EXPLORING THE EFFECT OF EDUCATION ON ENVIRONMENTAL PERFORMANCE OF SELECTED FEMALE FARMERS IN SOUTH WEST NIGERIA

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ABSTRACT

Sustainable agriculture has great potential to preserve the environment, ensure gender balanced growth and encourage positive changes to help achieve some sustainable development goals by the year 2030. However, unsustainable agricultural practices like bush burning have led to pollution, deforestation and land degradation over the years. However, education is very important for better environmental performance. This paper aims to examine the effect of educational empowerment on environmental performance among female farmers in South West Nigeria. Questionnaire was distributed to 508 female farmers. The Path coefficient of 0.688 showed that educational empowerment has a considerable influence on environmental performance. While R^2 value of 0.474 means that 47.4% variance in environmental performance can be explained by educational empowerment. The study concludes female farmers will be environmentally friendly if they have access to regular training on sustainable agricultural practices. Hence, it is recommended that female farmers should organize suitable training and find ways of reaching extension workers to sensitize them on sustainable farm practices and climate adaptation methods that promote environmental performance.

Keywords: Environmental Performance, Sustainable Development, Women Empowerment.

INTRODUCTION

Sustainable agriculture has great potential to preserve the environment, ensure gender balanced growth and encourage positive changes to help achieve sustainable development goals by the year 2030. However, the environment has been polluted over the years through unsustainable practices like bush burning, waste disposal, and wrong use of fertilizer (Lampridi et al., 2019; Reith & Blake wood, 2002). This has led to air and water pollution, deforestation and land degradation. Making environmental performance low.

Several factors affect performance, factors like financial capital, entrepreneurial orientation, entrepreneurial competency, individual characteristics, self-efficacy, human capital (Zahra, 2018; Hourneaux Junior et al., 2017). However, this study focuses on educational empowerment because education involves changing attitude and practices of farmers towards the environment. Education is a good way to reshapes their values, empower them to cultivate lifestyles that is sustainable and has great potentials to solve the sustainability challenges the world is facing.

Also, this study focused on female farmers because they are the principal agricultural

producers responsible for management, conservation, exploitation and utilization of natural resources as consumers and educators despite having serious limitations in access and control of these resources. They also have a smaller ecological footprint than men (OECD, 2007).

A good knowledge of natural and man-made limitations and need for ecological balance is important to preserve the environment. The access female farmers have to quality environmental education and knowledge about environmental sustenance could reduce environmental degradation and create opportunities for women (Solomon & Edet, 2018). However, only 20.7 percent of households participate in extension services (Kirui & Kozicka, 2018) (Nigerian National Bureau of Statistics, 2019). This has led to poor yields and low productivity is among the most problematic agricultural issues on the African continent. However, (Anunobi & Anunobi, 2018) confirms that agricultural extension services like advisory services, information and training, and access to production inputs such as seeds and fertilizers, are critical forincreasing the productivity of farm activities.

Hence, this study seeks to determine if educational empowerment enhances environmental performance among selected farmers in Southwest Nigeria. This will be useful to Nigerian government at all levels, researchers, NGOs, farmers associations and others clamouring for sustainable agriculture in other to achieve sustainable development goals.

The general objective of this study is to determine if women educational empowerment enhances women's environmental performance.

LITERATURE REVIEW

Educational Empowerment

Educational empowerment is the form of women empowerment that focuses on the opportunity women have to acquire knowledge and ideas, reading and writing skills needed to help expose their minds while also improving their socio-economic and political statuses. It canbe achieved through access to media, adult literacy programmes, workshops and awareness campaigns.

Education is an important tool for achieving the needed changes to bring about positive changes in the life style of life of people. Training is a vital process where people's self-confidence is developed by change of attitude and improving their knowledge and skills. Education is not just an end but a mean of achieving many other SDGs, like gender equality.

Education and training matter throughout the life cycle. Education, up skilling and re-skilling over the life course helps to keep pace with rapid technological and digital transformations affecting jobs, important for women's and girl's health and wellbeing, their income-generation opportunities and participation in the formal labour market. Since education enhances a person's self-worth and confidence and also creates an awareness of capacity, women will become more effective in their roles in social activities and take initiatives in the decision-making processes if they are educated. There by increasing their environmental performance.

