# Environmental Implications of Oil Palm Wastes Disposal Methods In Ikire, Irewole Local Government Area of Osun State, Southwest Nigeria

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## ABSTRACT

A huge variety of wastes is generated from oil palm fruit during milling activities. The presence of these wastes has created a major disposal problem causing environmental degradation that requires urgent attention. The study therefore examined the environmental implications of Oil Palm Wastes Disposal Methods in Ikire, Irewole Local Government Area of Osun State, Southwest Nigeria. Two stage sampling technique was used to select a total number of One hundred and twenty (120) oil palm processors for questionnaire administration.Data wereanalyzed using frequency count and Pearson Product Moment Correlation. Findings revealed that majority (75.0%) of the processors are females and more than half of the respondents (62.5%) are married with household sizes of 5-8. Majority (80.8%) of the processors are not aware that oil palm milling activities causes environmental pollution. Hence, processors dispose oil palm waste carelessly without taking into consideration its consequences on their immediate environment. However, the study revealed a significant relationship between environmental sustainability awareness and the effects of oil palm waste disposal methods ($r = 0.267$, $p< 0.05$). The study concluded that waste disposal methods among oil palm processors influenced environmental sustainability, hence; extension service agents and relevant agencies should create public awareness campaigns on the need for a sustainable environment.

**Keywords**: environmental pollution, environmental sustainability, oil palm wastes, processors

## Introduction

One of the greatest problem facing developing countries is indiscriminate waste disposal by man for survival (Joseph, 2006). This and many more like deforestation, loss of biodiversity, ozone depletion, global climate change, pollution and over-consumption of natural resources has resulted to environmental degradation that requires urgent attention (Adepoju, 2017).

In solving these contending problems, the United Nations Environment Program (UNEP, 2020) evolved means of sustaining the environment to ensuring that this generation does not jeopardize that of the future generations which is only achievable via responsible human-environmental interaction.

Waste generation and its management has become a major issue in Nigeria as it contributes greatly to deterioration of the environment resulting in pollution of the atmospheric space where the products are processed (Orji *et al.,* 2006). Wastes according to Olawepo *et al.* (2021) is defined as a substance produced in our daily activities which are unwanted and no longer useful to man. These substances must be managed and disposed with care so they do not constitute a threat to public health.

Oil palm (*Elaeis guineensis)* is one of the most important economic crops in the tropics.

According to Chikwendu and Ogbonna, (2018), oil palm originated from the tropical rainforest region of West Africa and it is the highest yielding source of vegetable oil among all oil-bearing plants which is locally used as cooking oil exported for use to many parts of the world. Oil palm processing is carried out using large quantities of water in mills where oil is extracted from the palm fruits; hence a huge variety of wastes is generated. However, Mosunmola and Olatunde (2020) opined that the presence of these waste has created a major disposal problem contributing heavily to environmental pollution, global climate change and extreme algae growth in the vicinity. Wastes generated during oil palm production process can be categorized into liquid, solid and gaseous wastes. Liquid waste also referred to as palm oil milling effluent (POME) is a voluminous wastewater extracted from palm oil milling exercises. Solid waste such as Empty Fruit Bunches (EFB), Oil Palm Chaff (OPC), Palm Pressed Fibre (PPF), Palm Kernel Shells (PKS) are gotten from the mesocarp. According to Otti *et al.* (2014), 70-75% of oil palm waste is gotten from the solid waste. Un-utilized solid wastes are piled up and openly burnt in the mills while POME is discharged into nearby water bodies without treatment. This action is found to be unappealing, unhygienic, uneconomical and environmentally unsustainable.

Ikire town is one of the areas in Osun State where majority of farmers engage in oil palm cultivation and production among other tree crops such as coffee, cocoa, citrus etc. (Soyebo *et al.*, 2006). Improper waste management of oil palm milling activities remains a major source of risk to public health as it contains several pathogenic organisms. It is very common to see decayed and overflowing solid and liquid waste dumps all over most oil palm milling industries. There is no special or sustainable waste disposal system or treatment. Hence, this paper therefore examined the environmental implications of oil palm wastes disposal methods in Ikire, Irewole Local Government Area of Osun State, Southwest Nigeria.

