International Journal of Intellectual Discourse (IJID)
ISSN: 2636-4832 Volume 7, Issue 1. March, 2024

New approach for environmental restoration in Ogoniland: A proposed framework

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Abstract
Oil and gas companies' operations in Ogoniland in Nigeria for over 50 years had caused serious catastrophic economic and environmental harm in the affected communities. Drinking water in more than 10 communities is contaminated with high levels of hydrocarbons, which posit a serious threat to their public health. The objective of this paper is to propose the use of the economic deterrence model as a panacea for the restoration of Ogoniland. The surface water throughout the creeks in and surrounding Ogoniland contains hydrocarbons. When an oil spill occurs on land, fires often break out killing vegetation and creating a crust over the land, making remediation or re-vegetation difficult. The methodology of this study would be quantitative research method if validated, at the current level a thorough search of the following databases; United Nations (UN) database, World Bank database, International Monetary Fund (IMF) database, Transparency International database, Human Rights Watch Reports, African Union (AU) Reports, Scopus database, Web of Science, Emerald, Google Scholar, among others were conducted to come up with the relevant and related literature on the subject matter. The economic deterrence approach nexus with effective enforcement of environmental regulation could be one of the best restoration approaches to the endemic social, political, and economic problems of Ogoniland. Hence, a framework using this approach is proposed in this study. Validation of this framework can serve as a policy tool available to the government, to restore contaminated land and other environmental challenges caused by oil and gas companies' operations. Finally, the study is designed to guide policymakers, especially in developing countries to explore the model to achieve the desired environmental policy.

Keywords: Economic approach, Environmental regulation, Ogoniland, Oil and gas companies

1. Introduction

Ogoniland located is located in the Niger-Delta part of Nigeria. The land is densely populated by numerous tribes. The most populous tribe among them are ogoni people. The ogoniland is surrounded with the waterways full of natural resources such as oil and gas. The area is called oil reach area, is a land where most of the giant oil and gas companies carried out their oil and gas development, oil extraction, production and transportation to the relevant terminal or Deports. Due to the oil and gas activities in the region specifically in ogoniland the famous oil giant Royal Dutch Shell operations causes the land, water and air to be inaccessible to the level the Ogoni people who are predominantly farmers and fishers lose their means of livelihood. Historically, in the 1990s, Ogoniland experienced the most inflicted oil spillage on a large scale which caused a lot of mayhem that leads to the loss of lives of many protesters including the leader of the Movement for the Survival of the Ogoni People (MOSOP) Ken Saro-Wiwa, and other eight members (Austin, 2019).

A report from the United Nations on environment in the year 2011 indicated that most the Ogoni people illness is due to the

contaminated drinking water and contaminated fish as a result of the persistent oil spillage from the operation of oil and gas companies (UN, 2011). Evidence from several medium shows that the oil and gas operation largely affected the economic activities of Ogoniland. It became seriously devastating since the people means of sustenance is carted away by the activities of the oil majors. Due the negative impact of the oil and gas operation in Ogoniland and the surrounding environment, many donor agencies such as World Bank and UNDP have made several reports in their quest to find solution to the environmental challenges affecting the Ogoniland and otherv affected areas in the Niger-Delta region. The world bank reported that the high rate of poverty in ogoniland is directly related the degradation of their environment, water and air, this is because over 60% of their income comes from the environment which was polluted by the oil and gas companies' operations and this statement was contain in their environment and poverty relationship report (World bank, 2003).

Additionally, the UNDP in one of its report highlighted that considering the level of dependency of ogoni people economic activities, more than 50% of the local communities depended on the resources from water, and the environment (UNDP, 2006). Looking at this menace from the economic point of view, the dilapidating situation of ogoni people environment created a lot of untold hardship to the individuals in the region, it may in long or short run created social unrest and increase in economic sabotage. More so, oil major's activities are considered as the reasons behind the economic challenges facing ogoni communities and Niger-Delta at large as indicated by several reports (World bank report, 2003, 2006; UN report, 2011).