Environmental Performance

The environmental pillar is the most popular of the three pillars of sustainability. Environmental performance refers to how well an organization meets its set goals (output-based approach), garners resources to gain competitive advantage (system resource-based approach),

employee communicate and flow of information (internal processes-based approach) and the extent to which stakeholders needs are met (strategic constituency-based approach). Also, environmental performance can be seen as the company's success in managing any interaction between the company's activities, products or services and the environment. Environmental performance focuses on organizational commitment to protect and conserve the natural environment including its multi-dimensional characteristics like maintenance of air, water, soil quality. It considers how businesses manage their environmental impact. Environmental impact focuses on the amount of harmful effects because of the operation of the farm. The harmful impacts can be traced to how farms use resources, what it releases into the water, atmosphere, or the soil. Farms that are environmentally friendly have better overall environmental conditions.

How water is taken from rivers and underground beds globally is beyond the environmentally sustainable level leading to a negative impact on rivers and underground beds. However, Sustainable agriculture posits that the amount of fresh water used for irrigation should be below acceptable range. This is measured by farmers' awareness and attitude concerning water and the success of water distribution institution.

Fertilizer pollution is another environmental risk. Agriculture can alter environmental quality through too much use or inadequate management of fertilizers. Sustainable agriculture requires that the amount of chemicals present in water and soil are kept within the standard threshold. Water and soil quality show the reason and level of pollution. It reveals farmers' knowledge of environmental risks caused by fertilizers and their take on fertilizer and manure management, through a number of management measures that help reduce pollution risk.

Pesticides are essential input in modern day crop and livestock farming but can cause harm to man and the environment if not properly managed. Pest management practices help reduce risks of using pesticides while reducing their impact on human health and on the environment. Sustainable performance is measured through farmers' knowledge of health and environmental risk related to the use of pesticide, various types of pesticides available and the steps taken to reduce the associated risk.

Educational Empowerment and Environmental Performance

Result of binary logistics model confirmed that farmers with greater access to knowledge and information on climate change through extension workers are likely to adopt measures and technologies to help them adapt to climate change. Educational levels, access to weather information, farming experience are among others factors that influence the possibility of using adaptive strategies by farmer. Recommended that factors that influencing use of adaptative measures should be identified and properly directed for sustainable rural and agricultural development revealed that farmers in Southeast Nigeria were educated not to cultivate in flood prone areas to reduce impacts of flooding in farms.

Formal vocational training makes farmers and other players in the agricultural system skilled entrepreneurs capable of running their farms sustainably. Training farmers in the agro-processing sector will sustainably raise productivity, income and competitiveness in the markets. A study by revealed that rural farmers normally rely on extension agents to provide them with information to enhance their agricultural practices. However, lack of information on new and efficient agricultural practices have brought about low farm produce but ICT based extension information services has improved access to agricultural information. This could reduce farmers'

risk and uncertainty while empowering them to make good decisions. Farmers get vital information from extension workers who act as advisers, technician, change agents, consultant and advocate helping farmers to identify their problems and find their own solution.

Reveal that farmers are also likely to adapt to climate change if they belong to farmer-based organization, have access to credit and extension services or agricultural training of women. The gender-differentiated impact shows that women would earn more than men from adaptation or lose more compared to men if they do not take any adaptation actions.

Social Exchange Theory

The social exchange theory can be traced to sociologist George Homans (1958) but developed upon by Peter Blau and Richard Emerson. Homans saw social exchange as the exchange of tangible or intangible, activity, rewarding or costly, between at least two people. The theory posits that individuals tie their behaviors to rational calculations planned to maximize individual profit.

The relevance of the Social exchange theory to this study is seen in the exchange between female farmers and the environment. Female farmer's daily endeavor to make the most of economic, environmental and social benefits the environment has to offer while minimizing cost to the environment. This is also the whole essence of sustainable performance.