## Methodology

### The Study Area

The study was carried out in Irewole Local Government Area (LGA) which was created in 1976 with the administrative headquarters located at Ikire. It is located between latitude $7^0$ 15' and $7^0$ 03' and Longitude $4^0$ 05' and $4^0$ 25' E with atotallandmass of 28,454 km$^2$ and a population of 223,583 as at 2020 using the population growth rate of the area (NPC, 2006) and.The local government shares the same boundaries with Isokan LGA to the South, Ayedire LGA to the North and to the West by Egbeda LGA of Oyo State. The LGA is highly endowed with a favourable climate and fertile agricultural land suitable for the farming activities. They also engage in income generating activities such as trading, oil palm processing, processing of indigenous snacks (dodo-ikire), local soap making, mat weaving, cloth weaving, cassava processing, tailoring, craftsmanship, woodwork, carpentry, basket weaving, blacksmithing, pottery and other small scale enterprises (Alabi, 2011).

### Sampling Procedure and Sample Size

The study was conducted among oil palm processors. Two stage sampling technique was used in this study. Stage one involves random selection of 5 political wards out of eleven political wards in Irewole Local Government Area. In stage two, 10 villages were selected from each of the political wards

out of which 12 registered processors were selected giving a total sample size of 120 registered oil palm processors.

## Data Collection and Analysis

A structured questionnaire was used to obtain information on the awareness level of processorson environmental sustainability and their perception on the effects of oil palm waste disposal methods. Data obtained were analysed using descriptive statistics such as frequency count to describe socio-economic characteristics and estimate the level of environmental sustainability awareness among oil palm processors while Pearson Product Moment Correlation (PPMC) was used to evaluate the perceived effect of oil palm waste disposal method on environmental sustainability.

## Results and Discussions

## Socio-economic characteristics of the respondents

The socio- economic characteristics of the oil palm processors were presented in Table 1. The results revealed that majority (60.8%) of the processors are within the age bracket of 50yrs and above. This implies that majority of the oil palm processors are aged. This result aligns with the findings of Akangbe et al. (2011), who reported that oil palm extractors are generally aged. Dominance of aged processors also explains the persistent use of traditional methods of oil palm processing. Majority (75.0%) of the processors were females with only (25.0%) males. This shows that the gender dominance is connected with the nature of the job and this supports the findings of Nwankwo (2016) who affirmed that women engage in almost all the stages of oil palm production.

Analysis from Table 1 further revealed that (35.0%) of the respondents have no formal education, (20.8%) have primary education, (26.7%) have secondary education and only (17.5%) have tertiary education. This indicates that majority of the respondents in the study area are not well educated and this has a serious implication on their attitude towards ensuring a sustainable and toxic free environment. About half (49.2%)of the respondents have household sizes of 5 - 8, (33.3%) have household of 1- 4 while (17.5%) have household sizes greater than 9. According to Onu (2005), large household size signifies an economical way of maximizing family returns by using family labour. This implies that oil palm processors have access to family labour. Findings also revealed that majority of the respondents (80.0%) practice farming as an occupation. This is because farming is the main economic activity and the fabric of rural societies which contributes to the rural development and means of livelihood.