The oil and gas companies who are the mastermind of the deplorable economic situation of the ogoni people are not doing enough to cushing the negative effects of their operations in the area (UNEP, 2011). However, government on the other hand are expected to enforce environmental regulations which can serve as deterrence to the polluters, regrettably, report shows that there is lack of such enforcement mechanism from the government (EIA, 2007). The EIA which stands for Energy Information and Administration reported that there was a total absent of government commitment previously with regards to enforcement of environmental regulations, notwithstanding, current government had demonstrated some level of interest in enforcing environmental responsibilities on oil and gas companies.

In spite of the tremendous environmental challenges affecting the ogoniland economic activities and their livelihood, only few studies found focusing on the ogoniland environmental restoration (Adelana et, al 2011; Zabbey, Sam, Onyebuchi, 2017; Zabbey, Arimoro 2017; Sam &Zabbey 2018). Notwithstanding, these studies have not look at the employment of economic tools to restore the Ogoniland. They mainly focused on youth employment or rather government should use the UN report for Ogoni restoration. Hence, this study is significant and timely. More importantly, literature have it that government usually resort to exploring ways to mitigate the negative impact of environmental challenges, especially when it affects the economic growth and development of their country (OECD, 2011)

Equally, policymakers have numerous tools available to remediate environmental challenges; some of these mechanisms are environmental taxes, environmental regulations and any other innovative policies capable to restore environmental issues. Particularly environmental taxation has tremendous advantage for example it improves economic efficiency, environmental effectiveness and monetary productivity (OECD, 2011). Additionally, environmental taxes have been used

effectively to address a wide variety of issues such as waste disposal, air emissions, and water pollution (OECD, 2011). Hence, following the above evidence environmental taxes can be seen as a mechanism to extract multiple revenues from the oil and gas companies, which can be channelled to restore the environmental challenges affecting ogoniland and Niger-Delta at large. Consequently, this study contributes to the literature in manifold. Firstly, this study expands Allingham and Sandmo (1972) economic deterrence model, the theory has three main variables that is tax rate, penalty and detection probability with additional variable environmental taxation.

Secondly, the paper proposes to expand the Allingham and Sandmoh (1972) model by adding a construct suitable for environmentally related policy (environmental regulation). This assertion corresponds with the belief of Goulder (1995), who argued that environmental regulations are viewed as the most favored instruments for environmental protection. He added that environmentally motivated taxes may possibly be an efficient and effective way of discouraging an environmentally damaging activity. Thirdly, prior research on environmental restoration concentrates on different aspect, for instance, bioremediation, and employment (Zabbey, et al., 2017; Sam & Zabbey ,2018), however, these two studies failed to identify how government could drive revenue to restore the already destroyed environment. Therefore, the current proposed framework can be seen as the innovative policy tools to be used in driving revenue from the oil and gas companies to remediate the affected environment.

The paper is organized in the following sequences: section one provides the general overview and the significant of this research. Section two provides details on literature under consideration. Section three present the framework of the study and section four provides conclusions and policy implication of the study.

2. Literature Review

This section provides the relevant and related literature related to the variables under consideration for a better understanding of the concept and the linkages between the constructs.

