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Policy Advocacy for Sustainable Agricultural Development Strategies: A Panacea for Green Economy Initiative in Imo State, Nigeria

Onubuogu, G.C and N.S Esiobu
Department of Agricultural Economics, Extension and Rural Development, Imo State University, Owerri, Nigeria
Email: successachivers2k@gmail.com

Abstract
Green economy upholds the efficient use of natural resources and energy while enabling economic growth that supports efficient social equity, sustainable agricultural production and improvement of rural and urban livelihoods thus alleviating poverty. It is only under these conditions that farmer's sustainable agricultural development strategies can prevail in Imo State, Nigeria. One hundred and twenty households farmers were selected using multi-stage random sampling techniques. Well structured questionnaire was the main tool for data collection. Data collected were analyzed using descriptive statistical tools and multiple linear regression. The mean age was 48.12years. Majority (63.33%) were males. Greater proportions (70.00%) were married with an average household size of 6.21 persons. Farmers cultivated on an average farm size of 1.26Ha. Average farm income was ₦82,782.00 ($551.88).The study identified environmental, economic and social dimensions of farmers sustainable agricultural development strategies for promoting green economy initiative in the area. Estimated multiple linear regression shows that age, household size, education, farm income, educational level and farm size influence the adoption of various sustainable agricultural development strategies for green economy initiatives at 1% level of probability respectively. The F-ratio was (68.926), revealing the overall significant of the regressor at 1% level of probability. Farmers complained of inadequate information and inadequate fund as the major barrier to sustainable agricultural development strategies for sustainable green economy initiatives in the study area. It was therefore recommended that effective agricultural policies and programmes should focus on how to intensify awareness on the use of sustainable agricultural development strategies to boast green economy initiative in the area. Government at all levels and private's support fund is necessary to enhance sustainable green economy initiative. Adoption of sustainable agricultural development strategies for green economy initiative is necessary, given the negative trends in climatic variables in recent times. Ultimately, in greening the economy, agricultural sector remains the major pre-requisite in view of safeguarding the sector's natural asset base over time in the area and beyond.
Keywords: Sustainable agricultural development strategies, Green economy initiative, Climate change, Socio-economic variables, Multiple linear regression, Constraints, Imo State

INTRODUCTION

Ensuring food security all year round for a fast growing global population estimated at 9.1 billion in 2050 and over 10 billion by the end of the twenty first century is a enormous challenge for the present agricultural production system (OCED, 2012). Meanwhile, the term "Green Economy" is used to describe as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNPFA, 2011). Therefore, green economy refers to all activities or actions that help reduce carbon emissions into the atmosphere which is a major component of greenhouse gases that enhances global warming thus causing climate change. Further, green economy upholds the efficient use of natural resources and energy while enabling economic growth that supports creation of job opportunities and improvement of livelihoods thus alleviating poverty. It is only under these conditions that sustainable development can prevail. However, sustainable agricultural development refers to the incorporation system of crops, plant and livestock production strategies to reduce environmental impact on human, crops and livestock thereby enhancing efficient and sustainable agricultural production over time (Chaudhury *et al.,* 2014).Sustainable agriculture satisfies human and livestock food and fiber needs, enhance environmental quality and agricultural production and make the most effective and efficient use of non-renewable resource and integrated where appropriate, natural cycles and controls, sustains the economic viability of farm operation and enhance the quality of life for farmer and society as a whole (TEEB,2012). Since green economy is a panacea for sustainable agriculture development strategies, it becomes not only worth pursuing but inevitable. Green economy provides the best eco-friendly option to ensure future agricultural sustainability. Green economy initiative is a key to counteracting the global negative impact of climate change. Meanwhile, Onubuogu and Esiobu (2014) asserted that climate change is a significant and sustained average adjustment in the geometric distribution of global environment over time. Adoption of sustainable agricultural development strategies is vital and necessary, given the negative trends in climatic

variables in recent times. This would help in the reduction of green house gases (CO_2, CFC) which the depletion of our ozone layer, provide eco-friendly environment and enhance green economy initiative in Imo State and beyond. Unfortunately, unsustainable agricultural strategies have led to poor agricultural productivity as well as poor adaptation to green economy initiative in Imo State, Nigeria. The poor performance of farmers and poor adoption of green economy initiative may be attributed to farmers lack of use of sustainable agricultural strategies and poor awareness about these sustainable agricultural strategies. Particularly, in Imo State, Nigeria, little or no study has rigorously modeled sustainable agricultural development strategies along with green economy initiative. The absence of these studies has left a void in research, empirical evidence remains largely scanty, isolated and devoid of in-depth analysis of policy advocacy for sustainable agricultural development strategies and road map for green economy in the Imo State, Nigeria. This creates a deep vacuum in research, knowledge and literature. Thus, the study is considered worthy and significant for further research. To fill this dearth in research, it becomes pertinent that the study is undertaken.