Hence, the hypothesis stated below in null form will be tested in this study

H_0: *Educational empowerment does not significantly influence environmental performance.*

METHODOLOGY

Research Method

This study employed a quantitative research method

Research Design

Used in this study is descriptive and explanatory research design.

Research Instrument

Questionnaire was adopted to get data from respondents. Questionnaire was employed because it gives room to ask standardized questions which can be easily interpreted by the respondents and at the same time scalable and needs little skill to fill.

The questionnaire for this study is made up of 3 parts. Section A asks questions on demographic characteristics. Section B contains open ended question on farm activities in the last 3 years. While section C contains 4 points Likert scale questions (Strongly Agree - 4, Agree - 3, Disagree - 2, Strongly Disagree -1. Addressing the hypothesis to be tested in order to know the level to which respondents agree with each statement.

The standard result for the assessment of reliability is 0.7 Composite reliability, Cronbach Alpha and average variance extracted (AVE) estimate were used to determine the validity and reliability of the research instrument. The researcher used convergent and discriminant validity

to get construct validity.

Study Population

The study population comprises of 508 selected female farmers in South West Nigeria (Ekiti, Kwara, Lagos, Ogun, Oyo, Ondo, and Osun State).

Sampling Frame & Technique

Table 1 shows the breakdown of correspondents per states in the South West.

S/N	State	Members
Table 1 **RESPONDENTS PER STATE**		
1	Ekiti State	90
2	LagosState	75
3	Ogun State	81
4	Oyo State	78
5	Ondo State	88
6	Osun State	96
	Total	508
Source: Research Study 2020		

Sample Size

The researcher used the Complete Enumeration Method.

DATA ANALYSIS

The researcher adopted Partial Least Software- Structural Equation Model for this study mainly to explain variances. PLS-SEM allows for estimation of various models with more than one construct or indicator variable. Meanly using regression and correlation.

Five hundred and eight copies of the questionnaire were distributed to female planters in South west Nigeria. Only four hundred and forty-nine (449) copies of the questionnaire were returned and used for the analysis.

	OYO	OGUN	ONDO	LAGOS	OSUN	EKITI	Total
Table 2 **AGE DISTRIBUTION OF RESPONDENTS**							
				States			**Total**
Below 25	5	7	7	5	11	9	44
	-1.1	-1.6	-1.6	-1.1	-2.4	-2	-9.8
25-35	23	24	17	16	23	30	133
	-5.1	-5.3	-3.8	-3.6	-5.1	-6.7	-29.6
36-45	25	27	34	19	30	25	160
	-5.6	-6	-7.6	-4.2	-6.7	-5.6	-35.6
46-55	10	8	15	8	9	6	56
	-2.2	-1.8	-3.3	-1.8	-2	-1.3	-12.5
56 & above	15	3	5	15	11	7	56
	-3.3	-0.7	-1.1	-3.3	-2.4	-1.6	-12.5
Total	78	69	78	63	84	77	449
	-17.4	-15.4	-17.4	-14	-18.7	-17.1	-100

This is a response rate of 88.4%, adequate to form empirical conclusion on the relationship between variables in Table 2.

Table 3 EDUCATIONAL QUALIFICATIONS OF RESPONDENTS							
	States						Total
	OYO	OGUN	ONDO	LAGOS	OSUN	EKITI	
B.Sc./HND	9	10	11	14	8	3	55
	-2	-2.2	-2.4	-3.1	-1.8	-0.7	-12.2
NCE/ND	18	18	20	12	25	25	118
	-4	-4.5	-4.5	-2.7	-5.6	-5.6	-26.3
SSCE	27	17	26	19	25	25	139
	-6	-3.8	-5.8	-4.2	-5.6	-5.6	-31
Pry School	18	16	13	11	18	17	93
	-4	-3.6	-2.9	-2.4	-4	-3.8	-20.7
No Formal Education	6	8	8	7	8	7	44
	-1.3	-1.8	-1.8	-1.6	-1.8	-1.6	-9.8
Total	78	69	78	63	84	77	449
	-17.4	-15.4	-17.4	-14	-18.7	-17.1	-100

Table 3 shows the number of training participants attended in the last three years. Of the 449 respondents, 112(24.9%) respondents ticked one year, while 202(45.0%) of the respondents ticked two years and 95(21.2%) ticked 3 years. 40(8.9%) ticked none. This means most respondents ticked two years training.

