



## ECONOMIC VALUE DETERMINATION AS A STRATEGY FOR BUILDING RESILIENT COMMUNITIES IN THE NIGER DELTA REGION

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**ABSTRACT.** In a novel approach to disaster resilience that embodies a multidisciplinary problem solving process in determining the value of damaged property, a framework has been developed for determining the economic value of damages to property due to contamination from human-caused oil-spill disaster in the Niger Delta. The framework will result in a reduction of the recovery process of affected communities following an oil spill as they know in advance what will be done and result in standardisation of the valuation process. It will enable the polluter to know the cost of their malfeasance and provide the property owners with the economic value of their polluted property to enable them to continue their livelihood. Professional valuers and property owners are very dissatisfied with the current practice without a standard framework and oil company operators hardly realise the economic cost of disasters imposed on the communities. Reviewing the theory and practice of economic value and ecosystem valuation, a mixed-methodology was employed using questionnaires and expert interviews to ascertain how contaminated wetland property is valued, the professionals involved and their respective roles. The proposed framework will provide a systematic process leading to the determination of the economic value of damages due to contamination of wetlands property.

**KEYWORDS:** Disaster resilience; Vulnerability; Property damage; Economic value; Niger Delta

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### 1. INTRODUCTION

The Niger Delta region of Nigeria has been experiencing a high risk from human-made and natural hazards and disasters in recent times. The losses due to disasters have been increasing with grave consequences for the survival, dignity, and livelihood of individuals (UNISDR 2004). Disasters occur when hazards interact with physical, social, economic, and environmental vulnerabilities. These vulnerabilities are related to changing demographic, technological and socio-economic conditions, unplanned urbanization, development within high-risk zones under-development, environmental degradation, climate variability, climate change, geological hazards, competition for scarce resources, the impact of social restiveness and epidemics such as HIV/AIDS (UNISDR 2004). Within the Niger Delta region the primary source of hazard has been traced to environmental degradation caused by the

development of oil/gas projects which sustains the Nigerian nation's economy. These developments have been responsible for environmental disasters like oil spills caused by accidents and equipment failures. The direct impacts of oil spills and other environmental shocks can be devastating on households and their livelihoods. In some cases, the long-term effects of such shocks, leads forward-looking households to adopt asset protection strategies which may come at a very high cost of immediately reduced consumption. While some households may be resilient to environmental hazards and disasters, others are unable to cope effectively and sometimes lose their livelihoods completely. An oil spill environmental disaster impacts the economy in three phases: the period of occurrence; the coping period when the land is decontaminated and households deal with the immediate losses created by the disaster; and the recovery period after decontamination as households try to rebuild the assets lost to the disaster. Disaster impact may include asset

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destruction, where planted farmland is completely destroyed; reduction in the disposable income of households as a result of crop failure or increase in medical expenses or costs of improving the usability of contaminated properties. Adopting the UNISDR's (2004) definition, this paper refers to a hazard, as "a potentially damaging physical event, phenomenon, or human activity that may cause the loss of life or injury, property change, social and economic disruption or environmental degradation. "Hazards can include latent conditions that may represent future threats and can have different origins like natural (geological, hydro meteorological and biological), or induced by human processes (environmental degradation and technological hazards). Similarly, vulnerability refers to "the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards" (UNISDR 2004), and resilience is "the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR 2004). The occurrence of human-caused disaster requires the management of the contaminated environment if the inhabitants are to be resilient to such experiences. Efforts to respond to the occurrence of such disasters have been to provide palliative measures to the affected landowners and pay compensation for any damages suffered, with the process been seen as consisting of only the determination of the compensation payable by professional valuers, without consulting other professionals whose inputs are required to analyse the impact of the spill on the environment. This paper aims to illustrate a multidisciplinary approach to solving the problem of determining the value of properties damaged by human-caused oil spill disasters in the Niger Delta, by proposing a framework that can be adopted.

### 1.1. Contaminated land valuation internationally

The practice of valuing contaminated land is not unique to the Niger Delta. While most countries with well-developed valuation practice appear to have perfected their methods, the Niger Delta practice appears to be less developed. The United Kingdom (UK), Australia and New Zealand, and United States of America (USA) all appear to have perfected the use of conventional valuation

approaches to value contaminated land. These countries mostly use the direct comparison method (Patchin 1994), capitalisation method (Patchin 1988; Mundy 1992; Dixon 1995), cost approach (Wilson 1996), hypothetical development method/residual method (Syms 1997) and discounted cash flow method (Gronow 1999). The difficulty of applying these conventional methods was highlighted in the works of Kinnard (1992) and Syms (1997) when they observed, that in view of the dependence on market evidence of the conventional methods and the lack of transaction data on contaminated properties, it is difficult to rely on market evidence to estimate prices, rents and yields of contaminated properties. Also, Wilson (1991) cautioned that "each environmental problem is as unique as a fingerprint" and Chan (2000) confirmed that it is difficult to get true comparables to apply the direct comparison method. These difficulties have led to the search for more advanced alternative methods like Syms' (1997) risk assessment model in the UK, and other methods in the USA involving the use of Multiple regression analysis, Survey Methods, Environmental Case studies, etc.

