Assessment of the Impacts and People'S Perception of Bush Burning on the Grasslands and Montane Ecosystems of the Obanliku Hills/Plateau, Cross River State, Nigeria

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Abstract

The main purpose of this study was to investigate the impact of bush burning on the grassland and montane ecosystems of Obanliku Local Government Area of Cross River state. Three hypotheses were formulated for the study. The sample of the study consisted of 200 respondents, the sample distribution in terms of gender, location and occupation was equitable. A 21- item structured and validated questionnaire was used to gather information from the respondents. The hypotheses were tested using the Pearson Product Moment Correlation Coefficient analysis. Based on the results obtained the following findings were made: significant relationship exists between bush burning and between people level of perception and their attitude toward bush burning on grassland and montane ecosystems conclusions were drawn and recommendations such as employing the service of environmentalists to serve as extension agents in communities, provision of articles in journal and textbooks in community and / or public libraries treating bush burning it's impacts and the various mitigation measures to curb the problem were made.
Keywords: bush burning, grasslands, montane ecosystems.

Introduction

Bush burning is the indiscriminate setting ablaze of the vegetation cover and the burning down of grassland and forest resources by fire. To the peasant farmer, it is the cheapest means of clearing farmlands. To the nomad, it is the easiest way to clearing garbage so as to allow for early sprouting of fodder for the animals, the hunters say, it is a technique for hunting games. Others set wild fires for the pleasure of it. Yet some bush fires have been traced to careless smokers who either are passing by or who go on picnics to tourist sites.

Although the farmers, hunters, pleasure seekers and the careless smokers do not seem to see any problem posed by bush burning, it is obvious that the impact posed by bush burning, is already telling on the environment of Obanliku and elsewhere.

Accusing fingers are pointing towards bush burning for lowering crop yields, invasion of foreign/alien species compartmentalization of the soil. Series of research studies have been, conducted, and a lot of articles published on the issue of bush burning and its attendant effect on the grassland and montane ecosystems. Many have contributed by making positive suggestions on how to curb bush burning, though such suggestion have not been adhered to.

With the results and recommendations that would be made here, it is hoped that, the farmers, hunters, policy makers and implementers, Environmental Educators, careless cigarette smokers on picnics or on camping and indeed the general public would be more aware of, change their attitude and take measures to curb the menace of bush burning.

Theoretical Framework

The Human ecological - systems theory was propounded in 1979 by Urie Bronfenbrenner. The theory in this context is closely linked with Ludwig Von Bertalanffys general systems theory (GST). It is understood as a theoretical perspective on, and a study of, the reciprocal relations between "humans and their socio-cultural-physical environment. It emphasizes the interaction of people with territorial habitats, and their interdependent functioning with each other and with their natural and man-made settings. It is therefore concerned with the relationships at the interfaces between systems and sub-systems. It deals with such matters as the spatial distribution, successions and temporal mobility of population, the use of land and other resources, food chains and other natural resources cycling processes, community locations, structure and evolution of people and their settings in a dynamic equilibrium. (Nwagbara, 1997).

Human ecological theory therefore contributes a behavior principle that states that the size of a community needs to be proportionate to the natural resources available for the use of its members in their habitat. There is also a principle of "Ecological complementarity". Nwagbara (1997) stated that "Earth and man are two complementary components of a system which might be called "cybenatics". Since each shapes the other in a

continuous system of creation" (P.34), closely related is "the ecosystem principle", the interdependence and reciprocity of biotic and abiotic structures and functions. The specific characteristic of environment affects styles of adaptation on the part of individual community members.

Purpose of Study

This study seeks**:**
1. To find out how bush burning impinges on the grassland and montane ecosystems.
2. To investigate the relationship between farming systems and bush burning on grassland and montane ecosystems,
3. To examine the extent to which the level of environmental perception influence peoples attitude towards bush burning on grassland and montane ecosystems.

Statement of the Problem

Bush burning and its impact on the grassland and montane ecosystems of Obanliku has been a matter of great concern. Throughout the dry season, when the fodder and the foliage have become dry, the commonest sight to behold at night is a glow mountain and smoke rising towards the sky; while during the day time, the whole environment is littered with falling ash.