Table 4 TRAINING ATTENDED IN THE LAST THREE YEARS							
	States						Total
	OYO	OGUN	ONDO	LAGOS	OSUN	EKITI	
1 Year	20	16	16	13	23	24	112
	-4.5	-3.6	-3.6	-2.9	-5.1	-5.3	-24.9
2 Years	35	29	32	35	40	31	202
	-7.8	-6.5	-7.1	-7.8	-8.9	-6.9	-45
3 Years	16	11	23	11	18	16	95
	-3.6	-2.4	-5.1	-2.4	-4	-3.6	-21.2
None	7	13	7	4	3	6	40
	-1.6	-2.9	-1.6	-0.9	-0.7	-1.3	-8.9
Total	78	69	78	63	84	77	449
	-17.4	-15.4	-17.4	-14	-18.7	-17.1	-100

Table 4 shows the measurement of descriptive statistics of educational empowerment usingfour (4) items. The researcher sought information on whether respondents received training or instructions on agricultural activities. 282(62.8%) of them agreed, whereas 167(37.2%)

disagreed. Leading to a mean score of 2.74 and standard deviation of 1.03. This reveals that the respondents got training or instructions on agricultural activities.

N	Items	A			D	ean	tdDev
Table 5 **EDUCATIONAL EMPOWERMENT AND ENVIRONMENTAL PERFORMANCE**							
Educational Empowerment (EE)							
E1	I get training or instructions on agricultural activities	21	61	5	2	.74	.03
		6.9	5.9	1.2	16		
E2	Agricultural associations organize training.	0	7	63	09	.53	.03
		7.8	1.6	6.3	4.3		
E3	I get information on farming activities from the news/internet	9	05	55	00	.52	.04
		19.8	23.4	34.5	22.3		
E4	Extension workers are available to guide me on farm practices	59	6	6	68	.53	.06
		5.4	9.1	8.1	7.4		
Environmental Performance (EP)							
P1	I do not burning when clearing	93	90	2	4	.26	.77
		43	2.3	1.6	3.1		
P2	I use water-efficient methods on the farm	2	7	79	11	.57	.01
		16	9.4	9.9	4.7		
P3	I know the right use of fertilizers	04	36	28	1	.59	.3
		3.2	0.3	8.5	18		
P4	A engage a licensed person to apply pesticides on my farm	8	35	48	8	.59	.99
		1.8	0.1	33	5.1		
P5	I usually test the soil nutrient composition on farmland	3	01	60	05	.52	.7
		8.5	2.5	5.6	3.4		

In Table 5 Item two measured if agricultural association organized trainings. 177(39.4%) respondents strongly affirm while 282(60.6%) disagree, resulting in a mean score of 3.33 and standard deviation of 1.03. 194(43.2%) respondents agree that they regularly get information on farming activities from the news/internet, while 255(56.8%) refute this statement with a mean score of 2.41 and standard deviation of 1.04.

In addition, 245(54.5%) respondents agreed that extension workers come to guide them on farm practices. On the contrary, 204(45.5%) respondents disagreed giving a mean score of 2.52 and a standard deviation of 1.06. This reveals that the respondents believe extension workers are available to guide them on farm practices.

Five items were used to measure environmental performance. Burning when clearing the farmland is one of the items. 383(85.3%) respondents agreed, while 66(14.7%) respondents disagreed. This gave a mean score of 3.26 and standard deviation of 0.77. Suggesting that respondents rarely burn when clearing their farm land. 159(35.4%) respondents agreed while 290(64.6%) disagreed that they use water-efficient method on the farm. Leading to a mean score of 2.57 and a standard deviation of 1.01. 240(53.5%) respondents agreed that they have the right knowledge of fertilizer use, while 209(46.5%) respondents disagreed resulting in a mean score of 2.59 and a standard deviation of 1.30.

