AWARENESS AND OCCUPATIONAL DIVERGENCE ON THE EFFECT OF BUSH BURNING ON THE ENVIRONMENT IN SOUTH WEST, NIGERIA.

[2]ODINE, A.I., [1]OLAREWAJU, T.O., [1]TOLORUNJU, E.T. and [1]AFOLABI, O.I

1. Department of Agricultural Economics & Farm Management, Federal University of Agriculture, Abeokuta P.M.B. 2240 Ogun State.

2. Department of Agricultural Economics and Extension, Federal University of Technology, Minna P.M.B. 65 Niger State.

Corresponding Author: [1]OLAREWAJU, Titilope Omolara

(Department of Agricultural Economics & Farm Management, Federal University of Agriculture, Abeokuta P.M B 2240, Ogun State. 08034316383, titiquadri@yahoo.com)

Bush burning is the most significant anthropogenic activity that contributes to climate change in Nigeria. This study therefore seeks to unravel the awareness of people of different occupation of the effect of bush burning on various component of the environment. A multi stage sampling technique that resulted in the selection of one hundred and eighty-six respondents drawn across different occupational background was employed. This includes the farmers, sand miners, others, artisans and fishermen with 0.4846, 0.4653, 0.4551, 0.4333 and 0.4253 awareness score in a decreasing order. This implies that the respondents are unaware of the effect of bush burning on the environment. The Least Square Difference (LSD) post hoc test however confirmed significant differences between the level of awareness of the farmers and the fishermen as well as the farmers and the artisans. The Implication is that the farmers, sand miners and other occupational group are better aware of the effects of bush burning when compared with the fishermen and the artisans. Although public awareness programmes should be intensified about the effect of bush burning, developing such to suit different occupational categories will achieve better result with the fishermen and artisans being more targeted than others.

Keywords; Climate change, Bush burning, Green House gases, Global warming

INTRODUCTION

Climate change is an adverse environmental phenomenon that is causing enormous concern all over the world and it refers to some observable wastes and fossil fuels in industrial and agricultural variations in the climate systems that are attributable to activities such as bush burning; and deforestation (Idowu *et al.* 2011). According to Nzor *et al.* (2012), bush burning is generally the preferred traditional means of clearing farmland for seedbed preparation, games or bush meat hunting and it increases the concentration of greenhouse gases and particulate matter in the atmosphere. The level of Green House Gases (GHGs) has gone above the normal level and this has manifested as the average temperature of the earth has risen between 0.4 and $0.8°C$. The increased volume of carbon

dioxide (CO2)and other GHGs released from bush burning, burning of fossil fuels, deforestation and other human activities are sources of global warming that have occurred in the last 20years (Intergovernmental Panel on Climate Change (IPPC), 2005; Nigerian Environmental Study/Action Team (NEST), 2004). ILO (2009) reported that every year, emissions from human activities release about 6 billion ton of CO2 to the atmosphere. Also, Cook-Anderson (2009) estimated that the burning of fossil fuels (oil, gas and coal) along with the destruction and burning of vegetation in forests and grasslands adds 8 billion tons of pollutants to the atmosphere annually.

Bush burning according to Hamid *et al.* (2012) has been detrimental to the environment and health of mankind. Apart from the emission of gases which has adverse effect on the ozone layer, it also leads to soil destruction and desert encroachment. Edwin (2006) observed that rampant bushfires cause significant damage in all the ecological zones, and is most pronounced where the savanna vegetation predominates and the incidence also remain the highest.

Ogbo *et al.* (2013) reported that bush burning, over grazing, gas flaring, CO2 are responsible for climate change in Nigeria. However, some farmers erroneously attribute climate change to sin or evil spirits and not their activities. More than half of bush burning throughout Nigeria is deliberately lit, costing millions of naira damages annually. Therefore, there is a need to determine the level of awareness of farmers about bush burning and its effect on the environment because farmer's awareness of causes and problems of climate change will enhance their ability to take actions that will mitigate its effect.