**Table 1: Summary statistics of selected socio-economic characteristics of the respondents**

| Variable | Frequency | Percentage |
|---|---|---|
| **Age bracket (years** | | |
| 21-30 | 15 | 12.5 |
| 31-40 | 12 | 10.0 |
| 41-50 | 20 | 16.7 |
| Above 50 | 73 | 60.8 |
| **Gender** | | |
| Male | 30 | 25.0 |
| Female | 90 | 75.0 |

| **Education status** | | |
|---|---|---|
| No formal education | 42 | 35.0 |
| Primary education | 25 | 20.8 |
| Secondary education | 32 | 26.7 |
| Tertiary education | 21 | 17.5 |
| **Household size** | | |
| 1-4 | 40 | 33.3 |
| 5-8 | 59 | 49.2 |
| 9 and above | 21 | 17.5 |
| **Occupation status** | | |
| Farming | 96 | 80.0 |
| Trading | 20 | 16.7 |
| Teaching | 3 | 2.5 |
| Others | 1 | 0.8 |

**Processors level of awareness on environmental sustainability**

The result as shown in Table 2 revealed that (64.2%) of oil palm processors have heard about environmental protection, (69.2%) wish to have a healthy environment while (70.8%) of the respondents are not aware that open burning method of disposing waste causes environmental pollution in the neighbourhood**.** It was further revealed that majority of the respondents (81.7%) do not dispose oil palm wastes properly, (59.2%) of the respondents are not aware that disposal of oil palm wastes at dump site poses a main risk to human and animal health while (69.2%) do not know that POME can be treated using chemicals. This result implies that respondents' awareness on environmental sustainability is critically low and this could be attributed to respondents' low level of literacy and poor awareness on environmental sustainability.

**Table 2: Distribution of respondents based on environmental sustainability awareness**

| SN | Awareness on Environmental Sustainability | Yes (%) | No (%) |
|---|---|---|---|
| 1 | Have you heard about environmental protection before? | 77(64.2) | 43(35.8) |
| 2 | Do you wish to have a healthy environment free of harmful substances? | 83(69.2) | 37(30.8) |
| 3 | Do you know that open burning of oil palm waste causes environmental pollution? | 35(29.2) | 85(70.8) |
| 4 | Do you know that oil palm processing activities defiles the environment? | 23(19.2) | 97(80.8) |
| 5 | Do you dispose oil palm wastes properly? | 22(18.3) | 98(81.7) |
| 6 | Are you aware that disposal of oil palm waste at dump sites poses a main risk to human and animal health | 49(40.8) | 71(59.2) |
| 7 | Do you know that POME can be treated with chemicals before disposing into water bodies? | 37(30.8) | 83(69.2) |

**Perceived effects of oil palm wastes disposal methods**

The result presented in Table 3 shows that (54.2%) of the respondents agreed that their waste disposal methods constitute a threat to the environment. This corresponds with the findings of Adelegan (2002) who reported that un-utilized waste affect water, land and air qualities if proper practices of management are not followed. Improper discharge of wastes constitutes environmental hazards. Oil palm solid wastes are piled up at dump sites while milling effluents containing suspended and dissolved particulate matter is discharged into a nearby stream without any form of treatment.

This is the situation in several oil palm mills in the country. Oil palm waste just like any other form of waste pollutes the environment. Also,(47.5%) agreed that disposal of POME in nearby streams pollutes water bodies and have negative implications on aquatic life. This is in consonance with the discovery of Todd *et al.* (2010) and Mosunmola and Olatunde, (2020) who asserted that oil palm wastes fosters the growth of algae blooms which deplete oxygen level, affects aquatic life and alters ecosystem. In addition, (40.0%) of the respondents disagreed that careless disposal of un-utilized solid waste can lead to disease outbreak in the neighbourhood, (40.8%) agreed that open burning method of waste disposal reduces soil quality while (40.8%) agreed that their waste disposal method contaminates the atmosphere. This is supported with the previous findings of Ohimain *et al.*(2012) who affirmed that un-utilized solid wastes are basically burnt in the mills resulting to atmospheric pollution. Also, (39.2%) of the respondents' also agreed that exposure to gaseous emissions from processing engines threatens human health and results to health complications.