2.1 Historical background of Oil and Gas Companies Operation in Ogoniland

Oil companies' activities in Niger Delta as a whole and Ogoniland in particular has been in existence for more than five decades. The Niger Delta region contains a huge deposit of oil reserve amounting to 37.4 billion barrels (OPEC, 2017a) and natural gas (192 trillion standard cubic feet, further, the region holds one of the most bio-diverse ecosystems worldwide (NNDC, 2014). The area contributes immensely to the economic growth of Nigeria. This statement is in agreement with Wurthmann, (2006), who stated that about 600 billion US dollars in crude oil revenue were generated from the area since 1960. The people of Ogoniland received their primary livelihoods from Agricultural food production and Fisheries (Pegg & Zabbey, 2013; Sam et al., 2017a; UNEP, 2011). Several oil giant companies operated within Ogoniland, for instance, Shell, Exxon, Chevron, etc. Nevertheless, the most controversial oil operation that turned oil from being a blessing to a curse, is that by Shell Petroleum companies. Oil companies' operations lead to extensive oil spillages, and water, soil, and air pollution (Joshi, et, al. 2014). Oil spillages and pollution are considered the causative agent of violence and conflicts in Ogoniland, due to their destructive effect on the livelihood and environment and by extension quality of life of people (Nwozor, 2019). Furthermore, reports from one of the environmental regulatory agency Nigeria's National Oil Spill Detection and Response Agency (2015), indicates that Ogoniland experienced more than 1,879 cases of oil spills from 2014 to 2015 while only 64 of

the spill cases were cleaned up (Kalejaye, 2015a).

Additionally, one of the former Managing Directors of the Niger Delta Development Commission (NNDC) states that there are more than 5000 enormously polluted sites in the Niger Delta area of which 25% of these sites are located in Ogoniland (Chukwu, 2018). Oil spillages cause a lot of disasters that aggravated environmental, social, and economic problems (Nwankwo, 2015; Oviasuyi and Uwadiae, 2010; Oyefusi, 2007; Watts et al., 2004). Accordingly, the entire region had witnessed over 50 years of oil-related contamination of the holistic environment (soil, air, biota & water) (Sam, &Zabbey, 2018). The deteriorated environmental conditions of Ogoniland might be attributed to so many factors such as socio-technical, socio-economic, and socio-political Madu et, al (2018) as depicted in Figure 1.0 below.

