SOIL SEEDBANK DYNAMICS AND REGENERATION OF VEGETATION ON OIL SPILLED SITES IN BARUWA COMMUNITY, ALIMOSHO LOCAL GOVERNMENT AREA OF LAGOS STATE.

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CERTIFICATION

This is to certify that this research was carried out by Adeola Adenike ADEGBITE (Registration Number SCP12/13/H/0073) of the Institute of Ecology and Environmental studies, Faculty of Science, as part of the requirements for the award of the degree Master of Science (M.Sc.) in Environmental Control and Management, of the Obafemi Awolowo University, Ile-Ife, Nigeria.

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Supervisor **Signature** **Date**

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DEDICATION

This work is dedicated to the most high GOD, my alpha and omega and also to my father, Late Prince Adegbite Adegboye Ademuyiwa.

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LIST OF ABBREVIATIONS

AAS	Atomic Absorption Spectrometer
ATSDR	Agency for toxic substance and disease registry
et al.,	and others
UNDP	United Nations Development Programmes
US	United State
%	Percentage

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ABSTRACT

The study determined the floristic composition of the standing vegetation and soil seedbank around oil spilled site, examined the relationship between standing vegetation and the soil seedbank as well as determined the effects of petroleum hydrocarbon pollutant on soil around the oil spilled site. This was with a view to determining the effects of oil spill on above and below-ground vegetation in oil polluted area.

Sampling was carried out in five plots of 25 m x 25 m using purposive sampling techniques. Five plots were selected based on their physical characteristics such as severely burnt (Plot 1), burnt with scanty re-growth of grasses (Plot 2), burnt but dominated by grasses (Plot 3), burnt but dominated by herbs (Plot 4) and partially burnt with herbaceous plants (Plot 5). In each sample plot, plant species were identified in the field and those of unknown identity were collected and pressed for later identification at the IFE Herbarium, Department of Botany, Obafemi Awolowo University, Ile - Ife. The species were classified into grasses (annual or perennial), trees, herbs, shrubs, creepers and sedges. Individual plants were counted to determine the abundance of each species. The composition of trees and shrubs > 1 m height and their density was recorded. Species richness, diversity and dominance for each of the plot were determined. Soil samples for the soil seedbank were collected at two different seasons (raining and dry) at the same locations. Five quadrants of 5 m x 5 m were marked out in each 25 m x 25 m plot. Twenty five soil samples were collected at random in each sampling site at two soil depths (0 – 15 cm and 15 – 30 cm) and were pooled together, to form one composite sample for each of the two depths in each of the sampling sites. Germinated seeds were observed and

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counted till six months when no further seed germination was confirmed. The composite soil samples were analyzed for petroleum hydrocarbon and heavy metals (Lead, Iron, Copper and Cadmium) using standard procedures. Data collected was subjected to analysis of variance to compare the relationships between the soil seedbank and the floristic composition of the vegetation.

The results showed that the frequency of occurrence of the vegetation were 917 herbaceous plants, 624 grasses, 186 creepers, 11 Sedges and 83 shrubs. Two (2) tree species were recorded in the oil spilled area. The total number of families recorded in the oil spilled area was sixteen (16). Shannon – Weiner index showed that species found in the burnt but dominated by herbs, were more diverse in their composition compared to other plots. Herbaceous species had the highest percentage contribution to the total seedbank density in both dry and raining seasons and at different depths, followed by grasses. No tree species emerged from the soil seedbank of the oil spilled area in both seasons. Sorenson index of similarity showed low similarity between the above-ground and below-ground vegetation of the oil spilled area. There was variation in the seedbank density in relation to soil depths in the oil spilled area in both seasons. The seedbank density was higher in the dry than the raining seasons at both soil depths. The seed density decreased with increase in soil depth by 14.5% during raining season and 32.1% during the dry season. The heavy metals (Lead, Cadmium, Iron and Copper) as well as the petroleum hydrocarbon in the soil of the oil spilled area were higher than the recommended level by Federal Ministry of Environment.