**Table 3: Perceived effects of oil palm wastes disposal methods**

| SN | Awareness on Environmental Sustainability | Strongly Disagreed | Disagreed | Not Sure | Agreed | Strongly Agreed |
|---|---|---|---|---|---|---|
| 1 | Threatens the environment | 10(8.3) | 6(5.09) | 9(7.5) | 6(5.0) | 30(25.0) |
| 2 | Water pollution | 20(16.7) | 11(9.1) | 12(10.0) | 57(47.5) | 20(16.7) |
| 3 | Causes disease outbreak | 38(31.7) | 48(40.0) | 15(12.5) | 6(5.0) | 13(10.8 |
| 4 | Reduces soil quality | 15(12.5) | 20(16.7) | 0 | 49(40.8) | 36(30.0) |
| 5 | Reduces soil quality | 20(16.7) | 7(5.8) | 0 | 44(36.7) | 49(40.8) |
| 6 | Affects human health | 19(15.8) | 4(11.7) | 0 | 47(39.2) | 40(33.3) |

The result of correlation in Table 4 revealed that there is a significant relationship between the processors' level of awareness on environmental sustainability and perceived effects of oil palm waste disposal methods (r = 0.267, p< 0.05). Findings revealed that awareness on environmental sustainability is critically low as majority (80.8%)of the processors revealed that they are not aware that milling activities defiles the environment. This may be connected to the respondents' low level of literacy and poor awareness on environmental sustainability hence; they are not taking into consideration the consequences on their immediate environment. This is supported with the findings of Aliu *et al.* (2014) who opined that waste management problems in Nigeria have been attributed to lack of awareness and inappropriate technology. Human activities

are hugely responsible for environmental degradation and this is jeopardizing the long-term health and security of animals, plants and human. In order to protect the sustainability of the environment, the processors need to understand the impact of their actions on the environment. Awareness creation is very instrumental to the enlightenment of individuals on environmental protection and until proper environmental awareness is created among these processors, the effect is the release of toxic and harmful substances into the environment.

However, since oil palm processors do no perceive the effect of indiscriminate dumping of wastes as a significant issue, it can be inferred that they are not likely to improve their waste disposal and management practices. The result presented in Table 4

further revealed that there is no significant relationship between characteristic variables and respondents' level of environmental sustainability awareness. Socio-economic characteristics like age ($r = 0.103$, $p > 0.05$) and education ($r = 0.074$, $p > 0.05$). This result contradicts the findings of previous authors such as (Chukwu, 2008 and Dan *et al.*, 2021). These authors reported that age and educational status are major determinant factors that influenced participation in environmental protection and sustainability awareness in Minna and Uyo respectively. Ogunbode and Arnold (2012) further explained that in most parts of Nigeria, older individuals are reluctant to engage in pro-environmental activities because they would probably not live long enough to enjoy the benefits.

**Table 4: Correlation analysis showing relationship between perceived effect of oil palm waste, selected characteristic variables and respondents' level of environmental sustainability awareness**

| Variable Description | r-value | p-value | Decision |
|---|---|---|---|
| Perceived effects of oil palm waste | 0.267 | 0.003 | Significant |
| Age | 0.103 | 0.416 | Not Significant |
| Education Status | 0.074 | 0.647 | Not Significant |

**Conclusion and Recommendation**

The result of this study shows that oil palm processors in Ikire town are not aware that indiscriminate disposal of oil palm wastes poses a main risk to human and animal health. They also lack proper awareness on the need to have a clean and toxic free environment. Discharging oil palm waste products on land and water bodies causes pollutes the environment.

The study further revealed that oil palm processors and residents living in the study area are under threat if their present habit of discharging untreated and un-utilized oil palm

wastes continues; they may begin to experience severe consequences of environmental pollutants. In view of the fact that the discharge of these wastes may continue unabated, it is therefore recommended that extension service agents and relevant agencies should create public awareness campaigns to sensitize those involved in small and large scale oil palm processing on the need for a sustainable environment. Government should also assist in providing affordable and sustainable waste recycling plants for proper recycling of solid and liquid oil palm wastes into value added products.

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