233(51.9%) agreed while 216(48.1%) respondents disagreed that they a licensed person

to apply pesticides on my farm. Leading to a mean score of 2.59 and standard deviation of 0.99. This shows that the respondents engaged a licensed person to apply pesticides on my farm. The researcher also enquired if respondents test the soil nutrient composition of their farmland. 184(41.0%) agreed but 265(59.0%) respondents disagreed with the statement resulting in a mean score of 2.52 and a standard deviation of 1.70. This shows that respondents do not usually test the soil nutrient composition of their farmland.

TEST OF HYPOTHESIS

H_0: Educational empowerment does not have significant influence on the environmental performance of female planters in Southwest Nigeria.

Partial Least Square (PLS) is the statistical tool for the analysis used to test the hypothesis of this study. It was picked because it helps envisage the effectiveness of the research model which shows the relationship between educational empowerment and environmental performance of selected female planters in Southwest Nigeria.

This study determined the influence of educational empowerment on environmental performance of female farmers. T-statistics values, path coefficients values, R-square values, and the p-values were used to analyze and evaluate the resultant effect and the relationship between educational empowerment and environmental performance of female planters in Southwest Nigeria. The degree of influence educational empowerment has on environmental performance of women farmers was determined by the path coefficient value as presented in Figure 1.The r-square values shown in Figure 1were also used for the determination of variance in environmental performance, as explained by educational empowerment. While Figure 2 shows *p- value*, which evaluates the predictive value of the tested hypothesis. The t-statistics helps in identifying the measured differences defined in units of standard error, which is also depicted in Figure 3.
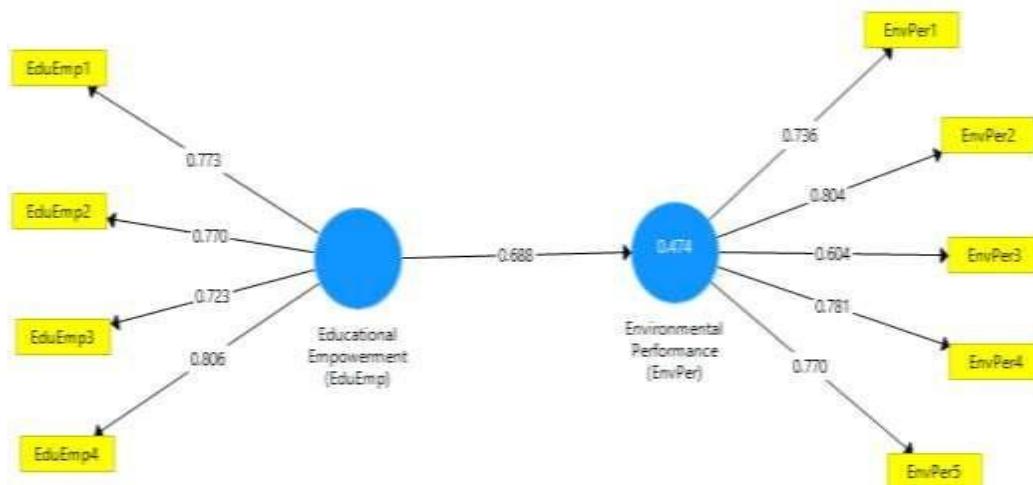

FIGURE 1
PLS ALGORITHM MODEL OF EDUCATIONAL EMPOWERMENT ON ENVIRONMENTAL PERFORMANCE OF FEMALE PLANTERS

Figure 1 reveals the PLS algorithm model educational empowerment and environmental