More so, it has been observed that the rate of crops yield has dwindled considerably, climatic conditions have changed drastically, indigenous species of wildlife have disappeared, feeder streams and springs are drying up. As Lopez (1999) in Awake (April, 22 1999) put it, "it will take well over ten years to recover the flora and fauna lost in one minute of bush burning.

On the whole, for a logical and detailed investigation into this study, it is essential that the following pertinent questions be asked.

Does bush burning significantly degrade grassland and montane ecosystems?

Is there any significant relationship between farming systems and bush burning on grassland and montane ecosystems?

To what extent does the level of environmental perception influence people's attitude towards bush burning on grassland and montane ecosystem?

Hypotheses

The following research assumptions were formulated to guide the study.

Ho1. Bush burning does not significantly degrade grassland and montane ecosystems.

Ho2. There is no significant relationship between farming systems and bush burring on grassland and montane ecosystems.

Ho3. No significant relationship exists between people's level of environmental perception and the attitude towards burning of the grassland and montane ecosystems.

Literature review

Bush Burning as a Factor of Environmental Degradation

Fires have always been a part of the ecosystems but in the past millennia, the development of human communities and more recently, the invention of safety matches have accelerated the effect of fire upon landscape.

Impact of bush burning on flora:

Bush burning is a notorious agent of deforestation in Nigeria (NEST 1991); Crowder and Cheda (1982), while affirming the deleterious effects and disadvantages of bush burning stated that:

"Burning injures range plants by removing top growth and depletes food reserves available for re-growth. And that repeated burning during the dormant period stimulates re-growth for out- of- season grazing and causes a drastic reduction of roof and crown reserves. Burning causes a deterioration of the vegetation. Burning too late in the dry season may injure browse plant as they annually leaf-out ahead of grasses. The damaging effect on vegetative cover and encroachment of undesirable species however, is related to time and frequency of burning" (page 299).

The most ancient and important influence of man on grasslands and other vegetation associations has been through the use of fire. Stewart (1950), as quoted by Crowder and Cheda (1982). Relative to the grassland and montane ecosystems of Obanliku, few grass exist which do not reflect burning impacts.

Pielou (1979) in his study argued that unlike climate, fire is another exceedingly important factor that guides parallel vegetation. It is not independent of climate for causes; fires are far more frequent in dry than wet climates. He continued further to assume that many of the selectively advantageous characters possessed by plants that thrive in dry climate are adaptation to fire rather than drought per se. comparatively, in the grassland and montane ecosystems of Obanliku, incessant fires are set during the dry months from November through

March when the temperature reaches extreme. Mutch (1970) also opinioned that in very dry climates, fire replaces bacterial and fungal decomposition as the agent of degrading litter and permitting the recycling of its mineral content. Fire is therefore a necessary occurrence for the maintenance of such vegetation for without it occurring, fairly frequent, the vegetation could not persist.

Smith (1977) identified three conditions which make fire to be an important factor in vegetation changes, these are: an accumulation of organic matter sufficient to bum; dry weather conditions to render the material combustible and source of ignition, which includes lightening and man (p.134).

Tivy (1971) stated the effect of fire on plants growth as been selective, the less resistant species may be destroyed completely or their number and vigor drastically reduced. Relieved of competition, the growth of the survivors is greatly stimulated. Regular burning tends to reduce the number and types of plant species that can grow in a given area and so result in the predominance of one or two fire resistant species.

Kellman (1975) noticed that fire affects plants primarily through its complete or partial destruction of their tissues and that species differ widely in their susceptibility to such damage. While some are extremely susceptible even to fires of low magnitude, others posses adaptations such as thick barks, woody tubers and deeply buried rhizome systems that permit survival of severe burns.

Impact of Bush Burning on Environment Fauna:
Ukpong, Eno, Ntia, Obot and Usang (1995), Stated that they are aware of the damages done to biodiversity in the process of bush burning. In most traditional settings, where hunters use fire as a technique for hunting, they set fire round a particular bush such that no single animal species can escape. By so doing the fire burns all animals young and old, male and female.

Lawal, Aniah, Uche and Animashaun (1995) revealed that incessant fire out breaks (bush burning) has been a major problem affecting game reserves. That it causes lack of habitat and is a major factor of species extinction.