The study concluded that oil spill impacted the species composition of the above and below-ground vegetation of the oil spilled areas.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The exploration and exploitation of petroleum hydro-carbons have been with Nigerians for decades and their concomitant effects on the oil producing communities have been quite problematic. These activities, though developmental, have elicited all kinds of impact, ranging from the barely tolerable ones to utterly disastrous effects. For instance, the activities are known to have decimated terrestrial and aquatic biota, which constitute the peoples' major source of livelihood.

Similarly, soil fertility still remains one of the inextricable effects that have received insufficient attention (Osuji, Adesiyan and Obonte, 2004). Oil spill, which is the release of a liquid hydrocarbon into the environment due to either conscious or unconscious exposure of the hydrocarbons into the environment, is one of the major problems facing the environment ant its major components (soil, water, vegetation and even humans). Oil spillage often pollute the immediate environment, including the ocean, land or soil, where they cause habitat disruptions, deaths of organisms, and they often bio accumulate in the ecosystem, where they cause salient but significant damage especially as they become interchanged within the food web (Omodanisi, 2011). The severity of oil spills is influenced by many factors including the quantity of oil, and the effects of the oil spill.

Oil spills have been known to destroy farmlands, terrestrial and marine communities, contaminate ground water, kill natural vegetation and disrupted the food chain (Omodanisi, 2011). The rainforest vegetation, a characteristic feature of most part of southwest Nigeria and mangrove forest of the coastal areas has been affected by oil spill and the diversity as well as the

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abundance of the biological communities have been greatly affected (Omodanisi, 2011). Every aspect of oil exploration and exploitation has deleterious effects on ecosystem stability and local bio - diversity which the peoples' livelihoods depend upon (Zabbey, 2005). However, to protect our environment and biodiversity, proper understanding of the impact of oil pollution on health of vegetation should be given serious attention.

1.1.1 Causes of Oil Spillage

Oil Spill has various causes, but the most common cause is as a result of anthropogenic activities, such as: Storage, handling, offshore drilling, routine maintenance activity, intentional oil discharge, vandalization

Storage: oil and oil products may be stored in a variety of ways including underground and above storage tanks. Such containers may develop leaks over time.

Handling: This happens during transfer operations and various uses.

Transport: Big oil spills (up to million and hundreds of million gallonsof water or land through accidental rupture of big transporting vessels (e.g. tanker, ships or tanker trucks). For example, Exxon Valdez spill was a massive oil spill off the Alaskan shoreline due to ship failure which happened in late 1980s.

Offshore drilling: There is current experience of massive oil spill in the Gulf of Mexico with its hard to predict consequences on environment, marine life and humans as the spill continues since April 22, 2010 and it may take a while until a solution is found.

Routine Maintenance activities: This involves cleaning of ships which may release oil into navigable waters. This may seem insignificant, however due to the large number of ships even

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few gallons spilled per ship maintenance could build up to a substantial number when all ships are considered.

Road Run off: Oily road run off add up especially on crowded roads. With many precipitation events, the original small amounts of oil from regular traffic would get moved around and may build upon the environment**.**

Intentional oil discharge: Such as those thorough drains or in the sewer system. This includes any regular activities such as changing car oil if the replaced oil is simply discharged in a drain or sewer system.

Vandalization of oil pipelines: Failures of petroleum pipelines are known to have caused environmental pollution and deaths of plants, animals and humans. Almost all the reported cases of pipeline explosions recorded in Nigeria were attributed to deliberate rupture by oil thieves or saboteurs (White, 1983; Baskin and Baskin 2004; Ferrandis*et al*., 1996).An example of the effects of pipeline vandalization was the fire disaster of 26th December 2006, which killed more than 256 people and significantly degraded the ecological system of the Ilado- Odo Community in Lagos State, Nigeria. According to Torulagha (2001), pipeline explosions take place due to the following reasons:

(a) During drilling activity at new site.

(b) Following an accidental bursting of pipeline work is taking place around the pipeline.

(c) An old pipeline that has not been checked for maintenance.

(d) Vandalization by angry youth and members of the host communities.

1.1.2 Effects of Oil Spillage on the Environm

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