performance of female planters with the loading values of each item used to measure educational empowerment and environmental performance, the path coefficient values and the R=square values. However Figure 2 shows the PLS Bootstrapping Model with β and P values of educational empowerment and environmental performance of female planters, while Figure 3shows the PLS Bootstrapping Model with β and t-statistics values of educational empowerment and environmental performance.
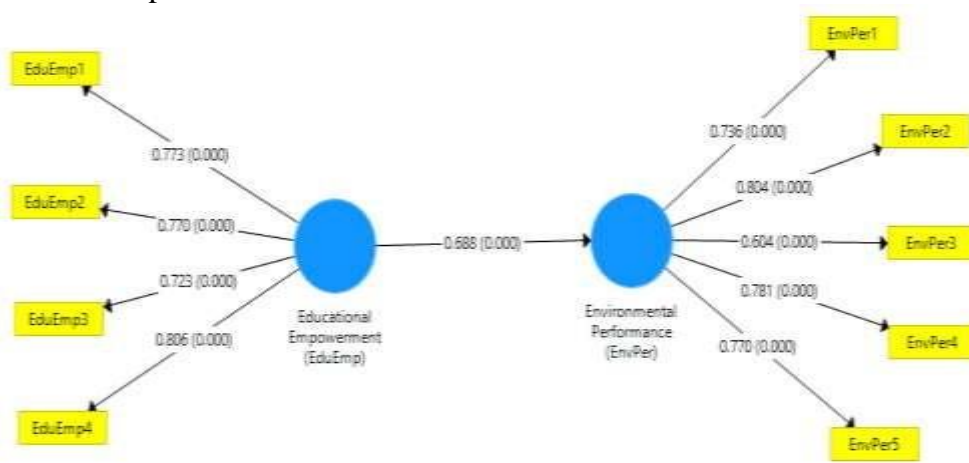

FIGURE 2
PLS BOOTSTRAPPING MODEL WITH B AND P VALUES OF EDUCATIONAL EMPOWERMENT ON ENVIRONMENTAL PERFORMANCE OF FEMALE PLANTERS

Figure 2 presents a p-value that depicts the level of probability. Usually the p-value is considered significant if values are less than 0.05. Figure 3 shows that all items used to measure educational empowerment and environmental performance of female planters in the questionnaire are significant at a p-value of <0.05. This implies that all the items of measurement contribute significantly. Hence, educational empowerment has a significant influence on the environmental performance of female planters. It also shows t-statistics values used to define thecalculated differences represented in units of standard error.
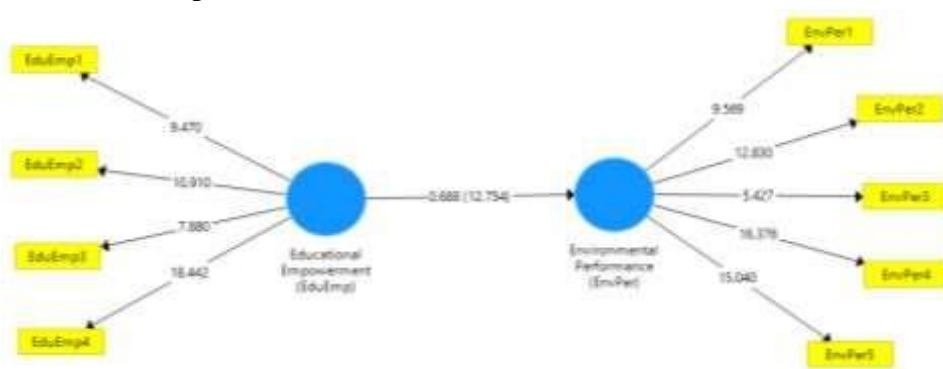

FIGURE 3
PLS BOOTSTRAPPING MODEL WITH B AND T VALUES OF EDUCATIONAL EMPOWERMENT AND ENVIRONMENTAL PERFORMANCE OF WOMEN

	Loading	Outer Weights	VIF	t-statistics	P-Value	AVE	Composite Reliability	Cronbach's Alpha
Constructs	> 0.7		<3.0	>1.96	<.05	>0.5	> 0.8	> 0.7
Educational Empowerment (EduEmp)						0.591	0.852	0.771
EduEmp1	0.773	0.289	1.728	9.47	0			
EduEmp2	0.77	0.284	1.723	10.91	0			
EduEmp3	0.723	0.329	1.326	7.88	0			
EduEmp4	0.806	0.394	1.478	18.442	0			
Environmental Performance (EnvPer)						0.551	0.859	0.798
EnvPer1	0.736	0.246	1.72	9.569	0			
EnvPer2	0.804	0.252	2.111	12.83	0			
EnvPer3	0.604	0.187	1.536	5.427	0			
EnvPer4	0.781	0.327	1.732	16.376	0			
EnvPer5	0.77	0.322	1.682	15.04	0			