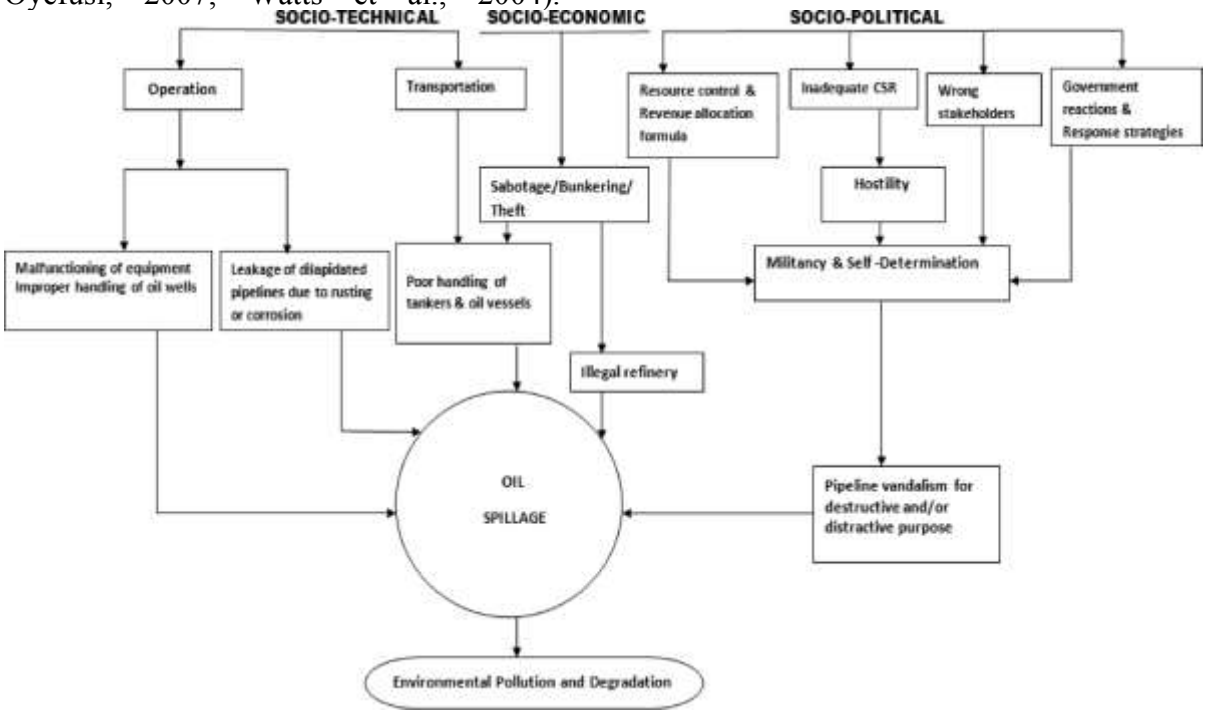

Figure 1: Chain of factors responsible for oil spillages in the Ogoniland.
Source: Madu et, al (2018, p. 80)

Figure 1 indicates the possible causes of environmental pollution and degradation in Ogoniland and Niger Delta in general. The situations severely escalate in the area and draw the attention of the World. The effects of environmental contamination on the livelioniland became a topic of rising international public health interest (Kponee, et, al., 2018).

2.2 Reports on Ogoniland

Report and empirical studies showed that the unprotected populations of Ogoniland are on the edge of having severe human health risks (UNDP, 2011; Onuoha, Anelo, Nkpaa, 2016; Nkpaa et, al, 2016; Nkpaa, Onyeso, Achugasim, 2017; Nkpaa, Amadi, Wegwu, 2018).

The United Nation Environment Program (UNEP), surveyed for over 14-month periods, examine more than 200 locations, and 122kilometwrs of a pipeline, engaged over 23,000 individuals, and reviewed over 5000 medical records in Ogoniland. UNEP further conducted thorough soil and groundwater contamination surveys at 69 sites which cover 1,300 square meters and

the project team admitted that the assessment was the most complicated ground assessment it had ever undertaken, and eventually, reported widespread contamination of the environment of Ogoniland (UNEP, 2011). It, however, is estimated that the remediation and restoration efforts will take 23 to 30 years and probably will cost over USD 1 billion in the first 5 years (UNEP, 2011). Based on UNEP recommendation Nigerian government announced a USD 1 billion on June 2, 2016, as a rescue program targeted at tackling environmental damages in Ogoniland (Sam et al., 2016; UNEP, 2016). More so, the project was initiated to be carried out by a newly created agency under the Ministry of Environment, named Hydrocarbon Pollution Restoration Project (HYPREP) (Zabbey et al., 2017). This appears to be an additional burden for the Nigerian government and may warrant the government to look for modalities for generating additional revenue to cater to such eventualities.

Many questions remain unanswered as regards these predicaments. Many reports and studies related oil company's operations as the major causes of environmental pollution and degradation in Ogoniland and Niger Delta in general (UNDP, 2011; Onuoha, Anelo, Nkpaa, 2016; Nkpaa et, al, 2016; Nkpaa, Onyeso, Achugasim, 2017; Nkpaa, Amadi, Wegwu, 2018). Therefore, several questions may be asked, for instance (1) Are there functional environmental regulations that regulate the conduct of oil companies' activities in Nigeria? (2) Is there environmental taxation that companies paid as a result of polluting activities in Nigeria? The answers are, yes there are environmental regulations in the country but not effective and functional (EIA, 2007). With regards to the second question, however, environmental taxation appears not to be implemented on oil companies despite its immense importance in preventing air, water, environmental control and ultimately increasing government revenues as advocated by many scholars for example (Bovenberg & Goulder, 1996; Jacobs & Ploeg, 2019; Freire-Gonzalez & Ho, 2019; Hu et el., 2019). Subsequently, in an attempt to assist the policymakers on the possible approach to the restoration and remediation of Ogoniland and the similar environmentally degraded area around the globe using the economic approach, the current study proposes the employment of Allingham and Sandmoh's (1972) economic deterrence model with additional variable environmental taxation as a new economic approach to reduce environmental challenges caused by externalities and recycle the funds for restoration and remediation of the affected environments.