MATERIALS AND METHOD

Study Area

The study was carried out in communities around and/or within Eleyele, Eriti, and Lagos Lagoon wetlands in Oyo, Ogun and Lagos States, in the Southwest rainforest zones of Nigeria. Eleyele wetland is located in Ido Local Government Area (LGA) of Oyo State, Nigeria. It lies between latitudes

07°22'30" N and 07°25'50" and longitude 003°2'00" E to 003°55'50" E, at an altitude approximately 1500m above sea level. The mean annual rainfall is 1413 mm, while the mean annual temperature ranges from 22.5^{o}C to 31.4^{o}C. Eriti wetland is located in Obafemi Owode LGA of Ogun state Southwest of Nigeria. It lies between latitude 7.73^0 and longitude 5.79^0 with an eleviation of 1505 feet with temperature ranging between 24°C to 30^{0}C. Lagos Lagoon wetland stretches from Epe LGA to Badagry LGA in Lagos state. Wetlands in Lagos are fed by several rivers, the most important of which are, the Yewa, Ogun, Ona/Ibu, Oshun, Shasha and Oni.

Method of Data Collection

Primary data were collected by personal administration of questionnaires /interviews schedule from individuals that have livelihood activities around the wetlands in the study area. The questionnaire was used to elicit information on various socio-economic parameters such as age, gender, educational status, occupation as well as awareness on the effect of bush burning on the environment. The study respondents were selected by multi-stage sampling technique. The first stage was a purposive selection of wetland communities located around/along the Badagry and Epe wetlands in Lagos state. At the second stage, 200 respondents were selected by systematic random sampling and they include, farmers, fishermen, fish farmers, sand miners, artisans and others found around the water body. However, only 186 respondents were used for the final analysis.

Method of Data Analysis

Descriptive statistics such as means, frequencies and percentages were used to describe the socio-economic characteristics of the respondents as well as the awareness of the respondents about the effect of bush burning on the environment.

Likert Scale.

A 2- point likert scale was used to assess the respondents' level of awareness of the effect of bush burning on the environment and an awareness score was computed as;

AS$_i$ = Σw$_{ij}$ / k

Where,

AS$_i$ awareness score of the ith respondent

w$_{ij}$ Weight of individual awareness levels across all (jth) awareness for the ith respondent

k Total number of perception and knowledge question

Analysis of Variance (ANOVA)

ANOVA was used to ascertain if there a significant difference in the awareness scores of the respondents across occupation and it is computed as follows;

Total sum of square $(SST) = \sum_i \sum_j x^2\, ij - \frac{T^2}{n}$

Between samples sum of square $(SSB) = \sum_i \frac{T_i^2}{n_i} - \frac{T^2}{n}$

Within samples sum of square $(SSW) = SST - SSB$

Total mean square $(MST) = \frac{SST}{n-1}$

Between samples mean square $(MSB) = \frac{SSB}{k-1}$

Within samples mean square $(MSW) = \frac{SSW}{n-k}$

$$F = \frac{MSB}{MSW}$$

Where;

k= number of samples

n$_i$= number of observations in ith sample and i= 1,2,.........k

n= total number of observations

x$_{ij}$= observation j in ith sample and j=1,2,....... n$_i$

T$_i$= sum of n$_i$ observations in ith sample

T= sum of all n observations

Least Square Difference (LSD) post hoc pair wise multiple comparisons was used to determine which pair of means differed.