METHODOLOGY

The study was carried out in Imo State, Nigeria. Imo State is located in the eastern zone of Nigeria. It is delineated into 27 local government areas. The State lies between latitudes 5^0 48^1N and 6^0 08^1N of the equator and longitudes 6^0 14^1E and 7^0 02^1E of the Greenwich Meridian (Chineke *et al.,* 2011). It occupies the area between the lower River Niger and the upper and middle Imo River. It is bounded on the east by Abia State, on the west by the River Niger and Delta State; and on the north by Anambra State, while Rivers State lies to the south. Imo State covers an area of about 5,067.20 km^2, with a population of 3,934,899 (NPC, 2006 and NBS, 2007) and population density of about 725km^2 (Ministry of Lands and Survey Owerri, 1992). The State has three Agricultural zones (Orlu, Owerri, and Okigwe Zones). These divisions are for administrative and extension services and not for any agro-ecological difference. The State has an average annual temperature of 28°C, an average annual relative humidity of 80%, average annual rainfall of 1800 to 2500mm and an altitude of about 100m above sea level (Imo ADP, 2004). Ultimately, Imo State was selected because of proximity, cost, familiarity and predominates by farmers. Multistage random sampling technique was in selection of respondent. Firstly, the three agricultural zones of the State were selected. In each agricultural zone, two Local Government Areas (LGAs) was randomly selected. In each of the selected LGA, ten communities were randomly selected. Ultimately, twelve farmers were randomly selected in each of the community to give a sample size of one hundred and twenty households farmers for the study. The main tool for data collection was a set of structured questionnaire and it was supplemented with oral interview in places where the respondents could neither read nor write. The questionnaire sought for information on socio-economic characteristics of the farmers sustainable agricultural development strategies and constraints to sustainable agricultural development.

The list of farmers in the communities, which forms the sample frame, was obtained from extension agents in the communities. Data collected were analyzed with descriptive statistics and multiple linear regression. The rate of involvement in green economy initiative was computed as the total number of sustainable agricultural development strategies (environmental, social and economic dimensions) of individual farmer divided by the total number of sustainable agricultural development strategies (environmental, social and economic dimensions) available in the study area or transferred by extension agents in the study area. It is expressed in proportion (%). The implicit model is given as follows:

$Y = f(X_1,X_2,X_3,X_4,X_5,X_6,X_7,X_8,X_9,X_{10}+e_i)$

Where Y = number of sustainable agricultural development strategies (environmental, social and economic dimensions) practiced for green economy initiative (%)

X_1=Age (Years)

X_2=Membership of cooperative society (member=1, otherwise=0)

X_3 =Educational level (Years)

X_4 =Farm size (Hectares)

X_5 =Household size (Number of persons)

X_6 =Gender (1=male, 0=female)

X_7 = Marital status (married =1, single =0)

X_8 =Farm experience (Years)

X_9 = Extension contact (number of visits per month)

X_{10} = Annual farm in (₦)

e_i = error term

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Farmers

Table 1 reveals that majority (46.50%) of the farmers fell within the age bracket of 41-50 years. The mean age was 48.12years. The implication of the finding is that there is a huge hope in sustenance of green economy