2.3 Empirical Studies on Ogoniland

Many scholars have conducted numerous empirical studies on Ogoniland, to ascertain the causes as well as the level of environmental damage in the area. For example, Chikere et al (2019), conducted a study on comparative metagenomics and functional profiling of crude oil polluted soil in Ogoniland. The result showed that the bacterial group had a resilient dependency on hydrocarbons, at the same time acid-acceptable bacterial communities can contribute considerably to biodegradation in the environments and other polluted areas within Ogoniland. Additionally, Nwozor (2019), revisited the UNEP environmental assessment of Ogoniland and conducted an interview as well as used secondary data to analyze data to get an insight into the connections between the restoration of the polluted area of Ogoniland, as well as the improvement of livelihood and sustainable development of Ogoni people.

The study found that there is a strong interconnection between the restoration of the polluted Ogoniland and improving the livelihood of the Ogoni community and concluded that having these in place will reverse the persistent conflicts and violence in Ogoniland and Niger Delta in general.

Furthermore, substantial metallic contamination of tubers (roots) cultivated in Ogoniland may cause a great health risk to the teaming populace specifically children through consumption of root tubers (Peters, Eebu, &Nkpaa, 2018). Likewise, Madu, et al., (2018) found that the key concerns of the Ogoniland people are Shell oil spillages and water pollution, and also their desire to witness Shell's implementation of the UNEP report recommendation, which may result to complete environmental mediation. Relatedly, Kponee et al., (2018) investigate the Volatility of Organic Compound (VOC) intensities in the internal air of 20 families in Ogoniland whose groundwater was contaminated with benzene at 900 times the World Health Organization recommendations and found a high indication of cancer risks and dangers from inhalation contact. Similarly, in a qualitative study conducted by Okeke-Ogbuafor, Gray, and Stead (2018), the findings revealed an indication of structural violence in Ogoniland, which was blamed by elites, and the only way to eliminate it is by reducing disparity and increasing democratization. Notwithstanding, none of the empirical studies try to apply the economic model concerning the restoration or remediation of Ogoniland. Therefore, this study expands the economic deterrence model to include environmental regulations relevant to oil and gas operation to serve as a proposed model for generating more revenue from environmental polluters to be recycled for remediation and restorations.

2.4 Environmental Regulations

Several scholars conducted studies on environmental regulations, for instance, Lane and McDonald (2005) found that environmental regulations are extremely intricate and dynamic than environmental governance. Moreover, Donal Duke and Augustenborg (2006) argue that industrial environmental control encompasses several regulations which ultimately depend on the regulated community to report, monitor, and self-identify requirements at their perception. Additionally, Ye, He, Yi, Quan, and Deng (2022) found that environmental regulation has an inverse relationship with the marine environment and technological innovation. More so, Zhao et al. (2018) found that environmental regulations have numerous impacts on the stock price of China's energy companies. Furthermore, Cheng and Liu (2018) found that firms that are subject to public scrutiny mostly comply with environmental regulations. Correspondingly, Zhang, Chen, and Guo (2018) argued that there is an urgent need for China's government to intensify environmental regulation supervision. Environmental regulations cause companies to adopt some changes in equipment procurement (Rittenhouse & Zaragoza-Watkins 2018). Some scholars argued that enforcement of environmental regulations harms investment (Feichtinger, Hartl, Kort, and Veliov, 2005), stressed that strict environmental regulations targeted at reducing emissions mostly have a significant effect on industrial development. Similarly, Shi and Xu (2018) confirm that cost of production used to be very high in an industry with higher environmental regulations.

Based on these arguments and to the best of the researcher knowledge there is lack of empirical study that tested the relationship between environmental regulations and environmental restoration the following preposition was drawn.

