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Perceived Effect of Bush Burning on Agricultural Farmland in Oluyole Local Government, Ibadan, Oyo State. Nigeria

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ABSTRACT: The practice of bush burning poses significant harm to agricultural land. The investigation examined the perceived effects of bush burning on agricultural land within the Oluyole local government area of Ibadan, Oyo State, Nigeria, this study adopted simple random technique to engaging a sample of one hundred (100) farmers. The data were analysed using percentage, mean and standard deviation. The survey findings revealed that males made up 62.0% of the participants, whereas females accounted for 38.0%. Furthermore, 40.0% of the participants were aged 35 years and above. The findings show that a substantial majority of farmers are married, accounting for 71.0%, and it was also found that a noteworthy portion, 40.0%, of farmers possesses literacy skills. The influence of bush burning on agricultural crops contributes to the control of pests and diseases. Promoting bush fallowing is considered essential to reduce the effects of bush fires, as it enhances the sustainability of cultivated crops. The findings demonstrate a notable connection between the socio-economic traits of farmers and their perceptions regarding the impacts of bush burning on agricultural crops. Therefore, it is advisable for agricultural extension agents to inform, assist, and enable farmers in adopting the best cultivation practices to reduce the effects of these activities on their farms.

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Agriculture encompasses the diverse techniques employed to cultivate agricultural plants and raise domesticated animals, thereby sustaining the global human population through the provision of food and other essential products. The term agriculture in English is derived from the Latin words *ager*, meaning field, and *colour*, which means to cultivate. Together, they refer to the practice of cultivating fields or land. (Wiedinmyer *et al.*, 2011). However, the term has

evolved to include a wide range of activities essential to agriculture, each characterised by its own specific terminology, such as cultivation, domestication, horticulture, arboriculture, and vegetable production, as well as various methods of extensive livestock management like mixed crop-livestock farming and pastoralism. Agricultural land is typically allocated for farming, which encompasses the organised and regulated use of living organisms, mainly for livestock

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management and crop production aimed at providing food for humans. It is frequently analogous to both farming and grazing land. (Ambe *et al.*, 2015). Farmland is typically classified into three distinct types: Arable crops, often known as cropland, refer to land used for growing crops that require yearly replanting or are utilised for agricultural production over a five-year period. Permanent cropland denotes land that produces crops which do not require yearly replanting. Endless grazing land, Grasslands and scrublands, whether natural or artificial, that are appropriate for cattle grazing. Bush burning has been utilised since ancient times and is seen in many cultures as a fundamental component of traditional agricultural practices. The evolving lifestyle patterns, population growth, urbanisation, and agricultural practices exerting strain on the natural environment indicate that the traditional practice of bush burning is no longer sustainable; nonetheless, efforts to diminish or entirely eradicate it have proven challenging (Aliero, 2004). Bush burning typically refers to the practice of igniting vegetation and other assets at one's disposal. The notion of incinerating his property originated from the remnants of fire left after cooking, which subsequently spread and devastated the surrounding ecosystem. Bush burning, as noted by Hamid *et al.* (2012), has adversely affected the ecosystem and human health. In addition to gas emissions that negatively impact the ozone layer, it also contributes to soil degradation and desertification. Edwin (2006) noted that raging bushfires inflict considerable damage across all biological zones, with the most severe impact occurring in areas dominated by savannah vegetation, where their prevalence is also highest. Incinerating agricultural land for crop cultivation adversely impacts soil fertility. During the combustion process, essential nutrients required by plants, such as phosphorus, nitrogen, and sulphur, are lost in the form of gases. The ash, a primary by product of combustion, although abundant in phosphorus, nitrogen, and potassium, can be readily eroded by rainfall.