initiative in the area as these younger farmers are more likely to adopt new innovation and other sustainable agricultural development strategies faster than the older ones. This finding is in line with Esiobu *et al.,* (2014a) who reported that majority of farmers within the age range of 41 to 50 years are still in their active age, more receptive to innovation more technically efficient, effective and could withstand the stress and strain involved in for sustainable agricultural development strategies. As shown in **Table** 1 majority (63.33%) were males. This result indicates that both men and women are involved in agricultural production in the study area but males were more involved than women. The finding is a positive hope for green economy initiative in the area as both gender are key in achieving eco-friendly environment for agriculture production to strive and sustaining green economy initiative in the study area. The implication of males greater proportion may be that technical efficiency and productivity is expected to be higher because males have the tendency to be more labour efficient (Onubuogu *et al.,* 2014). Entries in **Table 1** also show that majority (43.33%) of the farmers had secondary education. The mean educational level was 12.37 years. The result implies that approximately 87.63% of the farmers had trainings in formal educational institutions which no doubt increases their literacy levels. It is expected that the higher level of education of the farmers in the area will contribute significantly to understanding the concept of sustainable agricultural development strategies as well as to the concept of green economy initiative. Extension agents in the study area will have less work to do in educating the farmers due to the findings. The result supports the finding of Okoli *et al.,* (2014) who reported that exposure to high level of education is an added advantage in terms of achieving huge income and running efficient and sustainable agribusiness enterprise. **Table** 1 also reveals that majority (70.00%) were married. This shows that agricultural production in the area is an enterprise of married individuals, who are seen to be responsible according to societal standards (Onubuogu *et al.,* 2013). The implication of the finding is that married farmers would be more involved in sustainable agricultural development strategies, effective and efficient than their single counterpart in counteracting the negative impact of climate change and sustaining green economy initiative in the area. Since they would have easy access to production variables such as land and large family size which are traditionally owned and provided by household heads (husbands) to compliment family labour to enhance production, reduce the cost of hired labour and resource use efficiency of the household farmers.

Table 1: Socio-economic Characteristics of Farmers

Age (years)	Frequency	Percentage (%)
Less than 40	42	35.00
41-50	57	47.50
51-60	21	17.50
Total	120	100.00
Gender		
Male	76	63.33
Female	44	36.67
Total	120	100.00
Educational Level (Years)		
No formal education	26	21.67
Primary	32	26.67
Secondary	48	40.00
Tertiary	14	11.67
Total	120	100.00
Marital Status		
Married	84	70.00
Single	21	17.50
Widowed	15	12.50
Total	120	100.00
Farming Experience (Years)		
Less than 10	16	13.33
10-19	70	58.33
20-30	24	20.00
31 and above	10	8.33
Total	120	100.00
Household Size (Number of Persons)		
1-5	42	35.00
6-10	78	65.00
Total	120	100.00
Membership of Cooperative		
Member	81	67.50
Non member	39	32.50
Total	120	100.0
Extension Contact (Number of Visits)		
1-2	83	69.17
3 and above	38	31.67
Total	120	100.00
Average Farm Income (₦aira)		
Less than 20,000	4	3.33
21,000-40,000	24	20.00
41,000-60,000	14	11.67
61,000-80,000	68	56.67
81,000 and above	10	8.33
Total	120	100.00
Farm Size(Ha)		
Less than 1.0	70	52.50
1.0-1.5	45	48.33
1.6-2-0	5	15.83
Total	**120**	**100.00**

Average age = 48.12 years; Mean Educational level= 12.37 years; Average Farming Experience = 22.91 years; Mean household size= 6.21persons; Average farm income = ₦82,782.00 ($551.88); Mean Farm size = 1.26Ha

Source: Field Survey Data, 2014

Result in **Table** 1 also indicates that majority (58.33%) had 10-19 years of farming experience. the mean farming experience was 22.91 years. Experience in agribusiness enhances output performance. The finding supports Onubuogu and Esiobu (2014) who reported that farmers with higher years of experience would be more efficient, have better knowledge of climatic conditions, better knowledge of efficient allocation of resources and market situation and are thus, expected to run a more efficient and profitable agribusiness enterprise. The implication of the findings is that farmers would set realistic time and cost targets, allocate, combine and utilize a better sustainable agricultural development strategy to thwart the negative impact of climate change, enhance agricultural production and sustain the green economy initiative over time in the study area. Result in **Table** 1