All these methods rely on the availability of an active property market and data from previous market transactions, to be able to assess the impact of contamination on property value. It has been noted by Bartke (2011) that these methods are helpful for providing background to understanding the possible impacts of contamination, but typically they are not seen as methods to determine actual market behaviour and market values, which should be based on actual market transactions. The available literature has focused on how existing appraisal methods were adapted to estimate the impact of contamination on the value of residential and industrial properties. Also, none of the stated methods had been applied to wetlands by valuers, yet there is a preponderance of wetlands that are constantly being contaminated by pollution due to oil spillage in the Niger Delta. Since a wetland by its nature is a composite of both the upland, where residential or industrial properties can be developed, and the wetland that serves both recreational and other economic uses, it behoves valuers to adopt a method of valuation that can appropriately assess the value of each component of the wetland economically.

While valuers internationally have developed competences in valuing contaminated lands, they appear to have left the valuation of wetlands per se, to ecologists and environmental economists

who have used economic valuation methods like imputed preference, revealed preference, or stated preference methods (Defrancesco *et al.* 2012). Some authors like Zafonte and Hampton (2007) and Martin-Ortega *et al.* (2011), advocated the preference of damage assessment methods based on bio-physical indicators and on habitat or resource equivalency where compensation is based on remediation, while others have advocated the addition of monetary valuation to habitat and resource equivalency, arguing that this is the only way to reflect individual utility functions in damage assessment, since the impact of any contamination falls on individual claimants (Flores, Thatcher 2002; Dunford *et al.* 2004; Martin-Ortega *et al.* 2011). Defrancesco *et al.* (2012) posit that monetary evaluation of environmental damage is not only technical but allows the inclusion of efficiency and equity concerns in the determination of the attendant compensation, but stress that the experiences with such assessments are scarce in Europe, though widespread in the United States of America. Even in America where such assessments are common, published literature only indicates various approaches that may be used in valuing contaminated real estate or wetlands per se, but no framework has been proposed to incorporate all the necessary stages that lead to the determination of environmental damages (see Patchin 1988; Mundy 1992; Kinnard 1991; Wilson 1991). The only framework for evaluating environmental damages centred on economic concepts reflecting individuals' utility preferences and Total Economic Value of impacted resources but, also, the integration of bio-physical damage assessment was suggested by Defrancesco *et al.* (2012). These authors put forward a matrix-based framework for environmental damage valuation, which focused on non-market value elements of an environment when determining the total economic value including non-use or passive values with reference to Italian laws. While the framework provides an approach to valuing damaged ecosystems, it does not cover the incorporation of land and buildings which may form part of the ecosystem. As stated above, a wetland usually consists of both the upland and the wetland which the Defrancesco *et al.* (2012) framework does not accommodate. It is in a bid to fill this vacuum that a composite framework incorporating the valuation of both the upland and the wetland ecosystem is being proposed – a framework which may be adopted when defining environmental damage compensation as prescribed by the Italian Civil Code. While their

framework is useful, it is limited in application as it concentrates on welfare losses suffered by individuals because of environmental damage. It does not incorporate the diminution of real estate values arising from environmental contamination and thus confines its application to the wetland portion of a typical wetland, neglecting the upland portion. But as stated by Defrancesco *et al.* (2012), an environment can be analysed from different complementary viewpoints which include i) the scientific view which identifies the role of physical and biological systems; ii) the anthropocentric-economic viewpoint, which defines the value of ecosystems and assesses the changes in society's welfare; and iii) the socio-political view which deals with the ranking of values. It is necessary to reflect all these in valuing wetlands.

## 2. BACKGROUND INFORMATION ON NIGERIA

Nigeria as a country is reported as having a population of about 173 million people as at 2014 (World Bank 2014). This makes it the most populous nation south of the Sahara with an area of 923,768 km<sup>2</sup> with annual growth rate range of between 2.8 and 3.2 % between states. The country lies between Longitude 3° East and 15° East and Latitude 4° North and 14° North. It is bordered in the north by the Republics of Niger and Tchad; in the West with the Republic of Benin, in the south-east by the Republic of Cameroun and in the south by the Atlantic Ocean which forms a coastline of about 800 km. It measures about 1200 km from east to west at its widest point and about 1050 km from North to South. It has a topography ranging from the Niger Valley lowlands along the coast, to high plateaus in the north and mountains along the eastern border.

## 3. GEOGRAPHIC LOCATION OF THE NIGER DELTA

The Niger Delta, with an estimated area of 70,000 km<sup>2</sup>, is one of the world's largest deltas. It is located in the central part of Southern Nigeria between above latitude 5°33'49"N and 6°31'38"E in the north. Its western boundary is given as Benin 5°44'11"N and 5°03'49"E and its eastern boundary is Imo River 4°27'16"N and 7°35'27"E.