Umoh (1985) Stated that all the causes of bush burning as forest clearance, farming, hunting, lightening, are the major causes of fauna depletion.

Raven (1976) as quoted by Peters, Ekpoh and Bisong (1995) noted that although endangered animals receive greatest attention, plant extinction are often more significant ecologically because a disappearing plant can take with it thirty dependent species such as insects, higher animals, and even other plants. Fire on the ecosystem destroys virtually every living thing.

Observations show that forest fires bum all fauna and most especially the crawling and slow moving ones, whereas the flying and fast running ones are either maimed or escape further into the forest (UNEP, 1991 in Lawal etal 1995).

Marsh (1974) observed that forest fires destroy reptiles, insects, worms, with their eggs and seeds of trees. Bush burning is wasteful and scares indigent animal species away with its dazzling flames. One of the major causes of extinction of animals in the tropical regions of Africa is bush burning, it has to be stopped as it equally affects the genetic build-up of resistant survival fauna hence a major change in species characteristics (NEST, 1991). Birds' eggs, nest, their food sources, mice and other rodents are affected likewise breading seasons, of insects food supplies of mammals and other animals are impacted upon equally.

Impact of Bush Burning on Soil Nutrients and Microbes:
Nye and Greenland (1960) noted that, when debris is cleared and the forest burnt, all the nutrient elements except nitrogen and sulphur are deposited on the surface as ash and are washed into the soil by first rains. Nitrogen, sulphur and carbon in the burned material are lost as gases (thereby polluting the atmosphere). Much of the litter layer is also destroyed by burning. Consequently, the soil is bared to the sun and rain. Some of the soil may be blown or even floated off-the site.

Fire causes superficial depressive effect on soil fungi and animal populations. On the other hand, it's influence on soil moisture, on organisms and organic matter impoverishment produced by high rate of leaching during the first rains may be far more important. Similar conditions prevail on soil and have been noticed in Obanliku.   .

Confirming the impacts of bush burning on soils, George (1974) mentioned that: aside from mechanical and chemical effects of the disturbances of the soil by agricultural operations and of the freer admission of sun, rain and air to the ground, the fire itself exerts an important influence on its texture and conditions. It consumes a portion of the half decayed vegetable mould which served to hold its mineral particles together and to retain the water of precipitation and thus loosens, pulverizes and dries the soil.

Nye and Greenland (1960) further stated that the general results of burning the forest vegetation has little, effect on the general expanse of soil, but in patches where logs and heaps of wood undergo prolonged burning, the surface inch or two of the soil may undergo profound change.
They observed further that the effect of heating on the soils microbial population is usually referred to as "partial

sterilization" and it is similar to effects produced by drying or by treating the soil with antiseptics.
Cheda and Crowder (1982) analyzing the demerits of burning stated that:

Burning bares the soil to erosion and water run-off, deprives the soil of litter and mulch and reduces the effectiveness of rainfall. Again, they observed that there is loss of organic matter. Nitrogen in the plant is lost in burning, but the organic matter content of the soil changes little except under cultivation, unless there is a deep burn which damages rhizomes (p. 299).

Hudson (1961) agrees with the above assertion by stating that much nitrogen, an essential plant food is lost in the smoke during burning, and that the wood ashes contain valuable potash, but it is in form so soluble that the first rains wash a good deal of it away. Also, the preliminary burning destroys both humans and helpful bacteria in the upper soil layer.

Lawal, at el (1995) viewed that the implication of bush burning is that some populations of beneficial micro-organisms may be eliminated. The organic matter in the soil will be destroyed and the soil disrupted, thereby rendering such soil highly infertile. They went further to state that a major cause of soil erosions is poor land management as manifested in various human activities of which bush burning is chief. Bush burning causes accelerated erosion, soil humus, moisture and soil biota are affected.

Impact of Bush Burning on the Atmosphere:
Bush burning causes changes in the micro-climate at the soil - atmosphere interface. McKnight (1992) argued that atmospheric carbon dioxide continues to be increased because, there are fever trees to absorb it and because burning of trees for forest cleaning releases more carbon dioxide to the atmosphere. It is currently believed that the earth's atmosphere is heating up due to increasing amounts of carbon dioxide and other gases resulting from human activities such as bush burning. Droughts and high temperatures in certain regions of the world are early signs of global warming. Changes in global climate would have major implications for economic development and environmental health.