also show that majority (65.00%) had household size of 6-10 persons. The mean household size was 6.21 persons. This implies that farmers in the study area have large household size. Large household size ensures availability of labour and expansion of farm size. This finding supports the result of Onaiwu (2011) who reported that large household size compliment labour to enhance production and reduce the cost of hired labour. A household comprises all persons who generally live under the same roof and eat from the same pot. Esiobu and Onubuogu (2014) also defined a household as all people who live under one roof and who make or are subject to others making for them joint financial decision. For the purpose of this study, a household comprises the head, the wife/wives, children and other dependents that live in the same house. The implication of the findings is that, since farmers have pool household size as well as labour, there would be a significant positive involvement of farmer in sustainable agricultural development strategies to promote green economy initiative in the area. Membership of cooperative is also shown in **Table** 1 and it reveals that greater proportions (67.50%) of the farmers are members of cooperative society. The implication of this result is that majority of the marketers have access to credit facilities through cooperative society to which they belong, to enhance sustain agricultural development strategies, green economy initiative and agribusiness activities in the study area. Membership of cooperative society affords farmers the opportunity of sharing information on modern production techniques, purchasing inputs in bulk as well as exchanging labour (Okoli *et al.,* 2014). The result supports the findings of Esiobu *et al.,* (2014b) who reported that membership of cooperative society help agribusiness entrepreneurs obtain information and project a collective demand. Extension contact is also reported in **Table** 1 and it reveals that majority (69.17%) of the farmers receives 1-2 of extension visits per month. The mean visit per month was 2.0 times. This implies that the farmers in the study area are poorly visited by extension agents to ascertain their farming problem and know where they need assistance. The implication of the finding is that extension contact which is a channel through which agricultural innovations and information are passed to farmers for improvement in their standard of living, production and productivity are missing. This could bring about low productivity and threaten the noble vision of sustainable agricultural development strategies as well as the green economy initiative due to lack of innovative information in the study area. Farmers average farm income is also reported in **Table** 1. It reveals that majority (56.67%) of the farmers had an average annual farm income of between ₦61,000 – ₦80,000. The mean annual farm income was ₦82,782.00 ($551.88). The implication of the findings is that farmers with the higher farm income will be involved in several sustainable agricultural development strategies to enhance and sustain green economy initiative as well as achieve huge yield/output than their counterparts who have poor average farm income in the study area. **Table** 1 also reveals that majority (48.33%) had a farm size of between 1.0-1.5 hectares. The mean farm size was 1.26 hectares. This implies that farmers in the area are mainly small scale farmers operating on less than or equal to 1.50 hectares of farmland. This could be as a result of land tenure system predominant in the area or due to the increasing population. Onubuogu *et al.,* (2014) reported that large farm size increases agricultural productivity and improves farmers technical, allocative and resource use efficiency. This implication of the findings is that farmers might have several sustainable agricultural development strategies to practice in the study area but limited farm size would compel them to intensively farm on a small plot of land. This is no doubt a serious threat to green economy initiative in the study area and Nigeria at large.

Sustainable Agricultural Development Strategies and Green Economy Initiative in Imo State

Table 2 reveals the three dimensions (environmental, social and economic) of farmers sustainable agricultural development strategies for efficient and stability of green economy initiative in the study area. The sustainable agricultural development strategies for this study were based on asking farmers about their perceptions on green economy initiative, negative impact of climate change, low agricultural productive and the actions they had taken to thwart the negative impacts of climate change, increase, agricultural production and remained sustenance to green economy initiative in the study area. The sustainable agricultural development strategies that farmers report may be profit/economic driven, rather than climate change and stable green economy initiative driven. Regardless of this dearth in knowledge, the study assumed that farmers actions were purely based on climatic factor and green economy initiative driven rather than profit/economic driven in the study area. Entries in **Table 2** reveals that mixed farming, changing stocking and harvesting dates (for livestock), good ventilation during hot weather/heat, adequate supply of heat during cold weather, minimum tillage, mulching, planting cover crops, crop rotation, change planting and harvesting dates (for crops) stock rotation, utilizing combination of livestock and crops, use of fallow and agroforestry were the most commonly used sustainable agricultural development strategies to positively counteract the negative impact of climate change, low productivity and achieve stable green economy initiative as 99.17%, 97.50%, 95.83%, 95.00%, 95.00%, 94.17%, 91.67%, 90.83%, 87.50%, 81.67%, 77.50% and 75.83% of the farmers in the area respectively identified it. Plowing perpendicular to the slope in order to prevent erosion on steep lands, no use of chemical fertilizers, no use of medications and vaccination, proper use of recommended amount of fertilizers were the least identified and practiced among the various environmental sustainable agricultural development strategies identified by the farmers in the study area.

