic practices such as farming system, pre-planting, planting and post planting operations.

### **Recommendations**

- (1) Government should provide basic amenities for the extension agricultural workers to enable them effect proper training to women farmers in rural communities.
- (2) Associations and groups should be formed by women farmers to ensure cooperation and make enmasse training easier and effective.
- (3) Workshops and seminars should be organized for women in Ikot Ekpene Senatorial District to be informed and trained on sustainable agronomic practices.

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