It contains the world's third largest mangrove forest, the most extensive freshwater swamp forest in West and Central Africa and most of Nigeria's primary forests. The region, situated in the

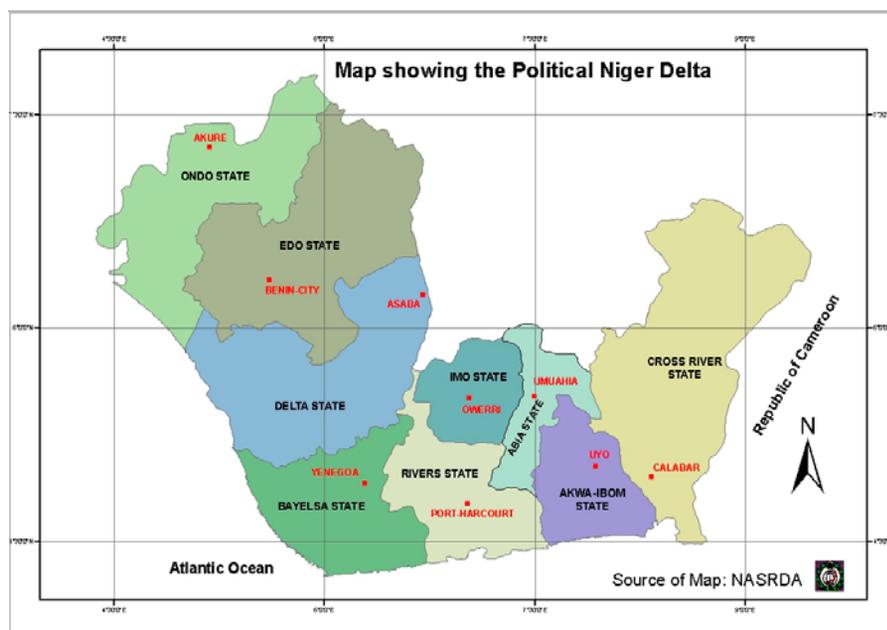


Fig. 1. Map of the political Niger Delta (adapted from NASRDA 2008)

southern part of Nigeria, is bordered in the east by the Republic of Cameroon and, in the south, by the Atlantic Ocean. Within Nigeria, the region is defined both geographically and politically, the latter description being for revenue sharing purposes. The geographic Niger Delta includes the littoral States of Rivers, Bayelsa, Delta Cross River and Akwa Ibom and has an area of about 67,284 km<sup>2</sup> with a combined population of 16,331,000 persons. The political Niger Delta includes these and, in addition, Abia, Edo, Imo, and Ondo states, with a total area of 112,110 km<sup>2</sup> of land. The region represents about 12% of Nigeria's total surface area (NDDC 2006). Figure 1, shows the States now known as the political Niger Delta States by the National Space Research and Development Agency of Nigeria (NASRDA 2008).

The area consists of a vast coastal plain spanning approximately 853 km facing the Atlantic Ocean endowed with immense natural resources especially hydrocarbon deposits. It is estimated to have about 37.2 billion barrels of proven oil and 5.153 trillion cubic feet of gas reserves as at the

end of 2012. There are about 606 oil fields in the Niger Delta, of which 360 are on-shore and 246 are offshore (Nwilo, Badejo 2007). Most of the new oil fields are deep water fields developed and being developed offshore. Within the Niger Delta area, there are over 21,000 km of moderate-to-large (152–1219 mm diameters) oil pipelines; about 5284 oil wells drilled and 527 flow stations for crude oil processing, with more than 7000 km of oil and gas pipelines traversing the entire area, and seven export terminals (DPR 2010). The region houses key industries with three refineries, two petrochemical plants, one liquefied natural gas plant, a major steel plant and three gas-fired electric power generating stations.

Official statistics indicate that, between 1976 and 1996 a total of 4647 incidents resulted in the spill of approximately 2,369,470 barrels of oil into the environment. Table 1 shows some of these oil spill incidents.

The region is endowed with both renewable and non-renewable natural resources. The major non-renewable resources include fossil fuels, crude oil

Table 1. Some reported oil spills (Babawale 2013)

S/No.	Year	Location	Operator	Quantity spilled (Barrells)
1.	1978	Escravos, Delta State	GOCON	300000
2.	1978	Forcados Terminal, Delta State	Shell Petroleum Development Company	580000
3.	1980	Funiwa-5, Bayelsa State	Texaco Oil Company	400000
4.	1982	Abudu Pipeline	Shell Petroleum Development Company	18818
5.	1998	Idoho Oil Well	Mobil Producing Unlimited	40000

and natural gas and construction materials such as gravel, sand, clay and earth. Sand is obtained from both land and river beds. The exploitation of resources or raw materials for use in economic activities, agro-processing and industrial activities impact negatively on the environment of the Niger Delta. Like other wetlands, the Niger Delta is subject to intense and growing pressures for development of residential, commercial and industrial development of oil and gas. Wetland species are harvested at very high rates and the scourge of pollution has pervaded the region and given it an identity. Heavy loads of industrial and domestic wastes are discharged untreated into the marsh. The combination of all these has led to serious degradation over time and these pressures continue to intensify. Land use decisions have been based on a development imperative that favours constant modification of the wetland for economic advancement of the nation. The attendant pollution that follows the production and evacuation of oil and gas has been allowed to continue without the economic value of the goods and services being considered, and not being factored into the development decisions. The region's biodiversity and natural ecosystems continue to be reclaimed, degraded and lost because they are seen as being "value-less" especially when compared to the gains from oil and gas production, whose revenue sustains the national economy.

#### 4. DEFINITION OF WETLANDS

A wetland is an ecosystem that bridges the gap between terrestrial and aquatic ecosystems. It is an area of land that is wet for all or part of the year like swamps and marshes and it is usually fed by creeks, streams, or even underground springs. It is a natural and important habitat for frogs, birds, turtles, molluscs, periwinkles, oysters and serves as a fish nursery. The Ramsar Convention (2005) defines it as "... areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt including areas of marine water, the depth of which at low tide does not exceed six metres". They are generally lands where saturation with water is the dominant feature determining the nature of soil development and the type of plant and animal communities living in the soil and on its surface and generally occupy about 6% of the world's land surface. Wetlands are generally divided into three categories namely marine/coastal type; inland type; and human-made types.