The heat generated during combustion generates adverse conditions for soil organisms, including earthworms and bacteria. The practice of burning dates back around 2000 years, having been identified as a common method for disposing of vegetative detritus following land clearing, particularly in both large-scale and small-scale agriculture. Indigenous Americans employed controlled burning to diminish dense underbrush, enhance the habitat for game hunting, and establish clearings for agricultural cultivation. In several nations, natural bush burning has fostered a significant diversity of flora linked to a bush burning ecosystem (Williams *et al.* 2016). In

addition to land being cleared for agricultural purposes, animals are also ensnared; the prevalent notion is that bush burning is detrimental to the ecosystem and should be unequivocally prohibited in both forests and fields. In the Twentieth Century, there existed a prevailing belief that all bush burning was detrimental, necessitating immediate and costly suppression efforts. It is evident that the policy of prohibiting all bush burning in the United States has led to an accumulation of combustible material on the forest floor, thereby resulting in a rise in the frequency of major and destructive wildfires (Halofsky, *et al.*, 2020). Forestry encompasses the art and science of cultivating trees and overseeing natural forests and woods for economically beneficial purposes. Properly managed forestry may significantly contribute to the provision of many commodities and services for both urban and rural livelihoods. These advantages are crucial for Nigeria's burgeoning population. A significant section of the Nigerian population, residing in urban, semi-urban, or rural regions, depends exclusively on forests and forest products for their living. The forest yields both timber and non-timber items. Non-timber forest products include wildlife, chewing sticks, medicinal plants, poles, edible mushrooms, fruits and nuts, spices, and soup seasonings. The services include recreation, nutrient cycling, enhancement of soil fertility, air purification, maintenance of the ozone layer, habitat for wildlife, and the creation of employment opportunities (Aoki, 2006). One of the primary problems of forest management is safeguarding the forest and natural environment against wildfires. Numerous studies on slash-and-burn agriculture indicate enhanced nutrient availability in the soil following combustion (De Rouw, 1994). Increases in soil fertility following burning have been ascribed to nutrient-dense ash in almost all tropical forest types studied in relation to slash-and-burn practices (Maass, 1995). Aside from the impact of combustion on soil. The production of NO₂, SO₂, SO₃, NO, CO, and CO₂ gases significantly contributes to global warming, adversely affecting the ozone layer, while bush burning alters the microclimate at the soil-atmosphere interface (Jamala *et al.*, 2012). McKnight (1992) contended that atmospheric carbon dioxide levels are rising due to a reduction in trees capable of absorbing it and the combustion of trees for forest clearing, which emits additional carbon dioxide into the sky. The prevailing belief is that the Earth's atmosphere is warming due to rising levels of carbon dioxide and other gases produced by human activity, including bush burning (Ambe *et al.*, 2015). Over the past three decades, global carbon emissions from slash-and-burn practices have been estimated, resulting in CO₂ releases into the atmosphere (Mieville *et al.*, 2010). An Environmental

Scientist stated: Burning soil destroys its nutrients and depletes it; burning grass releases carbon dioxide into the atmosphere, contributing to ozone layer depletion and climate change. Slash-and-burn farming techniques are detrimental to both local agriculture and the environment, highlighting the necessity for the Durban conference to offer alternatives for small-scale farmers (Wendi, 2011). Furthermore, bush burning has numerous detrimental effects on agricultural land, including the exposure of soil to erosion agents. Decline of fauna residing within the settlement. Depletion of forest reserves, which provide lumber for construction, furniture, firewood, and medicinal resources. Environmental contamination resulting from smoke emissions, Destruction of botanical communities. The combustion of the vegetation releases a surge of nitrogen into the soil, facilitating a temporary enhancement in productivity. Soil fertility may enhance following low-intensity burns, as fire chemically transforms nutrients contained in deceased plant matter and the soil surface into more accessible forms. The fire indirectly enhances the mineralisation rate through its effects.

MATERIALS AND METHODS

Location of the study area: The study was conducted in the Oluyole Local Government Area. Oyo State, Nigeria. The Local Government is based at Idi-Ayunre along the Old Lagos/Ibadan road. The area is adjacent to four Local Government Areas: Ibadan South-West, Ibadan South-East, Ona-Ara, and Ido, all located within the Ibadan Metropolis.

The region is adjacent to Ogun State, specifically through the Egbeda-Obafemi, Odeda, and Ijebu-North Local Government Areas. Oluyole Local Government was established in 1976 and covers an area of more than 4,000 square kilometres. Oluyole Local Government is located approximately at 3°52'0" East longitude and 7°13'60" North latitude. As of 2006, the area spans 629 km², exhibiting a population density of 320 individuals per km², resulting in a total population of 202,725. The postal code for this area is 200, and it operates within the UTC +1 time zone (WAT).

