

INCREASING RATE OF FOREST FIRES AROUND BAYELSA STATE, NIGERIA; IMPLICATIONS ON ECOSYSTEM HEALTH

***Ezenwaka, Jasper and Agbai, Williams Perekekeme**
Department of Crop and Soil Science, Faculty of Agriculture, Niger Delta University,
Bayelsa State, Nigeria.

Email: jezenwaka2001@gmail.com; jasper.ezenwaka@ndu.edu.ng

ABSTRACT

Forest fires are not new, but the frequency has been on the increase recently. This paper sets out to appraise the reason for the recent increase in incidences of forest fires, and to explore existing indigenous knowledge on forest fires. The semi-structured interviews involved 50 participants that were chosen through a Convenient sampling method. The interviews centred around; Why the increase in the incidence of forest fires? What is the purpose behind it? Are the people aware of the effect of fire on the ecology? What are the benefits? What are the disbenefits? Are there damages incurred as a result of forest fires? Chief among the benefits of forest fires that was mentioned included improvement to agricultural production. The disbenefits included smoky atmosphere, destruction of ecosystems, dusts as a result of ash particles, impure air, dirt being blown into houses, and loss to adjoining farms where fire was not originally intended. This research has pointed out that apart from effects to physical, chemical and biological components of the ecosystem, which have been illustrated in literatures that can be both positive and negative, there are obvious social disbenefits. It is essential to implement sustainable land management practices, conserve soil resources, and promote ecosystem resilience. By integrating scientific knowledge, traditional wisdom, and stakeholder engagement, it is possible to develop holistic approaches for mitigating the impacts of bush burning on soil properties and fostering sustainable land use systems in the future.

Keywords: forest fire, ecosystem, soil properties, soil health, sustainable agriculture

INTRODUCTION

The occurrence of bush fires dates back to ancient times. The initial phases of agricultural practices involved a method known as the slash and burn, which entailed clearing farmland and burning dried vegetation. This process, according to Ambe et al (2015) chemically transforms plant matter into ash and various organic substances useful for plant growth. Fire is commonly employed to prepare land for farming and to eliminate dry vegetation, and establish open spaces conducive to agricultural cultivation (Chungu et al., 2020).

Edwin (2008) indicates that extensive bushfires can cause substantial harm to the ecology. Forest fires can result in the complete or partial loss of vegetation, leaving farmlands and soils vulnerable to erosion (Assaf et al., 2014). Research has shown that fire has the potential to change numerous soil characteristics (positively and negatively) including texture, structure, bulk density, porosity, wettability, infiltration rates, and water holding capacity, as well as influence soil chemical components such as the pool of organic carbon, organic matter, nitrogen, and various essential cations (Inbar et al., 2014; Reinhart et al., 2016; Certini, 2019; Lehmann et al., 2021; Pereira et al., 2018; Wuyep et al., 2022; Neff et al., 2005; Brevik et al., 2022; Oliveira et al., 2015; Pereira et al., 2018; Zhu et al., 2021; Quintano et al., 2019); effect on biological properties is also argued by researchers to be both positive and negative (Kojar et al., 2021; Edem, 2013).

The extent of soil health impairment by forest fire substantially depends on the characteristics of the fire regime (Zhu et al., 2021).

Forest fires have been noticed to have become rampant around the Yenagoa metropolis. What has not been certain include:

- Why the increase in the incidence of forest fires?
- What is the purpose behind it?
- Are the people aware of the effect of fire on the ecology?
- What are the benefits?
- What are the disbenefits?
- Are there damages incurred as a result of wild forest fires?

This research was set out to explore answers to the above questions.