The most significant of the atmospheric changes most likely contributed by bush burning are: The green house effect, depletion of the protective ozone layer, atmospheric pollution. (Peters et. al. 1995).

Impact of Bush Burning On Environmental Resources:
Human and natural resources like structures, plantations, estates, and farmlands are destroyed due mainly to careless and uncontrolled fires (Umoh 1985). Natural resources such as timber, plants of exotic value are burnt and destroyed during forest fires. The fire that devastated Nigeria telecommunication facility in 1984 was due mainly to careless bush burning (Umoh, 1985).

Setting wildfires on forest where petroleum pipelines passes has been very devastating and have caused untold hardships to victims. They have lost their farmlands, human lives and all other resources of the environment as was the case of Jassi community of Delta State in 1999.

Farming Systems and Bush Burning:
Nest (1991) observed that the practice of bush burning which is part of the traditional farming system in Nigeria, has for a long time been known to be detrimental to forestry activities.

Nye and Greenland (1960) in like manner stated that shifting cultivation involves clearing by burning and in grassland ecosystems, it is often called 'slash and bum agriculture.

Onwueme (1978) affirmed that burning is such an essential part of traditional shifting cultivation that sometimes the system is referred to as 'slash and bum agriculture. As practiced by these farmers, burning has several disadvantages.

Firstly, the burning process results in loss of nutrients and organic matter from the soil. During the burning, much of the nitrogen is volatilized as oxides of nitrogen into the atmosphere likewise the oxides of carbon as carbon dioxide. Secondly, the heat of burning results in the killing of beneficial micro-organisms which are present in the soil such as earthworms. Thirdly, burning tends to have adverse effect on the structure of tropical soils.

Wilson and Kang (1981) while writing on types of shifting cultivation stated that clearance systems depends on the vegetation, distribution of rainfall, crops to be grown, tools available and the regional practices. They listed the following as kinds of clearance system of shifting cultivation:

i.   Burn and Plant- Burning off the thick dry secondary vegetation.
ii. Burn, hoe, cut and plant-   Common around the savanna where fire effectively remove most of the vegetation.
iii. Cut, burn and plant- Very common in tropical vegetation, cut usually towards the end of the dry season, allowed to dry and burnt when rain approaches.
iv. Cut plant and bum- common with plantation agriculture.
v.   Cut, burn refuse and plant- common in the grassland ecosystems.

vi.   Cut, wooding, bum, plant and hoe: this is most common in the tropical rain forest (page 121).

Higson (1961) confirmed that West Africans adopt shifting cultivation, which is a system by which a patch of bush is cleared and burnt, and that burning is wasteful, on each acre of forest cleared, more than 200 tons of timber, firewood and green manure may be destroyed.

Theodore (1975) writing on pastoralism in tropical Africa stated that nomads on arrival in the wetter plains, burn the tall stand of grass to introduce a 'green flush, to kill ticks, and to control bush growth.

Heady (1960) as quoted by Cheda and Crowder (1982) stated that only nomadic herdsmen can still be extravagant with fire. They stated further that the extent of fire is not easy to assess, and that most ranchers of European origin either do not bum and take precautions against fire sweeping across their properties or they follow a planned programme of burning to keep the bush open. NEST (1991) admitted that the most dangerous form of bush burning is the one where hunters and Fulani herdsmen set fire to the bush in other to hunt wild animals and get new growth of grasses for their animals respectively. This practice is by and large responsible for making large areas formerly of forest cover devoid of vegetation.

Ukpong et al (1995) concluded that: 'for now, it is difficult to provide a more realistic, meaningful and feasible approach to farming in the forest Zones without bush burning.

People's Perception and Bush Burning:
The chambers 20th century dictionary says perception is the apprehension of any modification of consciousness. Otherwise, it is the mental ability of perceiving, discerning or apprehending any modification of an event or consciousness. It has been observed by Hinckley (1976), that most wildfires are caused by careless campers and picnickers who throw cigarette stumps carelessly and refuse to quench camp fires after camping. Indiscriminate forest fires have spurred the forest service and state divisions of forestry to spend much time and money to persuade people to stop bush burning carelessly.