In the Niger Delta, the different types of wetlands consist of both the upland and the wetland and Keating (2002) indicates that two property types are often involved in any wetland. The oil infrastructures within the Niger Delta render the region liable to incessant contamination by oil spill disasters which cause hardship to the inhabitants. These incessant contaminations pose serious risks to the environment requiring response skills that will ameliorate such disasters.

#### 5. RATIONALE FOR VALUATION OF WETLAND ECOSYSTEM GOODS AND SERVICES

The management and use of a contaminated wetland poses serious challenges to the stakeholders of such wetland. Decisions are required on what measures to implement to ameliorate the adverse effects of the contamination on the impacted communities, with such measures ranging from the provision of temporary relief to the payment of compensation for damages suffered, as determined by a professional valuation of such damages. A comprehensive response will require the consideration of the duration of impact of the contamination on the affected wetland. Management decisions involving the payment of compensation will require the valuation of the damaged properties, and as Heal cited in Berkes and Folke (1998) stated, valuation is a way of organizing information to help guide decisions but is not a solution or end in itself. It is one tool in the much larger politics of decision making and, wielded together with financial instruments and institutional arrangements, allow individuals to capture the value of ecosystem assets. The Millennium Ecosystem Assessment (2005), defines "Valuation" as the process of expressing a value for a particular good or service in terms of something that can be counted, often money, but also through methods and measures from other disciplines (sociology, ecology and so on).

Economic valuation is often undertaken to influence a decision. It is important to consider carefully, the decision that the valuation advocacy intends to influence. Being based on the view of the ecosystem as a source of goods and services for consumption and other inputs for production, economic valuation is influenced by human use or enjoyment of the environment. While the UNEP Convention on Biological Diversity (1996) asserted that the failure to properly value natural resources generates misleading information about their

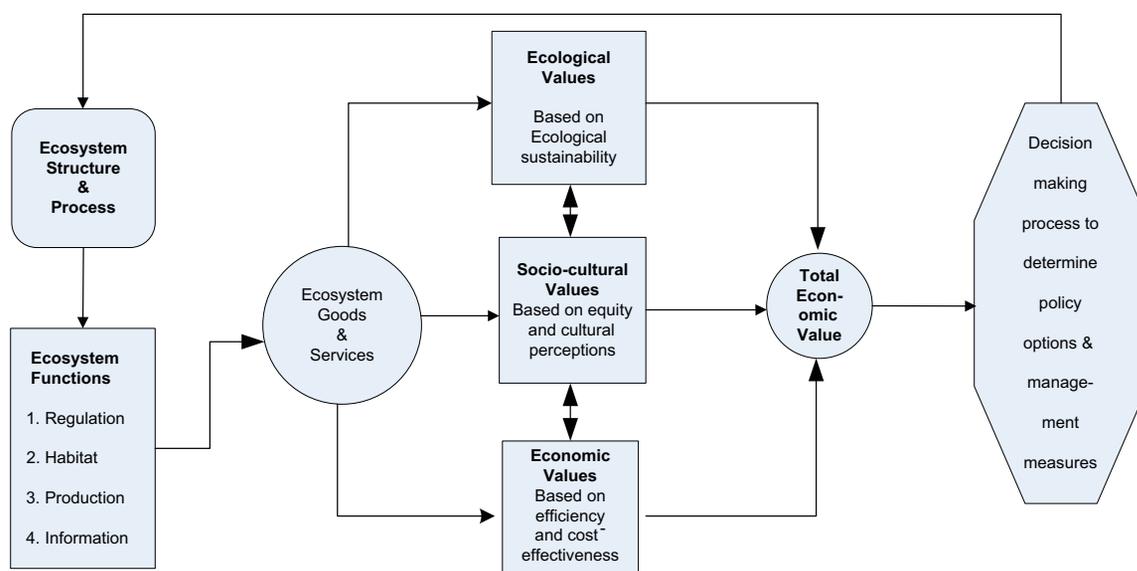


Fig. 2. Framework for ecosystem total economic value valuation (De Groot *et al.* 2002)

abundance, Mooney *et al.* (2005) stated that the logic behind ecosystem valuation is to unravel the complexities of socio-ecological relationships, make explicit how human decisions would affect ecosystem service values, and to express these value changes in units like money that allow for their incorporation in public decision-making processes. Brander *et al.* (2010) summarized the six reasons for conducting valuation studies as missing markets; imperfect markets and market failures; to understand and appreciate the alternatives and alternative uses of some biodiversity goods and services; to appreciate the uncertainty involving future supply and demand of natural resources; for use in designing biodiversity/ecosystem conservation programmes; and for use in natural resource accounting. Otegbulu *et al.* (2013) opined that ascertaining and assigning the full value of natural resources is crucial to protecting such resources. This full value can only be determined through an economic valuation and, as Kopp and Smith (1993) stated, damage assessment is undertaken to estimate how the value of one or more natural assets injured by hazardous waste or oil has changed due to those injuries. Though it has been argued that it is either impossible or un-necessary to value ecosystems as we cannot place value on such 'intangibles' as human life, environmental quality or long-term ecological benefits, valuation is done unintentionally every day. When construction standards are set for highways, bridges and the like, we are in fact valuing human life as spending money on construction would save lives. Since ecosystem goods and services provide outputs and outcomes