RESULTS AND DISCUSSIONS

Table 1 shows the characteristics of the respondents. As shown on the table majority (75.3%) of the respondents were male that were mostly (91.4%) married. Also shown on the table is the fact that most of the respondents have had one form of formal education or the other. Only a few (14.5%) had no formal education. It is interesting to note that some (12.9%) of the respondents had tertiary education. This implies that respondents should have basic knowledge of climate change and should be able to understand the causes and methods of militating against it. Table 1 also revealed that most (35.5%) household had between 4 and 6 persons. This implication is that respondents should be able to use other means of clearing other than bush burning since they have household labour. However, this depends on the age composition of the household. Furthermore, household wealth for majority (55.4%) of the respondents was below ₦50, 000 indicating that the respondents have a higher possibility of involving in bush burning activities since it is quite cheaper and they are constrained financially.

Table 1: Socio-Economic Characteristics of Respondents

Description	Frequency	Percentage
Gender		
Female	46	24.7
Male	140	75.3
Marital status		
Married	170	91.4
Single	10	5.4
Widow(er)	6	3.2
Educational Level		
None	27	14.5
Primary	67	36.0
Secondary	68	36.6
Tertiary	24	12.9
Occupation		
Farming	103	55.4
Fishing	33	17.8
Sand mining	12	6.5
Artisans	25	13.4
Others	13	7.0
Household size		
1-3	63	33.9
4-6	66	35.5
7-9	37	19.9
10-12	9	4.8
Above 12	11	5.9
Household wealth		
Below 50000	103	55.4
50000-100000	22	11.8
100001-500000	32	17.2
500001-1000000	23	12.4
Above 1000000	6	3.2

Source; Data from field survey 2010

Table 2: Awareness of Respondents on Effect of Bush Burning

Description		Farming	Fishing	sand mining	Artisan	others	All respondents
Bush burning leads to loss of soil fertility	yes	65(63.1%)	31(94.0%)	10(83.3%)	24(96.0%)	12(92.3%)	142(76.3%)
	No	38(36.9%)	2(6.0%)	2(16.7%)	1(4.0%)	1(7.7%)	44(23.7%)
Bush burning causes health hazard	No	30(29.1%)	0(0.0%)	2(16.7%)	0(0.0%)	0(0.0%)	32(17.2%)
	Yes	73(70.9%)	33(100.0%)	10(83.3%)	25(100.0%)	13(100.0%)	154(82.8%)
Bush burning contaminates water sources	No	36(35.0%)	2(6.0%)	3(25.0%)	0(0.0%)	1(7.7%)	42(22.6%)
	Yes	67(65.0%)	31(94.0%)	9(75.0%)	25(100.0%)	12(92.3%)	144(77.4%)
Bush burning leads to air pollution	No	12(11.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	12(6.5%)
	Yes	91(88.3%)	33(100.0%)	12(100.0%)	25(100.0%)	13(100.0%)	174(93.5%)
Bush burning affects neighbouring farms or homes	No	91(88.3%)	32(97.0%)	10(83.3%)	24(96.0%)	12(92.3%)	169(90.9%)
	Yes	12(11.7%)	1(3.0%)	2(16.7%)	1(4.0%)	1(7.7%)	17(9.1%)

Source: Data from Field Survey 2010

Table 3: Awareness of Respondents on Effect of Bush Burning

Description		Farming	Fishing	Sand mining	Artisan	others	All respondents
Bush burning increases diseases in crop	Yes	4(3.9%)	1(3.0%)	0(0.0%)	0(0.0%)	0(0.0%)	5(2.7%)
	No	99(96.1%)	32(97%)	12(100.0%)	25(100.0%)	13(100.0%)	181(97.3%)
Bush burning predisposes soil to erosion	No	86(83.5%)	33(100.0%)	11(91.7%)	24(96.0%)	11(84.6%)	165(88.7%)
	Yes	17(16.5%)	0(0.0%)	1(8.3%)	1(4.0%)	2(15.4%)	21(11.3%)
Bush burning kill growth of soil organisms	No	75(72.8%)	32(97.0%)	11(91.7%)	24(96.0%)	11(84.6%)	153(82.3%)
	Yes	28(27.2%)	1(3.0%)	1(8.3%)	1(4.0%)	2(15.4%)	33(17.7%)
Bush burning reduce soil productivity	Yes	72(69.9%)	32(97.0%)	10(83.3%)	25(100.0%)	13(100.0%)	152(81.7%)
	No	31(30.1%)	1(3.0%)	2(16.7%)	0(0.0%)	0(0.0%)	34(18.3%)
Bush burning encourages insect attack	Yes	63(61.2%)	31(94.0%)	9(75.0%)	24(96.0%)	12(92.3%)	139(74.7%)
	No	40(38.8%)	2(6.0%)	3(25.0%)	1(4.0%)	1(7.7%)	47(25.3%)
Bush burning reduce shelf life of crops	Yes	7(6.8%)	1(3.0%)	0(0.0%)	0(0.0%)	1(7.7%)	9(4.8%)
	No	96(93.2%)	32(97.0%)	12(100.0%)	25(100.0%)	12(92.3%)	177(95.2%)