Ukpong et al (1995) observed in confirmation that most people set the bush ablaze for the mere fun of burning, the ecosystem - grassland and montane forests just to admire the dazzling flames. They further advised that these pleasure seekers should desist from such cruel act to the environment because of the huge losses to biodiversity.

Confirming that perception of people towards bush burning causes them to engage in the act, Odum (1971) pointed out that fire can sometimes act as a regular consumer where there is the tendency to build-up of dead vegetation and it is not necessarily damaging to the productivity of the ecosystem. For example, it has been shown that in some parts of the United States of America, especially California, periodic fire started by lightening are an important ecological factor in determining the climax vegetation.

Duffey (1974) opinioned that burning is likely to be used most effectively by the conservationist in the reclamation of rough grassland which has been ungrazed or under grazed, and where there is a considerable accumulation of dead plant materials. This is a clear pointer to the fact that most people perceive bush burning in the light of assisting to clear vegetation not minding the environmental consequences.

Dasmann (1972) confirming that people's perception of bush burning influences their engagement in the act, stated that fire can also be used as a management tool which produces different effects in different grassland and forest types.

NEST (1991) concluded that fire serves useful purposes. But more often than not, the fires get out of control to consume adjacent non- target vegetation. Ultimately, destructive bush burning derives from careless disregard for the values of vegetation, perhaps because of lack of awareness or the attitude that vegetation is 'bush and a symbol of lack of development.

Methodology
Research Design
The survey research design was used in this research because a small representative sample was used to draw inferences from and generalizations to a population that would have been too expensive to study as a whole.

Population and sample of the study
The population comprises all the inhabitants of the ten (10) council wards of Obanliku which are: Becheve, Utanga, Bebi, Basang, Busi, Bendi I Bendi II Bishiri north and Bishiri south. The Obanliku plateau and sankwala hills are Precambrian north- western projections of the Bamenda highlands, drained by the katsina-ala tributory of the Benue river valley (Church 1977). The natives of the area are mostly farmers and game hunters. Tourist attractions abound hence tourists visit the area in leaps and bounds.

The human population as at 2012 estimated from 2006 census stood at one hundred and thirty thousand nine hundred and four persons (130,904). A sample of two hundred (200) persons was used for this study, twenty (20) from each council ward. The sample distribution   in   terms   of gender,   location   and occupation   was equitable. The sample technique employed here was the purposive sampling. This is because

the researcher felt bush burning is a common feature in all the wards of Obanliku and anybody in the ten (10) wards was in a better position to respond to the questionnaire irrespective of age, sex, occupation, marital status, educational qualification and family background.

Instrumentation

The instrument used for this study for data collection was the questionnaire. The questionnaire comprised 21 items and was administered on 200 respondents. The questionnaire was developed by the researcher using Likert -5 point scale. Values attached to them in order of importance were thus: Strongly Agree (SA), Agree (A), Disagreed (D), Strongly Disagreed (SD), and Neutral (N).   .

There were two sections in the questionnaire, section A contained personal data of the respondent, section B was made up of the items which the respondent were required to tick (√) depicting their views about the research topic.

Procedure for Data Collection

Copies of the questionnaire were administered by the researcher. The respondents completed the questionnaire and returned to the researcher the someday they were administered to ensure effective returns. Two hundred copies of the questionnaire were administered and retrieved duly completed thus the return rate was 100%.

Results

Ho1

Bush burning does not significantly degrade the grassland and montane ecosystems. Data for testing this hypothesis were subjected to Pearson product moment correlation analysis. The results are as tabulated in table 1

Table 1: Bush burning and the degradation of grassland and montane ecosystems: n = 200.

Variable	$\sum x \sum x^2$ $\sum Y \sum Y^2$		$\sum xy$	r-cal	r-critical
Bush burning	1547	398851	455181	0.98	0.138
Degradation of ecosystems	1724	504720			

Data Analysis 2014

Table 1 shows that, the $\sum x$ ($\sum x^2$) showing bush burning as related to the degradation of the ecosystems was 1547 (398851) respectively, while $\sum y$ ($\sum y^2$) was 1724 (504720). The relationship with $\sum xy$ of 455181 yielded a Pearson product moment correlation co-efficient of 0.98. This was statistically significant.