Preposition 1: Environmental regulations will affect the environmental restoration

2.5 Environmental Tax Rates

Tax rates are defined as the applicable proportion or share of taxes applied to the chargeable profit of a companies and individuals. Freebairn (2017), argued that lower corporate tax rate help in reducing the tax burden of the larger business. However, deterrence models of tax compliance behavior predict that an increase in tax rates will increase compliance or provides mixed predictions of the effect of marginal tax rates on compliance (Allingham

&Sandmoh 1972). Contrarily, other researchers on tax rate found that higher tax rates decrease compliance or rather, provides mixed results for examples (Pommerehne & Weck-Hannemann, 1996; Weck-Hannemann & Pommerehne, 1989) postulates that tax evasion increases as a result of the increase in marginal tax rates. In a similar vein, Clotfelter (1983) and Slemrod (1985) investigate marginal tax rates and found that marginal tax rates have a significant effect on underreporting. Additionally, Bayer (2006) found that higher tax rates increase evasion". It can be seen from the literature that high tax rates discourage compliance. However, in the context of environmental taxation which is imposed to control negative behavior, it can be logically argued that the imposition of a high rate will discourage adverse behavior and will likely force oil and gas companies to restore the environment or even discourage pollution in the first place. Based on this argument the following preposition developed

Preposition 2: Environmental tax rate will affect environmental restoration.

2.6 Detection Probability for Environmental Pollution and Damages

Detection probability may be seen as the tendency of discovering certain activities by relevant authorities. Detection probability of environmental pollution and damages could be the ability of the environmental regulatory bodies to uncover the level of environmental damages caused by oil and gas companies' activities. Under a "tax environment, detection probability could be defined as the ability of tax authorities to uncover the illegal activities of taxpayers. The economic deterrence theory which assumes taxpayers try to maximize their compliance outcomes decision by weighing the risk of detection and punishment against the successful evasion, emphasizes that the anticipated value of non-compliance depends on audits probabilities and fines (Kirchler, et, al., 2010). For example, Alm (1991) found a positive relationship between the probability of detection and tax compliance. Additionally, Mason and Calvin (1978), in their research using a survey indicate that evaded taxpayers perceived chances of being caught lower than honest taxpayers. On the other hand, Young (1994) and Slemrod et al, (2001) in different studies show that detection probability was found to be an important determinant of taxpayer compliance".

Moreover, Gërxhani and Schram (2006) experimented with Albanian and Netherland, and they found that participants in Albania were not affected by audits rates of 16.6% and 50%, while evasions were found more in Dutch participants when audit probabilities are low. Furthermore, "Alm, McClelland, and Schule (1992) experimented and found the relationship between audit probabilities and tax compliance to be non-linear. Kirchler, et al., (2010) posited that in most of the empirical studies supporting the effects of the probability of auditing on compliance, the reported effects are sometimes weak. On the other hand, Slemrod et al (1988), found that the relationship between detection probabilities and tax compliance was vague". Empirical findings on the relationship between detection probabilities on environmental pollution and damages and environmental restoration are lacking in the existing literature. However, effective deployment of detection mechanisms could lead to compliance (Alm 1991; Mason & Calvin 1978; Young 1994; Slemrod et al, 2001. Some insights could be obtained from the literature reviewed here on how detection probability encourages tax compliance and discourage tax evasion, hence, confirming its deterrence effect. Therefore, it is logical to argue here that oil and gas companies who think that the probability of detection through environmental audit of their non-restoration behavior and believe that there could be severe punishment following such detection will be more likely to restore the environment to its natural position after

completing their operations in the affected communities. Based on this we argued that efficient enforcement of environmental detection probability will compel oil and gas companies to restore the polluted environment. Based on the above argument the following hypotheses were developed.

Preposition 3: Detection probability for environmental pollution and damages will affect environmental restoration.