that directly and indirectly affect human wellbeing, valuation is necessary as it will contribute to better decision making by ensuring that policy appraisals take into account, the costs and benefits to the natural environment and the implications of new developments on human wellbeing. Otegbulu *et al.* (2013) opined that natural resources are managed sustainably as to place proper values on such resources. A proper value is practically an economic value that reflects the use and potential of such resources. To them, this is necessitated by the fact that natural ecosystems serve economic values and environmental functions that have positive economic values and that, where natural resources are assigned zero value, an over-exploitation of such resources very often results. It is the need to capture the total economic value of degraded environments that De Groot *et al.* (2002) suggested the framework for valuing the total economic value of ecosystems illustrated in Figure 2.

## 6. THE BODO OIL SPILL CASE

In December 2008, an oil spill occurred within the wetlands owned and used by members of Bodo Community in the Gokana Local Government area of Rivers State in the Niger Delta region. The spilled oil was not cleaned but left to contaminate the soil and neighbouring land surrounding the coastline. In a bid to manage the conflict attending the spill, different professionals were engaged independently of one another to study and advise on the impact of the attendant contamination on the community land and properties. The results

of these studies were used by lawyers representing the affected community, to litigate for compensation for the community. The absence of any co-ordination between the various professionals resulted in the production of disjointed reports, which proved almost impossible to enforce and a clamour for an alternative means of dispute resolution that did not require the reports and posed difficulties for the stakeholders. Attempts to determine the values of the damages suffered only resulted in the determination of a cross-sectional value without any regard to the duration of the impact of the contamination on the environment but as DeFrancesco *et al.* (2012) opined, environmental damage valuation focuses on relationships, over time and space, between damaged resources and the behaviour and utility levels of the affected individuals. The valuers' input to the decision making process was made by adopting property valuation methods that failed to account for the wetland portion of the contaminated land due to the fact that professional valuers are only trained in the methods of property valuations that do not incorporate wetland valuation techniques. To be able to propose a robust framework that could be used for such analysis, a case study approach was adopted since the methodology admits multiple sources of data collection.

## 7. MATERIALS AND METHODOLOGY

This paper presents the results of a survey that was administered between December 2012 and January 2013 to professional valuers in the Niger Delta of Nigeria. The survey was administered in the Niger Delta since the region hosts the oil industry in Nigeria and is the region that experiences incessant oil spills that have resulted in several cases of environmental contamination. The professional valuers were selected from the directory of The Nigerian Institution of Estate Surveyors and Valuers, Rivers State Branch, a professional body that registers professional firms engaged in valuation practices in Nigeria. To validate the results from the returned questionnaire, academics who train prospective valuers were sent a validation questionnaire by mail and their responses reflected in the final developed framework.

A total of 130 questionnaires were sent out to the firms, ministries and universities where professional valuers practise. 65 firms responded out of which 62 completed questionnaires, representing a response rate of approximately 52% were useable. The other 3 were discarded due to incompleteness.

Within each firm, two senior valuers were served with the questionnaire, which contained 23 questions that took approximately 20 minutes to complete. The principal partner of the firm and the next senior valuer of the firm completed the survey. The firms were Estate Surveying and Valuation firms engaged in Valuation consultancies. Table 2 shows that consultant Estate Surveyors and Valuers constituted the bulk of the respondents.

Table 2. Classification of respondent firms

Specialisation	Frequency	Percentage
Estate Surveyor and Valuer	1	1.6
Property/Facility Manager	17	27.9
Consultant Estate Surveyor and Valuer	44	70.5

Source: Field data (2013).

The survey questions ranged from general questions about the specialization of the firm and the competency of the valuers, to the need for a composite method of valuation incorporating both market value and non-market values. After the initial delivery of the survey instrument, phone-calls were made to remind respondents and a follow up visitation made to retrieve the questionnaire. All responses were anonymous. After the analysis of the survey, the developed framework was mailed to 10 academics and experienced valuers to confirm its usefulness and their responses and comments were used to modify and produce the final framework shown here. The choice of academics was informed by the need to balance theory with the practical input of the practicing valuers.

## 8. RESULTS

The study revealed that the applicable Valuation methods are the Comparable Sale Method (ComSalcont); Depreciated Replacement Cost Method (DepRecont); Use of Pre-determined Compensation Rates (PreRatecont); Income Capitalisation Method (Incmetcont); Subdivision Development Valuation Method (SDmetcont); Land Value Extraction Method (LVEExtcont); Discounted Cash Flow Technique (DCFcont); Contingent Valuation Method (Convalcont); and Hedonic Pricing Model (HPMcont). Table 3 indicates the various responses.