Greater involvement of the farmers in mixed farming, changing stocking and harvesting dates (for livestock), good ventilation during hot weather/heat, adequate supply of heat during cold weather, minimum tillage, mulching, planting cover crops, crop rotation, change planting and harvesting dates (for crops) stock rotation, utilizing combination of livestock and crops, use of fallow and agroforestry could be associated with the lower credit driven, ease of access, easy practice, easy labour availability and pursuit of higher income through livelihood diversification. Low in use of plowing perpendicular to the slope in order to prevent erosion on steep lands and Proper use of recommended amount of fertilizers could be attributed to the need for more farm labour which is not available in the area especially able-bodied men who may have migrated to the cities in search of white collar jobs. The implication of the findings is that farmers environmental sustainable agricultural development strategies would compliment various interest agencies efforts in thwarting the negative impact of climate change and achieving sustainable green economy initiative in the study area. **Table 2** also indicates the social dimensions of farmers sustainable agricultural development strategies for efficient and stability of green economy initiative in the study area. It shows that participation in village/community activities, satisfaction with farming job, satisfaction with green economy initiatives, sense of no deprivation, use of communication channels, satisfaction with sustainable agricultural development strategies, participation in climate change activities and assigning location were most practices as identified by 99.17%, 98.33%, 95.83%, 93.33%, 92.50%, 86.67%, 85.83% and 62.50%. The implication is that the above farmers agricultural development strategies are all sustainable and a key to reducing of negative impact of climate change and a boast to green economy initiative in the study area. Increase in them, will no doubt increase and sustain the green economy initiative in the study area. Economic dimensions of farmers sustainable agricultural development strategies for efficient and stability of green economy initiative in the study area is also reported in **Table 2,** and it shows that access to agricultural bank loans, access to farm machinery access to climate change information, access to green economy initiative information, access to sustainable agricultural development strategies information, access to well acclimated breeds of livestock, access to processing facilities and access to improved seedlings as 98.33%, 97.50%, 94.17%, 91.67%, 90.00%, 88.33%, 85.83%, 85.00%, 68.33%, 67.50% and 60.00% of the farmers identified it. The result implies all the above strategies farmers identified are all sustainable. Increase in them will no doubt enhance achievement of sustainable agricultural development strategies and sustainability of green economy initiative over time in the study area. Ultimately, there is no doubt all the farmers identified sustainable agricultural development strategies in the study area are key in counteracting the negative impact of climate change. Increase in them will sustain agricultural production; provide eco-friendly environment and boast green economy initiative in the study area and beyond.

Table 2: Farmers Sustainable Agricultural Development Strategies in Imo State

ENVIRONMENTAL DIMENSIONS	Frequency	Percentage (%)
Use of fallow	93	77.50
Stock rotation	105	87.50
Utilizing combination of livestock and crops	98	81.67
Mixed farming	119	99.17
Adequate supply of heat during cold weather	114	95.00
Good ventilation during hot weather/heat	115	95.83
No use of chemical fertilizers	33	27.50
No use of medications and vaccination	51	42.50
Use of animal manure to reinforce soil	100	51.67
Water immersion/sprinkling on livestock	118	83.33
Change planting and harvesting dates (for crops)	117	90.00
Changing stocking and harvesting dates (for livestock)	116	97.50
Mulching	113	94.17
Planting cover crops	110	91.67
Proper use of recommended amount of fertilizers	49	40.83
Number use of chemical pesticide	51	42.50
Crop rotation	109	90.83
Minimum tillage	114	95.00
Agroforestry	91	75.83
Plowing perpendicular to the slope in order to prevent erosion on steep lands	47	39.17
SOCIAL DIMENSIONS		
Satisfaction with farming job	118	98.33
Satisfaction with green economy initiatives	115	95.83
Sense of no deprivation	112	93.33
Satisfaction with sustainable agricultural development strategies	104	86.67
Assigned location	75	62.50
Participation in village/community activities	119	99.17
Rate of trend to insurance of crop farmland	39	32.50
Rate of trend to insurance of livestock house	41	34.17
Rate of participation in promotional and training course	38	31.67
Use of communication channels	111	92.50
Participation in climate change activities	103	85.83
ECONOMIC DIMENSIONS		
Access to types of fertilizers	47	39.17
Access to farm machinery	108	90.00
Access to warehouse cold storage	31	25.83
Investment in agriculture	118	98.33
Access to improved seedlings	72	60.00
Access to processing facilities	81	67.50
Access to better livestock feeds	113	94.17
Access to sustainable agricultural development strategies information	102	85.00
Access to climate change information	110	91.67
Access to agricultural bank loans	117	97.50
Access to types of seeds	59	49.17
Access to well acclimated breeds of livestock	82	68.33
Access to green economy initiative information	106	88.33