Sampling techniques: The sample for the study was obtained using a Multi-stage sampling technique to selected five (5) community in Oluyole Local Government which are: Abanla Area, Idi Ayunre Area, Alata Area, Onigambari Area, and Onipe in the study area because of the high concentration of farmers in those areas as well as currency of the bush burning activities. Total number of 100 correspondents formed for the sample size of the study.

Method of Data collection: Data was collected using structured questionnaire administered to the respondents. The instrument was measuring which consist two section, section A consist the socio-economic status while section B consist the effect of bush burning of farm land.

Data Analysis: The participants respondent along point likert scale response option which are: strong agree (SA), agree (A), disagree (D) and strong disagree (SD). The data were analyzed using descriptive statistics such as (percentage, frequency, mean and standard deviation).

RESULT AND DISCUSSION

Table 1 presents the findings about the socio-economic characteristics of the respondents, encompassing age, gender, education, marital status, religion, household size, occupation, years of farming experience, and types of crops cultivated.

Table 1: Socio-economic characteristics of the respondent in the study area.

Variable	Frequency	Percentage (%)
Gender		
Male	62	62.0
Female	38	38.0
Total	100	100.0
AGE		
21-25 Years	24	24.0
26-30 Years	16	16.0
31-35 Years	20	20.0
Over 35 Years	40	40.0
Total	100	100.0
Marital Status		
Single	5	5.0
Married	71	71.0
Divorced	11	11.0
Widowed	13	13.0
Total	100	100.0
Educational Level		
No Formal Education	40	40.0
Primary Education	31	31.0
Secondary Education	19	19.0
Tertiary Education	10	10.0
Total	100	100.0
Religion		
Christianity	49	49.0
Islamic	50	50.0
Traditionalist	1	1.0
Total	100	100.0
Household		
Nuclear Family	38	38.0
Extended Family	62	62.0
Total	100	100.0
Farmer	44	44.0
Trader	29	29.0
Civil Servant	18	18.0
Other Occupation	9	9.0
Total	100	100.0
Years Of Experience		
1-5 Years	27	27.0
6-10 Years	33	33.0
Above 10 Years	40	40.0
Total	100	100.0

Source; Field Survey, 2022 (n=100)

Table.2: Identify the Effect of Bush Burning on Farm Crop

Effect of bush burning on farm crop	Strong Agree (SA)	Agree (A)	Strong Disagree (SD)	Disagree (D)	Mean	Standard deviation
Bush burning increases diseases in crop	1 (1.0)	8 (8.0)	24 (24.0)	67.0	1.86	0.586
Bush burning predisposes soil to erosion	70.0	-	28.0	2.0	2.03	1.290
Bush burning reduce soil/plant productivity	2 (2.0)	4 (4.0)	68 (68.0)	26 (26.0)	1.82	0.593
Bush burning encourages insect attack on crop	-	1 (1.0)	88 (88.0)	11 (11.0)	1.90	0.333
Bush burning reduce shelf life of crops	47 (47.0)	49 (49.0)	4 (4.0)	-	3.43	0.573

Source; Field Survey, 2022 (n=100)

Table.3: Identify the effect of bush burning in relationship to land

Effect of bush burning in relationship to land	Strong Agree (SA)	Agree (A)	Strong Disagree (SD)	Disagree (D)	Mean	Standard deviation
Loss of life	-	-	-	-	-	-
Loss of crops	-	-	-	-	-	-
Loss of livestock	15.0	53.0	30.0	2.0	2.53	1.077
Destruction of trees	28.0	65.0	2.0	5.0	2.59	0.922
Destruction of building	32.0	1.0	2.0	65.0	2.63	0.960
Loss of nonfarm asset	50.0	-	43.0	7.0	2.36	1.45
Respiratory diseases	1.0	5.0	83.0	11.0	1.24	0.588
High temperature	45.0	1.0	8.0	46.0	2.83	1.101
Ozone layer depletion	17.0	65.0	2.0	16.0	2.97	0.642
Air pollution	23.0	64.0	0.0	13.0	2.97	0.869
Causes of Soil erosion	17.0	1.0	4 6.0	36.0	1.89	1.072

The table above indicates that 62.0% of respondents were male and 38.0% were female, suggesting a greater male participation in arable crop farming within the study area. This male predominance has often been ascribed to the labour-intensive nature of farming, which relies heavily on manual labour. The research indicates that the majority of responders were male. The results indicate that 40.0% of respondents were above 35 years of age, followed by 24.0% aged 21-25 years, 20.0% aged 31-35 years, and 16.0% aged 26-30 years. This suggests that the farmers remained within their active age range, consistent with Sofoluwe et al. (2011), who reported that younger farmers tend to possess greater knowledge of optimal practices and are often more inclined to accept risks and adapt to improved farming techniques due to their extended planning horizons.