In determining which stakeholder was more influential, the study revealed that the international oil companies (IOCs) are the most influential stakeholders in choosing a valuation method and also influencing valuation practice in the de-

Table 3. Frequently used valuation methods in the valuation of contaminated land

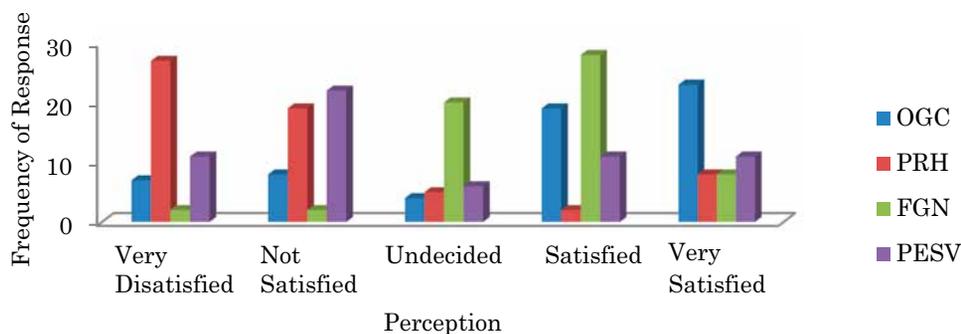
	Never	Rarely	Sometimes	Often	Always
ComSalcont	23 37.70%	9 14.80%	8 13.10%	14 23%	7 11.50%
DepRepcont	22 36.10%	5 8%	17 27.90%	8 13.10%	9 14.80%
PreRatecont	13 21.30%	7 11.50%	12 19.70%	16 26.20%	13 21.30%
Incmetcont	22 36.10%	8 13.10%	13 21.30%	15 24.60%	3 4.90%
SDmetcont	40 65.60%	15 24.60%	4 6.60%	2 3.30%	0 0%
LVExtcont	36 59%	14 23%	10 16.40%	1 1.60%	0 0%
DCFcont	39 63.90%	11 18%	8 13.10%	3 4.90%	0 0%
Convalcont	44 72.10%	8 13.10%	6 9.80%	2 3.30%	1 1.60%
HPMcont	48 78.70%	11 18%	2 3.30%	0 0%	0 0%

Source: Field data (2013).

termination of damages due to contamination. On a Likert Scale, respondents were asked to state their level of satisfaction with the current practice. 7 (11.5%) respondents said the IOCs were very dissatisfied; 8 (13.1%) said they were dissatisfied; while 23 (37.7%) said they were much undecided; 11 (18.0%) said they were satisfied; while 12 (19.7%) said they were very satisfied (Figure 3 shows these results). This response is curious as the IOCs were said to be the most influential in the choice of valuation method in the damage assessment process and should be satisfied with the outcome of the process they have engineered.

The responses showed that the property right holders are generally very dissatisfied with the damages assessed currently and would welcome a framework that will improve their present experience.

The Federal Government as a stakeholder has power, legitimacy and urgency and is thus a dominant stakeholder who not only prescribes rules and regulations for the oil industry, but also prescribes the valuation methods to be used and specifies compensation rates. It does appear that this is a very powerful stakeholder, who is very satisfied with the damage assessment process, no doubt due to its power. The professional valuers were generally not very satisfied with the current damage assessment process and would welcome a framework



OGC = Oil and Gas Companies (IOCs)  
 PRH = Property Right Holder (Landowners)  
 FGN = Federal Government of Nigeria  
 PESV = Professional Valuer

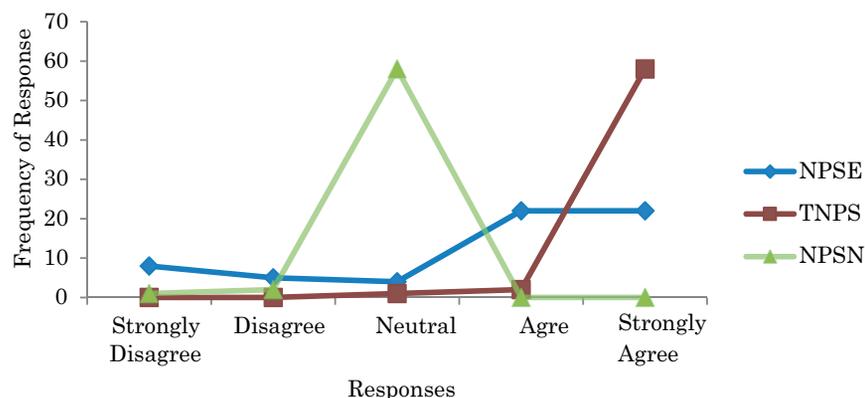
Fig. 3. Stakeholder satisfaction with current damage assessment legend

that legitimises their role in the contaminated property valuation process. These questionnaire responses were corroborated by the expert valuers interviewed, when one of them summed it thus: *“The IOCs see the payment for damages as a privilege as they not only dictate the rates but also the amount they are willing to pay, sometimes against the recommendation of their consultant valuers”*. Both the questionnaire respondents and the expert valuers interviewed indicated that the absence of a practice standard was responsible for the current practice.

Realising the absence of a practice standard (as it obtains in advanced economies) available to valuers in the Niger Delta in particular and Nigeria in general, it became necessary to examine if the practitioners would welcome such a standard. Respondents were asked if they agreed that there is need for a practice standard that will specify the valuation methods that should be adopted for valuing contaminated wetlands by indicating their opinion on a Likert scale with options as Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. Figure 4 shows the responses on the need for a practice standard.