Source Computer Printout of STATA (2014); * Multiple response

Determinant of Sustainable Agricultural Development Strategies for Sustainable Green Economy Initiative on Farmers Socio-economic Characteristic

Table 3 shows the result of determinant of sustainable agricultural Development strategies for sustainable green economy initiative on farmers socio-economic in the study area. A multiple linear regression analysis was carried out in four functional forms (linear, semi-log, double-log and exponential forms). Based on the statistical significance of the coefficient, goodness of fit and the econometric model that supports sustainable agricultural production concept, the semi-log function was chosen as the lead equation. The semi-log regression function was chosen as the lead equation based on the value of R^2(0.913), F-Ratio value (68.926), and highest number of significant variable (six variables). The coefficient of multiple determinations (R^2) was found to be 0.913 (91.3%). This is an indication that 91.3% of the variation in sustainable agricultural development strategies for sustainable green economy initiative in the study area was explained by the explanatory variables (socio-economic characteristics) while approximately 8.7% was accounted-for due to stochastic error term (e_i) or un-captured variables. Hence, the findings present the marginal effects of the estimated multiple linear regression analysis.

Table 3: Estimated Econometric Analysis of Farmers Socio-economic Characteristic on Sustainable Agricultural Development Strategies for Sustainable Green Economy Initiative in Imo State, Nigeria

Explanatory Variables	Semi-Log	Double-Log	Linear	Exponential
Constant	151.4E+825	-418.104	53910.9139	36.685
	(31.012)***	(-24.302)***	(8.916)**	(21.393)***
Age (X_1)	-1.033E+302	5.26E+516	9301.917	0.519
	(-2.393)***	(0.147)	(2.142)**	(3.529)***
Membership of cooperative society (X_2)	2.210E-013	051.672	5312.919	-1.516E-631
	(4.192)***	(1.535)**	(1.019)*	(-1.983)**
Educational level (X_3)	1.416E+835	6.18E-925	7419.361	0.845
	(3.921)***	(1.021)*	(1.405)**	(1.091)*
Farm size (X_4)	5.392E-467	-7521.017	-6157.110	0.916
	(6.163)***	(-0.710)	(-0.615)	(0.915)
Household size (X_5)	4.319E-155	-8057.514	-8239.903	-0.617
	(2.515)***	(-1.510)**	(-0.472)	(-0.518)
Gender (X_6)	0.747E-919	-9115.416	-6234.564	8.265E-519
	(0.485)	(-0.917)	(-0.914)	(0.852)
Marital status(X_7)	0.636	64061.212	9518.947	0.874
	(0.042)	(0.315)	(0.952)	(3.157)***
Farming experience (X_8)	1.610	5150.429	8362.518	3.561
	(0.028)	(0.516)	(1.470)*	(2.178)**
Extension contact (X_9)	0.106	8210.915	7460.257	0.510
	(0.312)	(3.712)***	(0.791)	(0.542)
Annual farm income (X_{10})	2.493	7159.115	6185.417	0.816
	(4.201)***	(0.834)	(1.621)**	(2.156)**
R^2	91.3	88.1	62.7	54.1
R^{-2}	90.6	82.3	60.5	53.6
F-Ratio	68.926***	41.281***	30.180***	24.018***
Sample Size (n)	120	120	120	120

Source Computer Printout of STATA (2014); Values in Parenthesis are t-ratio * Significant at 10%; ** Significant at 5% and * Significant at 1% level of probability**

Age (X_1): The age of the farmers had a negative significant relationship on the adoption of various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area. Farmer's age was positively related to the likelihood of choosing all the various agricultural sustainable options implying that younger farmers adopted the sustainable agricultural development strategies more than the older farmers. Onubuogu and Esiobu (2014) attest to these findings when they observed, in their studies, that there was a negative relationship between age of the household head and the adoption of various sustainable agricultural technologies options. The relationship was significant at 1% level of probability.

Membership of cooperative society (X_2): Membership of cooperative had a positive coefficient with the adoption of various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area. and it is statistically significant at 1% level of probability. Membership of cooperative society affords farmers the opportunity of sharing information on modern production techniques, purchasing inputs in bulk as well as exchanging labour. The result supports the findings of Esiobu *et al.,* (2014b) who reported that membership of cooperative help agribusiness entrepreneur to get needed information and project a collective demand at all time. The implication of the findings is that, Increase in Membership of cooperative society; increase the adoption rate of various sustainable agricultural development strategies in the study area.