The obtained r-value was 0.98 and the critical r-value listed against 0.05 level of significance is 0.138 at df 198, compared with the calculated r-value there was sufficient evidence to reject the null hypothesis; therefore the alternate hypothesis was accepted. The findings of hypothesis one is in agreement with the views expressed by Ajayi and Halstead (1979) that bush fire can affect the following environmental variables either directly or indirectly.

Soils by: Affecting numbers and rate of activity of soil organisms removing or changing rates of soil organic matter formation and accumulation, affecting amounts and availability of essential nutrients, affecting soil water retention capacities, removing soil surface horizons through surface run-off and sheet erosion.

Land surface by: affecting degree and rates of surface erosion by effects on soil and vegetation cover, effect on water movements.

Water by: changing rates of transpiration and evaporation, changing rates of permeability and sub-surface flow, affecting amounts and rates of sedimentation, changing stream and river structure, through bank and surrounding vegetation destruction.

Vegetation by: changing direction and speed of vegetation succession, affecting plant biomass, structure and shape, indirectly altering water availability.

Wildlife by: destruction of habitat, removal of food resources, destruction of young ones, eggs and exposure to predators. It is obvious that many of these effects are related and interacting thus what is most important is the confirmation of the study findings that bush burning significantly degrades grassland and montane ecosystems.

Ho2:

There is no significant relationship between farming systems and bush burning on grassland and montane ecosystems.

Data for testing this hypothesis were subjected to Pearson's Product moment correlation analysis. The results are as tabulated in Table 2.

Table 2: Farming systems and bush burning n=200

Variable	$\sum$x $\sum$Y	$\sum$x^2 $\sum$Y^2	$\sum$xy	r-cal	r-critical
Farming system	1632	438998			
			483667	0.97	0.138
Bushing burning	1832	536652			

Source: Data Analysis 2014

As shown in Table 2 the $\sum$x ($\sum$x^2) for farming system is 1632 (438998) while that of bush burning $\sum$y ($\sum$y^2) is 1832 (536652) respectively. The relationship $\sum$xy, 483667 yielded a Pearson product moment co-efficient r of 0.97.

There is a strong relationship between the two variables. However, the critical value listed at df-198 at 0.05 level of significance is 0.138, compared with the calculated r-value of 0.97, the critical T-value is less than the calculated T-value. We therefore reject the null hypothesis.

The findings of this hypothesis revealed that the farming systems practiced by Obanliku people greatly relate to their involvement in bush burning. These tallies with Garrity and Khan (1994) who viewed that shifting cultivation, slash-and-bum agriculture account for about 50 to 75% of the 17 million hectres of forest loss currently every year. Dove (1983) similarly stated that according to the recent estimates slash-and burn agriculture is practiced by 240 and 300 million people on nearly one half of the land area in the tropics.

The result also agrees with the findings of Nest (1991) which stated that bush burning is a frequent phenomenon in the rangelands, and that it occurs as farmers clear their farmlands. Herders annually burn the vegetation in order to stimulate early sprouting for their livestock.

Bennet and Humpries (1974) agrees equally with the findings when they concluded that fire is caused by man as a regular agricultural practice or by sheer carelessness.

Ajayi and Halstead (1979) supporting the finding observed that savanna is burnt to flush out animals during hunting expeditions, to remove old unpalatable growth to control brush and encroachment of rangelands by woody plant species.

Ho3

No significant relationship exists between people's level of perception and attitudes towards bush burning.
Data for testing this hypothesis were subjected to Pearson's product moment correlation analysis. The results are as tabulated in table 3

Table 3: Perception and attitudes towards bush burning

| Variable	$\sum$x $\sum$Y	$\sum$y^2 $\sum$Y^2	$\sum$xy	r-cal	r-critical
Level of participation	1950	467331			
			475942	0.74	0.138
Attitude to burning	1683	532060			

Source: Data analysis 2014

Table 3 shows that $\sum$X ($\sum$x^2) for people level of perception is 1950 (467331) while attitude towards bush burning, $\sum$y ($\sum$y^2) is 1683(532060). The relationship $\sum$xy of 475942 yielded a Pearson product moment correlation co-efficient r of 0.74.