The data indicates that 5.0% of the respondents are single, 71.0% are married, 11.0% are divorced, and 13.0% are widowed, demonstrating that the majority of respondents are married. Married individuals were more engaged in agriculture and may obtain assistance from their wives in doing various farm duties. The data indicates that 40.0% of respondents possessed no formal education, 31.0% had primary education, 19.0% had secondary school, and 10.0% had higher education in the study area. The respondents' attainment of education suggests their lack of options for promptly grasping new agricultural techniques due to their previous educational deficiencies. Education is a crucial attribute, particularly in the attainment of information and skills across several domains of human activity. Additionally, 63.0% of the

respondents belonged to nuclear families, whilst 62.0% were part of extended families. Indicates that 49.0% of the respondents identified as Christians, 50.0% as Muslims, and 1.0% as traditionalists. Ultimately, 44.0% of the respondents were farmers, 29.0% were traders, 18.0% were civil servants, and 9.0% held other occupations. This may be ascribed to the engagement of over half in bush burning to expel animals such as rodents, wild rabbits, and cane rats from their natural habitat. This is in agreement with Gnado (2004) who observed that farmers use fire to hunt for games or bush meats despite its widely acclaimed long-term devastating effects on the environments.

From table 2: Illustrates the level of awareness among respondents from various occupations regarding the impact of bush burning on different environmental components. The results indicated that respondents in the study area claimed that bush burning increases diseases in crops, with a mean score of (1.86). The presence of bush burning increases the likelihood of soil erosion, with a mean score of 2.03. The study results, as illustrated in the table above, reveal that nearly all respondents strongly agreed, resulting in a mean score of 1.82. A significant proportion of the respondents noted that bush burning diminishes soil and plant productivity, with a mean score of 1.90. Ultimately, the act of burning promotes insect infestation on crops, resulting in a mean score of 3.43. The findings align with Jamala (2012), who discovered that farmers asserted bush burning results in diminished pasture for livestock, destruction of wildlife habitats, a decrease in soil fertility, an increase

in soil erosion, and the destruction of soil micro-organisms. From table 3: The findings demonstrated the impact of bush burning in relation to land within the study area. The findings revealed a mean score of 2.53 for the loss of livestock. The data presented in the table above shows that the respondents indicated a mean score of 2.59 regarding the effects of tree destruction, while the mean score for the destruction of buildings was 2.63. The loss of nonfarm assets was found to be highly significant in the study area, with a mean score of 2.36, whereas the mean score for high temperature was recorded at 2.83. The findings indicated that participants in the study area reported a mean score of (2.97) for bush burning's impact on ozone layer depletion, while the air pollution rate, attributed to bush burning, also scored (2.97). Additionally, soil erosion received a score of (1.89). The findings indicated that the mean score for respiratory disease was 1.24. Conversely, the findings from Ambe *et al.* (2015) and Aluko *et al.* (2019) highlighted the necessity of raising awareness due to the detrimental impacts of bush burning. The farmers likely possess a greater awareness than those in other professions due to their direct engagement with the land, leading them to understand the environmental consequences of bush burning over time.

Conclusion: The study concludes that the area is predominantly inhabited by farmers who have suffered from the effects of burning activities. One of the primary reasons for the burning of bushes in the area is linked to land clearing and the management of weeds. Additionally, farmers have suffered significant asset losses amounting to millions of naira due to bush burning practices. In addition to various considerations, the farmers are acutely aware that bush burning results in the detrimental loss of crops. It is recommended that farmers, hunters and environmental educators, and the general public should be sensitized on the effects of bush burning, so as to take positive steps and measures in controlling the hazards of bush burning, appropriate and correct farming methods should be made available by the government for land clearing which will reform their attention from bush burning.

Declaration of Conflict of Interest: The authors declare no conflict of interest.

Data Availability Statement: Data is available upon request from the corresponding author.

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