Educational level (X_3): Educational level had a positive and significant relationship with the adoption of various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area. A unit increase in the year of education of farmers increases the probability of choosing various sustainable agricultural development strategies. The probable reason for the positive relationship is due to the fact that educated farmers have more knowledge of climate change and are already aware of various techniques and management practices that could be employed to combat the negative impact of climate change in the area. These findings are confirmed by studies undertaken by Esiobu *et al.,* (2014a) have all noted that higher education was likely to enhance information access to the farmer for improved technology up take and higher farm productivity. They have also observed that education is likely to enhance the

farmers' ability to receive, decipher and comprehend information relevant to making innovative decisions in their farms. The result is also consistent with the findings Olowa and Olowa (2012) who reported that educated farmers are more enlightened and have more access to information of sustainable agricultural practices. The relationship was significant at 1% level of probability.

Farm Size (X_4): Farm size was found be positively related with the adoption of various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area. It is expected that farmers with large farm size would adopt various sustainable agricultural development strategies than counterpart with less farm size. This may be because; they could use some of their farm lands while allowing others to fallow for the crops farmers, While livestock farmers may practice stock rotation as a way of checking climate variations in the study area. Okoli *et al.,* (2014) reported that large farm size increases livestock farmers productivity, improves their technical, allocative and resource-use efficiency. Adoption of sustainable agricultural development strategies is vital and necessary, given the negative trends in climatic variables in recent times. This would help in the reduction of green house gases (CO_2, CFC) which causes the depletion of our ozone layer, provide eco-friendly environment and enhance green economy initiative in Imo State and beyond. The relationship is significant at 1% level of probability.

Household Size (X_5): Household size had a positive coefficient with the adoption of various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area. This could be that increase in household size makes for increase in labour hence ensures expansion of farmland. Farmers with large household size have the likelihood adopting various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative than their counterpart with less household size in the study area. The probable reason for this relationship is that large household size which is normally associated with a higher labour endowment would enable a household to accomplish various sustainable agricultural development strategies tasks especially at the peak of the farming seasons. Thus large household size reduces the cost of hired labour, ensures availability of labour as well as expansion of farm size. This findings support the result of Oluwatayo *et al.,* (2008) who large household size compliment labour to enhance production and reduce the cost of hired labour. The relationship was statistically significant at 1% level of probability.

Farm income (X_7): Farm income had a positive and significant coefficient with the likelihood of choosing various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area. This is because farmers with higher farm income are poor in experiencing climatic risk, have access to information, and adapt easily to climate change at a lower discount rate, than farmers with less-income as adaptation options is expensive to be implemented. Knowler and Bradshaw (2007) and Onubuogu *et al.,* (2014) noted that farmers' incomes (whether on-farm or off-farm income) have a positive relationship with the adoption of agricultural technologies since the latter requires sufficient financial wellbeing to be undertaken. Nonetheless, off-farm income generating activities may sometimes present a constraint to adoption of sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative because they compete with on-farm activities. Thus, off-farm income is sometimes less likely to influence on-farm adoption by farmers. The relationship was statistically significant at 1% level of probability.

The F-ratio (68.926), which determines the overall significance of the econometric model, is highly significant at 1% level of probability, hence concludes that the farmers socio-economic characteristics is the major significant determinant with adoption of various sustainable agricultural development strategies for reducing the impact of climate change and sustaining green economy initiative in the study area.

Constraints of Farmers in Sustainable Agricultural Development Strategies for Green Economy Initiative

Figure 1 shows that 98.28% identified inadequate information as a constraint to sustainable agricultural development strategies for green economy initiative in the study area. Lack of information could be attributed to dearth in research on sustainable agricultural development strategies in the country as well as well as poor information dissemination on the part of the government/private information agencies in the study area. Poor knowledge on appropriate sustainable agricultural development strategies left most of the farmers unaware of better sustainable strategies to adopt and address climate change and sustain green economy initiative in the study area.