Method:

To find answers to the research questions, a semi structured interview was conducted with 50 participants that were selected through a Convenient sampling method (Ezenwaka and Bethel, 2023) within Amassoma community in Southern Ijaw LGA of Bayelsa State; this community was purposively chosen because of the spate of forest fires (example is shown in Figure 1) noticed around the community's environment within the period October and December 2023. The interview sessions centred around the reason for the forest fires, benefits, disbenefits, and damages. The essence was to gather valuable indigenous knowledge on forest fires. The responses were recorded in a field jotter and was later transcribed to form a primary report for the interviews. The report was further analysed aligning with the pre-set thematic contents. Photography and transect walk were other tools employed during the field work.



Figure 1: Forest fire spotted in Amassoma community forest

Results:

The outcome of the interview sessions have been collated under the following themes. Direct quote (of participants responses) are written in italics.

Why set fire to the forest?

Majority of those interviewed (90%) set fire to the forest for the purposes of farming; preparing their farmlands for cultivation. These were Farmers.

Other purposes included to clear the surrounding vegetation; *it's cheaper that way than paying labours to clear the bushes*. Some of the observed fire sites were vast areas of land being prepared for building projects. These set of persons felt that it was more economical to use "fire" to clear the vegetation than to pay for labour or hire a tractor.

A few others mentioned that nomads will sometimes introduce fires, deliberately, because it allows for the lush growth of grasses for their animals.

In all of the above responses, the setting of the forest fires were deliberate, and was for some personal reasons to the person who started the fire. But fire can go beyond the original intention of the starter if it is not controlled, and becomes damaging.

What are the benefits?

Surprisingly, the farmers possesses the knowledge that the act of setting fires to clear the dried plant debris on the farm plots has the abilities of *improving their crop yield*. What they could not explain was 'why or how'?

Indigenous knowledge is rich. Science (literatures) provides scientific basis which supports the indigenous believes, in some cases. The inability of the rural dwellers to properly appraise the positive and negative effects of their actions may sometimes make them not to know how to control the negative or unwanted effects. For example, the literatures corroborates that there are both benefits and disbenefits to forest fires. The question to ask when employing forest fires should be, to what extent will this fire become damaging and override the good intentions? It does imply that expert advise is important when a deliberate fire is to be employed for any purposes.

What are the disbenefits?

All of the beneficiaries of the forest fires could not ascertain any disbenefit of forest fires. But two persons that were not beneficiaries were bitter about the *incessant and increasing rate of forest fires around the Yenagoa metropolis*. The complaints was about the *smoky* atmosphere and *dusts as a result of ash particles, and makes the air impure*. Other complaints include *dirt being blown into nearby homes (houses)*. A particular participant was bitter about how he *lost hectares of cassava farm to wild fire that spread into his farm*. This points to the fact that apart from physical, chemical and biological disbenefits that have been highlighted in the literatures, there are social disbenefits as well of forest fires.

Why the increase in the incidence of forest fires?

All the participants agreed that there have been a sudden increase in the incidence of forest fires in 2023. A participant explained that *this fire is everywhere around Bayelsa State*. Another said *the fire is all through the East-West road from Zarama up to Sagbama, and to Toru-Orua*. This description is massive in extent. Another participant said *we have never had our atmosphere this smoky*. For the reasons why there is sudden increase in forest fires, no one could point to a reason. This could be a point for a further questioning.

CONCLUSION:

Bush burning has profound effects on soil properties, with implications for ecosystem health, agricultural productivity, and food security. Recent research indicates that bush burning can alter

soil physical, chemical, and biological properties, leading to soil degradation, nutrient loss, and reduced fertility over time. While fire can have short-term benefits such as weed control and nutrient release, the long-term consequences of bush burning are often detrimental to soil health and ecosystem functioning. To address these challenges, it is essential to implement sustainable land management practices, conserve soil resources, and promote ecosystem resilience. By integrating scientific knowledge, traditional wisdom, and stakeholder engagement, it is possible to develop holistic approaches for mitigating the impacts of bush burning on soil properties and fostering sustainable land use systems in the future.

Author contributions:

Ezenwaka, J.: Topic conceptualization, framework development, social data collection and analysis, editing

Agbai, W.P.: Effects of forest fires on soil health, initial draft report

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