The relationship was beyond chance occurrence. There was sufficient evidence to reject the null hypothesis; therefore, the alternate hypothesis was accepted. The findings revealed that the level to which individuals are aware of their environment influence their attitude towards bush burning. Ajayi and Halstead (1979) agree to this finding when they stated that scientist and managers of game reserves advocate using fire as a tool for achieving appropriate integration of the renewable natural resources and their change. This indicates clearly that they view bush burning as a management tool. In most cultures, it is perceived that fire is applied on the bush to clear the evils of the previous poor harvest.

Socioeconomic characteristics of respondents
The socio-economic characteristics of the respondents in the study area presented in figure 1 shows that majority of the sampled population were male with a value of 53% while only 47% of the sampled population were female. It was also noticed in figure 1 that over 41.5% sampled population were married while 32.5% were single. Although, only 13.5% and 12.55 of the sampled population across the communities were divorced and widowed.

Figure 1: Socioeconomic characteristics of respondents
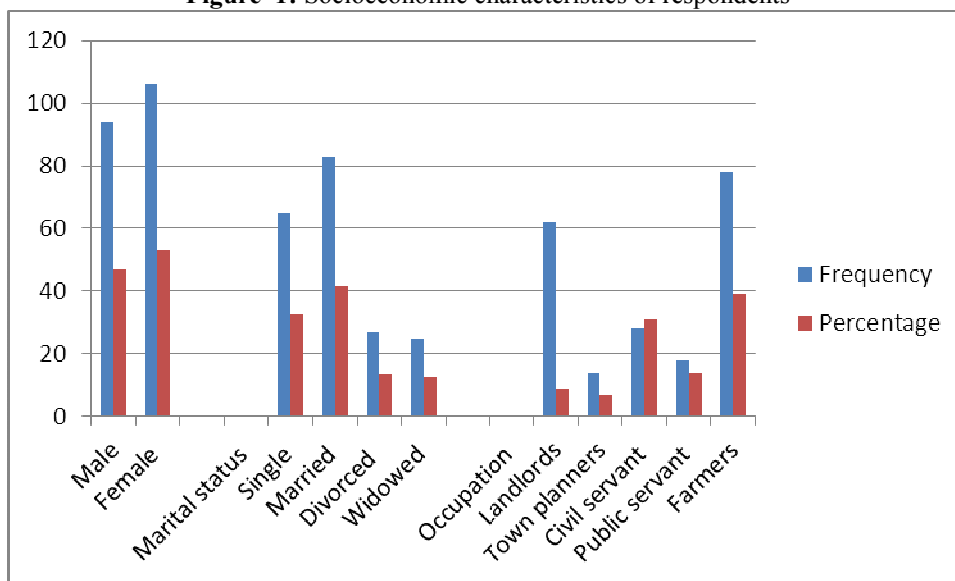
Source: Field survey, 2014

Conclusion:

From the outcome of these research findings, it was concluded that: Bush burning significantly degrades the grassland and montane ecosystems. This means that bush burning degrades soil, land surface, water, vegetation, wildlife and indeed the entire ecosystems including the atmosphere.

There was a significant relationship between farming systems and bush burning on grassland montane ecosystems. This was so because a majority of obanliku people engage in peasant farming which of course requires bush burning as a clearance tool, shifting cultivation, nomadism and game-hunting being the chief farming methods. The level of environmental perception relates significantly with the attitude towards bush burning. This showed that the more people are aware about their environment, there would develop a better attitude as regards bush burning.

Recommendations:

Sequel to the findings and conclusions of this study, the following recommendation are made:

1. The Government should as a matter of urgency employ the services of environmentalist to be deployed to various communities who will act as extension agents. The services of these agents would include bringing to the notice of the villagers the dangers of bush burning, work with the community members to fire-trace protected areas, act as police on those who violate the laws against bush burning.

2. There should be provision for articles on journals and textbooks in community libraries treating bush burning, its impacts and the various mitigation measures to curb the problem.

3. Strict laws should be enacted by the legislatures against bush burning, and appropriate punishments spelt out to persecute defaulters in the courts of law.

Modem methods of farming should be introduced to the villagers, so as to enable them drop the traditional methods which require burning.

4. More protected areas and nature reserves should be carved out while NGO's intensify their efforts of educating the public about the benefits of such reserves.

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