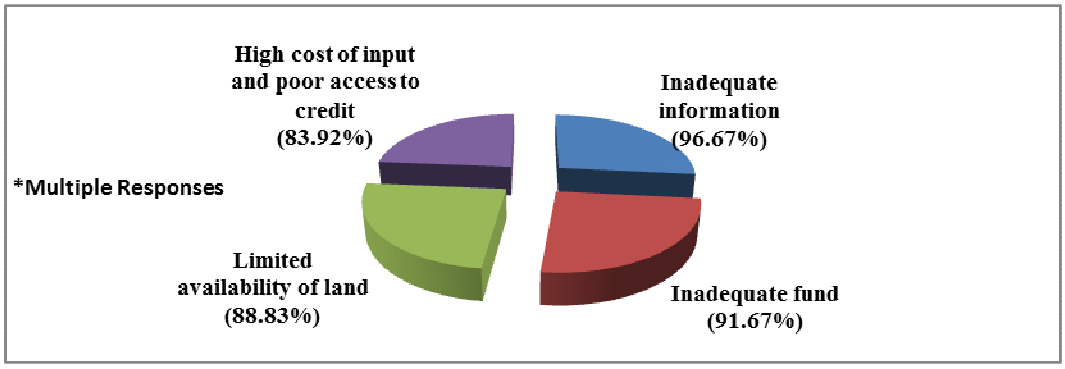

Figure 1: Pie Chart Distribution of Farmers Barrier to Sustainable Agricultural Development Strategies Green Economy Initiative

Majority (91.67%) of the farmers identified inadequate fund. This could be attributed to high cost of inputs in adoption of sustainable agricultural development strategies for green economy initiative in the study area. Inadequate fund hinders farmers from getting the necessary resources and technologies which assist to successfully adopt sustainable agricultural development strategies for green economy initiative in the study area. Onubuogu and Esiobu (2014) reported that adaptation options are costly. Hence if farmers do not have sufficient family labour, financial means to hired labour and access to credit they cannot adopt any sustainable agricultural development strategies as well as queuing into the green economy initiative in the study area. About 88.83% of the farmers complained of limited availability of land. This could be attributed to land tenure system which is prevalent in the study area as well as the increasing population. Also, high population pressures force farmers to intensively farm over a small plot of land and make them unable adopt of sustainable agricultural development strategies for green economy initiative in the study area. Greater proportion (83.92%) of the farmers identified high cost of input and poor access to credit. this could be attributed to farmers poor access to credit. Sustainable agricultural development strategies for green economy initiative requires substantial amount of funds to purchase the needed equipment to boast effort in counteracting the negative impact of climate change. Ultimately, there is no doubt that these constraints are responsible for the poor and un-sustainable agricultural development strategies for green economy initiative recorded in the study area. Fighting these barriers will be vital in counteracting the negative impact of climate change in the study area, providing eco-friendly environment for human and agricultural production to co-exist and promoting not just sustainable agricultural development strategies for green economy initiative in the study area but beyond.

CONCLUSION AND RECOMMENDATIONS

Green economy upholds the efficient use of natural resources and energy while enabling economic growth that supports social equity, efficient and sustainable agricultural production and improvement of rural and urban livelihoods thus alleviating poverty. It is only under these conditions that farmer's sustainable agricultural development strategies can prevail in Imo State, Nigeria. Farmers cultivated on an average farm size of 1.26Ha. Average farm income was ₦82,782.00 ($551.88).The study identified environmental, economic and social dimensions of farmers sustainable agricultural development strategies for promoting green economy initiative in the area. Estimated multiple linear regression shows age, household size, education, farm income, educational level and farm size influence sustainable agricultural development strategies for green economy initiatives at 1% level of probability respectively. The F-ratio was (68.926), revealing the overall significant of the regressor at 1% level of probability. Farmers complained of inadequate information and inadequate fund as the major barrier to sustainable agricultural development strategies for sustainable green economy initiatives in the study area. Adoption of sustainable agricultural development strategies is vital and necessary, given the negative trends in climatic variables in recent times. This would help in the reduction of green house gases (CO_2, CFC) which the depletion of our ozone layer, provide eco-friendly environment and enhance green economy initiative in Imo State and beyond. Effective agricultural policies and programmes should focus on how to intensify awareness on the use of sustainable agricultural development strategies to boast green economy initiative in the area. Government at all levels and private's support fund to enhance sustainable green economy initiative is required. In greening the economy, agricultural sector remains the major pre-requisite in view of safeguarding the sector's natural asset base over time in the area and beyond. Ultimately, fighting these barriers will be vital in counteracting the negative impact of climate change in the study area, providing eco-friendly environment for human and agricultural production to co-exist and promoting not just sustainable agricultural development strategies for green economy initiative in the study area but beyond.

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