2.7 Penalty for Non-Compliance with Environmental Regulations

A penalty may be defined as a punishment "imposed by relevant authorities for breaking law and order. Deterrence theory suggested that taxpayers comply with their tax responsibilities to avoid legal sanctions such as penalties (Doran, 2009). However, empirical evidence on the relationship between penalty and tax non-compliance indicates a positive relationship between the two variables for example Virmani (1989) found a positive relationship between higher tax penalty and tax non-compliance and further argued that imposing higher penalty rates may have induced taxpayers to behave dishonestly. Additionally, Lee (2015) argued that imposed penalty has an indirect effect on tax evasion. Doran (2009) found that penalties may encourage evasion. Furthermore, Sinnasamy and Bidin (2017) found that there is a positive relationship between penalty and tax non-compliance. Contrarily, Balassone and Jones (1998) argued that a penalty reduces the possibility of higher tax evasion. Savitri (2016) found a positive relation between penalty and tax compliance through the mediation effect of service quality". The relationship between penalty for noncompliance with environmental taxation and environmental restoration has not been established in the existing literature. Nevertheless, previous literature indicates a strong connection between environmental taxation and environmental remediation or restoration for instance (Goulder, 1995; Bovenberg & Goulder 1996). On the other hand, (Balassone& Jones 1998; Savitri 2016) found an increased penalty on tax (including environmental tax) to increase compliance. It is clear from the prior literature discussed here that a penalty leads to tax compliance. The implication of this is that penalty may serve as a deterrence mechanism to control negative behaviors such as environmental damages. It is logical to argue that the existence of environmental taxes alone may not have the desired deterrence effect of curving environmental damages until it is combined with a certain penalty to punish noncompliance. The fact is that some oil and gas companies may tend to evade or avoid the payment of such environmental regulations. Thus, to make the environmental regulations more effective in enhancing environmental restoration or preventing environmental damages there should be an existence of control mechanism such as the penalty for non-compliance with such environmental regulations. The expectation is that such a penalty for noncompliance will likely reinforce compliance with environmental regulations and ultimately ensure environmental restoration by oil and gas companies. However, conceptual and empirical literature that postulates and examines this possible link is still lacking within the extant literature. This led to the development of the following proposition.

Preposition 4: Penalty for non-compliance with environmental regulations will affect environmental restoration.

2.8 Economic Deterrence Theory

Economic deterrence theory is originated from the research seminal of Becker (1968) which focus mainly on economic activities and its related crime which postulate that people consider the deterrence of their action before deciding to commit a crime. Later Allingham and Sandmo (1972) expand the model nexus to tax domain. According to them some economics tools can be useful in reducing the level of tax evasion, such mechanism includes tax rate, penaly and detection probability. They

further reiterated that these tools are useful for policymakers to reduce the effects of tax evasion and any other externalities. Following this plausible argument this study chooses the theory to serve as the foundation of the research considering it relevant in reducing externalities.

3.Proposed Framework

Following the literature discussed above, Figure 3.1 below shows the conceptual framework which depicts the direct relationship of the constructs under consideration. Although, researchers around the globe have applied and expanded different categories of models to meet their contextual and peculiarities needs for instance (Chan et al., 2000; Chau & Leung, 2009; Fischer et al., 1992; Manaf, 2004; Mustafa, 1997). Polluters' activities cause a lot of damage to less privileged and vulnerable communities without taking the necessary remedial action. Most of the affected people perceived polluters' activities as illegal and uncalled for, because of the consequence attached to their operations on the social, political, and economic activities of the affected communities. Allingham and Sandmoh's (1972) model is perceived to be the most appropriate model to convert illegal behavior Mohd-Isa (2012). It is in this regard this study proposes the application and expansion of Allingham and Sandmoh's (1972) model to meet the contextual need of the Nigerian oil and gas industry and by extension other oil and gas producing countries can apply the model in their context with little modification where needs arise.