Source: Data from Field Survey 2010

Table 2 shows the awareness of respondents of various occupations on the effect of bush burning on different components of the environment. Majority (76.3%) are aware that bush burning can lead to a reduction in soil fertility while 82.8% of the respondents consider health hazard as one of the consequence of bush burning while 17.2% of the respondents didn't associate bush burning with health hazards. Air pollution is one of the negative effects of bush burning and the results of the study as shown on the table 2 indicates that almost all (93.5%) of the respondents were aware of that but, 6.5% of the respondents who happen to be farmers were unaware that bush burning could pollute the air.

Table 3 revealed that larger percentages (97.3%) of the respondents in the study area are unaware that bush burning facilitates increase in crop disease. Bush burning has been found to facilitate soil erosion, kill soil micro organisms and further encourage insect attack. Nevertheless, majority (88.7% and 82.3%) of the respondents in this study are unaware that bush burning exposes the soil to erosion and also kills soil growth organisms' respectively. The result is in line with Jamala (2012) who found out that farmers in Adamawa maintained that bush burning leads to lack of pasture for livestock, destruction of wildlife habitat reduction in soil fertility, promotes soil erosion and also destroys soil micro-organisms.

Table 4: Awareness Scores by Occupation

Occupation	Awareness score
Farming	0.4846
Fishing	0.4253
Sand mining	0.4653
Artisan	0.4333
Others	0.4551
Total	0.4637

Source: Data from Field Survey 2010

The awareness scores of the respondents by occupation are as shown on table 4 above. The results revealed that respondents in the study area were not aware of the effects of bush burning on the environment as all respondents of various occupations had awareness scores of 0.4637 which is less than 1. However, the farmers had a higher awareness score of 0.4846 than the sand miners and fishermen who had awareness scores of 0.4653 and 0.4253 respectively. This implies that respondents engage in bush burning out of ignorance because they are unaware of the negative effect it has on the environment. The analysis of variance results on table 5 indicate that there was significant difference in the awareness scores of the respondents as the F-ratio was significant at $p < 0.05$. To further buttress the difference in the means, One way post hoc pair wise multiple comparisons was employed and the results revealed that the level of awareness of the farmers was significantly different from that of the fishermen and artisans but there was no significant difference in the level of awareness of the other category as shown on the table 6. The farmers may be better aware than their counterparts of other occupations because they work directly on land and overtime have realized the impact of bush burning on the environment.

Table 5: Results of ANOVA

Item	Sum of squares	df	Mean squares	F
SSB	0.121	5	0.024	2.65
SSW	1.641	180	0.009	
SST	1.762	185		

Source: Data from Field Survey 2012

Table 6: LSD Post Hoc Test

	Occupation	Mean difference	S.E	sig
Farming	Fishing	0.005934*	0.02007	0.004
	Sand mining	0.01935	0.02913	0.507
	Artisan	0.05129*	0.02129	0.017
	Others	0.02950	0.02810	0.295

Source: Data from Field Survey 2010

CONCLUSION AND RECOMMENDATION

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