A strong majority of 44 (72.2%) agreed that there exists no practice standard. This response lends credence to the non-uniformity of approach in valuing contaminated wetlands to assess damages due to contamination and the dominance of the International Oil Companies (IOCs) and Government in choosing a valuation method to use in assessing damages. It also confirms that there is a laissez faire approach in valuation practice among valuers which creates doubts about the relevance of the profession in the development of that region in particular and the country in general and in the

management of oil contaminated lands; it also creates the vacuum being exploited by the IOCs to dictate the method that should be used for any particular type of valuation. All the respondents (100%) strongly agreed that there is need for a practice standard, contending that this would streamline the valuation practice, especially in the area of contaminated wetland valuation. The need for a practice standard necessarily calls for a framework that will lay down the protocol to be followed when a wetland is contaminated in order to obviate any confusion among the stakeholders. Such a framework should guide all the parties to identify their roles in the process of assessing damages due to contamination and confirm the multidisciplinary nature of contaminated land management. A summary of the expert interview opinions was stated by one of the experts to be that *“there should be a framework and guideline defining the procedures to be adopted when a contamination occurs. This will also enable valuers to value from both the polluters’ and the claimants’ viewpoints and make it easy for arbitration in case of any disagreement between the parties. This study is overdue since all the practice of valuation has been based on the mainland, neglecting the wetlands which are very useful. The current practice regards wetlands as being useless and the study should critically consider the economic potentials of wetlands.”* There was no agreement between practising valuers on which valuation method should be adopted in assessing damages due to contamination, as there was constant under-cutting between firms as they contend for patronage by the IOCs when any contamination occurs, thus weakening the usefulness of valuation opinions in decision making. The main reason for the present quagmire is the absence of



NPSE = No Practice Standard Exists  
 TNPS = There is Need for a Practice Standard  
 NPSN = No Practice Standard Needed

Fig. 4. The need for a practice standard  
 Source: Field data (2013)

any valuation framework that will regulate the procedure and method, which those valuers may adopt in valuing contaminated wetlands, and the various professionals that will be required to conduct a comprehensive study of the contamination impact, which will be known to both land owners and the polluters alike, to produce an unbiased value and minimise disputations between them. Such a framework will guide valuers in undertaking the valuation of contaminated wetlands and also inform the polluters of the necessary protocols to follow in the event of any occurrence of a contaminating event. While existing literature describes in broad terms the various stages of investigations required for the valuation of contaminated land, (Bell 2008) and others have illustrated a framework focused only on non-market goods and contaminated ecosystems valuation from the public's perspective (Defrancesco *et al.* 2012). No single literature has integrated the various stages

of investigation in a single framework designed to assess the diminution of value from a property owner's viewpoint. This study combines evidence from literature and results from field research to propose a novel framework that accommodates the peculiarities of a contaminated wetland in the Niger Delta region of Nigeria.

Figure 5 shows the proposed composite valuation framework for valuing contaminated wetlands.

**8.1. Phase I: occurrence of contamination**

Land contamination is defined by the UK Environment Agency (2004) in its broadest sense as a general spectrum of site and soil conditions which can include areas with elevated levels of naturally occurring substances, as well as specific sites that have been occupied by former industrial uses, which may have left a legacy of contamination