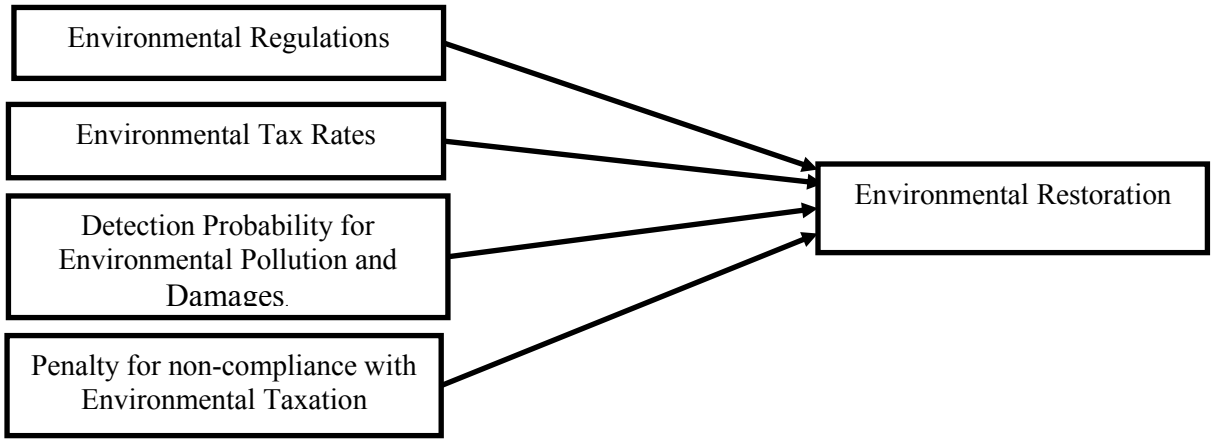

Figure 3.1 Proposed *Conceptual Framework*

4. Conclusions and Policy Implications

This study proposes a framework designed to address environmentally-related challenges caused by externalities with specific reference to the Nigerian oil and gas industry and by extension other countries with similar environmentally related issues. Oil spillages in Ogoniland and its surrounding had led to extensive ecological devastation, infrastructural damage, and negative human health impacts. Currently, soil, air, and water contamination is gaining global attention, as it can be seen as a great threat to the present and future generations. Due to this perception, most Developed countries for example UK and USA have developed methods and policies to deal with the contaminated environment (Luo et al., 2009). Developing countries like Nigeria are yet to reflect this global response to the Ogoniland clean-up. Nigeria needs to develop policies that meet international standards. Scholars like CL: Aire (2010)

advocate for the development, adoption, and adapting models or instruments on the contaminated land applicable to the real environment that would encourage skills development and long-term opportunities that can support economic fortune in the communities. Hence, the development of the proposed framework. Based on UNEP recommendations it will take 25 to 30 years to remediate the environmental damages in Ogoniland. The report further recommended the creation of the Ogoniland Environmental Authority, Center of Excellence in Environmental Restoration and Environmental Restoration Fund (CEERERF) for Ogoniland. These projects demand huge capital outlay, currently, the government concentrates more on fighting insecurities which is of national and public importance. Oil companies need to pay for what they pollute so that government can generate more revenue to carry out those gigantic remedial projects as recommended by UNEP. Based on the above evidence, scholars like Xiong and Li (2019), recommended that the energy sector can introduce an ecological tax that has a huge ecological footmark. The proposed model specifically, focuses on the use of economic deterrence theory to reduce illegal environmental challenges resulting from externalities through the employment of environmental regulations, penalty, detection probability, and environmental tax rate. The proposed framework is concomitant with the work of Goulder (1995) who argued that economists had for long chosen the use of taxation as the mechanism for environmental protection. He further stresses that for any activities involving serious externalities taxes could be the most appropriate instruments to reduce the negative effect of such externalities. In recent time tax competition on environmental pollution rises gradually, the reasons are the fact that tax competitions stimulate the socially optimal level of public goods such as the environment as emphasized by (Bai, Lu, and Li, 2019).

The model has some potential policy implications. First, it has the potential for generating revenue for the government to be recycled for Ogoni clean-up. Secondly, the model will assist in ecological restoration through extracting revenues from polluters and may provide potentially positive effects for realizing long-term developments for Ogoni communities. Lastly, it can be deployed as a future deterrence mechanism to control the behaviors of oil and gas companies in relation to environmental damages and degradation. The paper is conceptual in nature; therefore, the main methodology adapted is a review of related literature from the relevant data bases.

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