Table 6
CONSTRUCT VALIDITY AND RELIABILITY FOR HYPOTHESIS ONE

FARMERS

The factor loadings revealing the standardized regression and correlation coefficients between the observed variable and common latent factors are shown in Table 6. Composite reliability, Cronbach Alpha and average variance extracted (AVE) estimate were used to determine the validity and reliability of the research method and the recommended values weremet.

The researcher used convergent and discriminant validity for the get construct validity. Theproof of the relationship between educational empowerment and environmental performance is defined by convergent validity. All loading factors for each measurement items are above the thresholds recommended. This implies that a large percentage of variation is normal across all items. For each of the constructs, AVE was equated with the squared correlation to determine the discriminant validity. The latent variable's AVE exceeds the squared correlations in the model between the dormant variable and constructs.

Table 7
PATH COEFFICIENTS OF EDUCATIONAL EMPOWERMENT AND ENVIRONMENTAL PERFORMANCE

	Path Coefficient	R-Square	Std. Dev	T-statistics	P-value
EduEmp ➡ EnvPer	0.688	0.474	0.054	12.754	0

Table 7 shows the smart partial least squared statistical results of this hypothesis, which looks at the influence of educational empowerment and environmental performance. The findings show that educational empowerment has a significant effect on environmental performance. In specific terms, the results showed that educational empowerment has a considerable influence on environmental performance at (β= 0.688, R^2=0.474, t-statistics= 12.754> 1.96, P-value= 0.000<0.05). The Path coefficient of 0.688 shows that a considerable positive affect on educational empowerment and environmental performance. The R^2 value of

0.474 indicates that 47.4% variance in environmental performance can be explained by educational empowerment.

Table 8 DISCRIMINANT VALIDITY FOR HYPOTHESIS ONE		
	Economic Performance	**Financial Empowerment**
Educational Empowerment	0.769	
Environmental Performance	0.688	0.742

Correlation matrix of the discriminant validity of the observed variables reveals that the diagonal elements (1) surpassed the largest square relationship between the constructs of the study in Table 8.

FINDINGS

Analysis of data reveals that educational empowerment has a considerable positive effect on educational empowerment. This is evident in the direct influence education empowerment has on environmental performance at 0.688 with the r-square value of 0.474 meaning educational empowerment explains 47.4% of environmental performance variance.12.754 T-statistics, above the critical value of 1.96 at 95% confidence level.

Training women on agricultural activities will enhance environmental performance by encouraging them to cultivate sustainable farm practices.

Efficient use of water on the farm, right and timely application of fertilizers will increase iffemale farmers have access to information on different platforms.

Receiving information and guidance from government extension workers on environmentally friendly farm practices will foster environmental performance like testing soil for nutrient content. This finding validates the finding of Solomon and Edet (2018) they found out that a farmer is more likely to adopt agricultural technologies and other adaptive ways if they have access to extension worker who share knowledge and information

CONCLUSION AND RECOMMENDATION

Educational empowerment is one of the strategic platforms that can be employed to enhance environmental performance of female planters.

The study concludes that if female farmers have access to regular training on sustainable agricultural practices; it will encourage them to be more environmentally friendly.

It is recommended that female farmers should continue to source for sponsors or arrange training for themselves on sustainable farm practices and climate adaptation methods to enhance environmental performance.

SUGGESTIONS FOR FUTURE STUDIES

Female planters in Southwest Nigeria were surveyed. Further studies could widen or focus on other geo-political zones in Nigeria. Future studies can also introduce a moderating/mediating variable like any dimension of entrepreneurial orientation to know their effect. Other studies can also look at other facets of the agricultural sector.

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