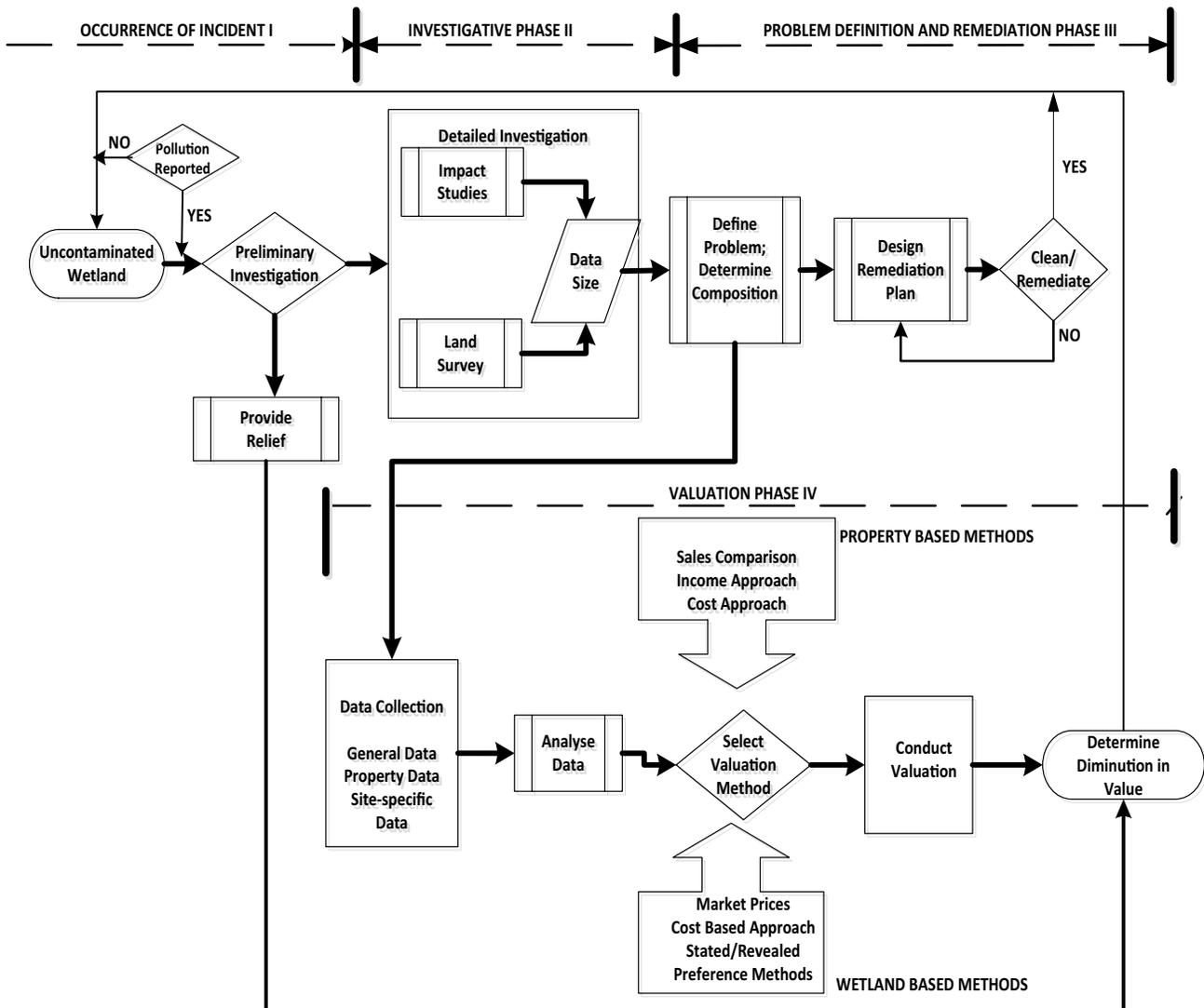


Fig. 5. Proposed framework for valuing contaminated wetlands

from operational activities or from waste disposal, and also include areas of land in which substances are present as a result of direct or indirect events, such as accidents, spillages, aerial deposition or migration. Thus defined, contamination involves three basic components of contaminant, a receptor, and a pathway. A contaminant describes any substance in, on, or under the land with the potential to cause harm or to cause pollution of adjoining waters and may include crude petroleum and crude petroleum pipelines; a receptor which is something that could be adversely affected by a contaminant like people, an ecological system, real property, or a water body; a pathway which is the route or means through which a receptor can be exposed or affected by a contaminant. Contamination usually impacts the surrounding environment.

### 8.2. Phase II: detailed investigation

Upon confirmation of the veracity of the contamination report, the IOC will initiate a detailed investigation of the incident in compliance with the applicable laws. The first action here will be the identification of the Stakeholders of the incident, which will include the operators of the oil/gas field, the landowners/users, and the parties responsible for the incident.

The oil industry operations in the Niger Delta as in other parts of Nigeria is subject to certain laws such as the Oil Pipelines Act Cap. 07, LFN (2004), the Petroleum Act Cap. P10, LFN (2004), and the National Oil Spill Detection and Response Agency (Establishment) (NOSDRA) Act, 2006. There are other regulations like the Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN) of NNPC (2002), issued by the Department of Petroleum Resources (DPR). The DPR supervises all petroleum industry operations and enforces the other laws, while NOSDRA is a government agency responsible for compliance with the environmental laws affecting the petroleum sector.

### 8.3. Phase III: remediation

The actual remediation of the site commences when the results of the detailed investigation stage indicate the presence of concentrations of hazardous materials over the regulatory thresholds and thus define the nature and extent of the contamination and its remediation; it will continue until the concentrations of hazardous substances are reduced to their regulatory standards; and may continue until after the clean-up of the receptors. The results of

this stage will inform the actual valuation process, as this stage provides the required input data that is necessary for determining the damages suffered due to the contamination.

### 8.4. Phase IV: the appraisal stage

Whipple (1993) was of the opinion that fields of study like Valuation which are fundamentally healthy, exhibit a process of intellectual growth and development. This growth involves rethinking the process followed by professional valuers in executing valuation assignments to meet the needs of their clients, avoid malfeasance and enrich their practice, and this is what the proposed framework is designed to achieve. This is necessitated by the cry of inadequacy of the compensation paid as damages due to oil pollution contamination and a general feeling that traditional valuation methods were not serving clients' needs and the need to provide a protocol for defining and solving valuation problems within a logically coherent frame of reference. To do this, the valuer is required to follow a protocol that entails: the definition of the problem, determination of the land composition, data collection and verification, analysis of data, selection of the appropriate valuation methods and the valuation of the contaminated wetland. The details of these steps are contained in the Supplementary Appendix.

## 9. CONCLUSION

This study sought to propose a framework for valuing contaminated wetlands as an aid to managing such contaminated lands. It reviewed the current valuation practice adopted when an oil spill contamination occurs by conducting a questionnaire survey of valuation firms, and found that there is a lot of discontent among the stakeholders of a contaminated wetland. The adoption of property-based valuation methods was found to be inappropriate for wetland goods and services that are not usually marketed. Also that professional valuers adopt property based valuation methods because they are not skilled in wetland valuation methods and it is suggested that only a composite valuation method that combines the property based valuation methods with the wetland based valuation methods can adequately capture the value of contaminated wetlands and aid the management of such lands. This paper adopts this basis in proposing a framework that reflects the multidisciplinary nature of the contaminated wetland valuation pro-

cedure and debunks the notion that such valuation is the preserve of only the professional valuers. While the case study was drawn from the Niger Delta of Nigeria, the proposed framework will be useful to any region where a wetland exists and will enable Valuers to update their valuation skills to include such environmental goods and services and the various methods of valuing such economic resources in addition to their training in valuing the built environment.

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