South Asian Journal of Social Studies and Economics

Volume 20, Issue 1, Page 42-48, 2023; Article no.SAJSSE.100796
ISSN: 2581-821X

Disaster Rehabilitation and Restoration Program towards Oil Spill Impacted Communities in Selected States in Niger Delta Region, Nigeria

I. B. Olawuyi [a*], A. A. Obafemi [a,b] and O. S. Eludoyin [a,b]

[a] Centre for Disaster Risk Management and Development Studies, University of Port-Harcourt, Nigeria.
[b] Department of Geography and Environmental Management, University of Port Harcourt, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/SAJSSE/2023/v20i1690

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/100796

Original Research Article

Received: 24/04/2023
Accepted: 03/06/2023
Published: 06/07/2023

ABSTRACT

The study examined the disaster rehabilitation and restoration program towards oil spill impacted communities in selected states in Niger Delta Region, Nigeria. The study was carried out from six (6) LGAs from three (3) states, that is, Akwa Ibom, Bayelsa and Delta while questionnaire was administered among 400 respondents with return rate of 94% amounting to 375 valid questionnaires. The returned questionnaires were analysed using descriptive statistics and ANOVA for the study hypotheses. The outcome of the study indicated that repair of damaged community infrastructure (31.7%) and community arrest of the vandals (27.5%) are the most adopted disaster rehabilitation practices while application of fertilizer to improve the soil quality (35.2%) as the major restoration practices. Statistically, there was no significant difference in various rehabilitation programs among selected communities (where $p > 0.05$, $p= 0.336$); however, restoration programs

**Corresponding author: Email: comradeben3765@gmail.com;*

showed a significant different among the selected community (where p > 0.05, p= 0.003). Deployment of capable hands for post disaster activities and stricter monitoring of activities during and after remediation, to ensure that the activities they have implemented are in accordance with regulatory standards was recommended.

Keywords: Disaster management practice; disaster rehabilitation; reconstruction; restoration; oil spill management.

1. INTRODUCTION

"Oil spill in Nigeria occurs as a result of sabotage, corrosion of pipe and storage tanks, carelessness during oil production operations and oil tankers accidents" [1,2]. "Other examples of oil spill in Nigeria includes: Shell Petroleum Development Corporation (SPDC) Forcados Terminal Tank in 1978 of about 580,000 barrels Texaco Funiwa-5 blowout in 1980 of about 400,000 barrels, and Abudu pipeline spill in 1982 of about 18,818 barrels" [3]. "Major oil spill like the Jesse fire incident had claimed thousands of lives and the Idoho oil spill in January 1998, in which about 40,000 barrels were spilled into the environment" [3].

As it were, there are no consistent figures on the quantity of oil spills in the Niger Delta [4,5], but it is estimated that oil spill accounts for as many as 546 million gallons of oil into the Niger Delta environment over the last five decades, equivalent of about 11 million gallons annually [5,6]. "Oil spills continue to occur in alarming proportion in the Niger Delta communities including Ogoniland who are living in a chronic state of pollution" [5,7].

Measures taken so far by the Government to manage oil spillages in Nigeria include the setting up of various legislative frameworks to govern the petroleum industry such as: Federal Environmental Protection Agency Act, 1990; National Oil Spill Detection and Response Agency Act, 2006, National Emergency Management Agency (NEMA), Ministry of Niger Delta, etc. Also, the government acquired a 25 metres right-of-way (ROW) on each side of the pipelines before they were laid and the pipes were buried a meter deep to prevent accidental contact with land-based activities (Ogundele, 2007). However, recent events have shown that the integrity and safety of the pipelines have been compromised by vandals who tap into them resulting in damages and ruptures that affect lives and property within the ROW.

"Rehabilitation and reconstruction operations are integral to disaster recovery. They provide a direct 'connect' between disaster response and long-term development. The two activities, however, do not have similar connotation" (IFRC, 2012). "Rehabilitation involves restoring local services related to the provision of immediate needs. It implies a systematic return to pre-disaster status. It refers to actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims' self-help efforts to repair physical damage, restore community facilities, revive economic activities and provide support for the psychological and social well-being of the survivors. It focuses on enabling the affected population to resume more or less normal patterns of life. It may be considered as a transitional phase between immediate relief and major long-term development" (IFRC, 2012).

"Reconstruction, on the other hand, represents long-term development assistance, which could help people in the affected areas to rebuild their lives and meet their present and future needs. It considers reduction of future disaster risks. Rehabilitation may not necessarily restore the damaged structures and resources in their previous form or location. It may include the replacement of temporary arrangements established as part of emergency response or the upgrading of infrastructure and systems from pre-disaster status" (IFRC, 2012).

Considering various related studies (Atubi, 2015), [8,9,10,2,11], the aspect of disaster rehabilitation and restoration activities towards community that are impacted with oil spill event shows gap in empirical knowledge. "Ecological restoration of oil spill sites involves passive restoration (natural attenuation and secondary succession) or interventionist restoration (clean up/removal of oil, bioremediation of the site, introduction of desired species, and ecosystem management). Restoration ensures that sustainable economic development takes root especially in poor regions of the world, as well as for biodiversity preservation" [12,13]. Although a restoration project may affect different people in different ways, the people who are affected by it

need to understand the reason for restoration and appreciate its value. The focus of the study is to examine the rehabilitation practices available and restoration programmes being carried out among oil spill impacted communities.

2. MATERIALS AND METHODS

2.1 Study Area

The Niger Delta Region of Nigeria is located on 4º49'60"N and 6º0'00"East (Fig. 1) protruding towards the Gulf of Guinea on the Atlantic coast of West Africa [14]. The Niger Delta region is a densely populated area in Nigeria. Its population is about 31 million people. The land mass extends over about 70,000 km^2, and make up 7.5 percent of Nigeria's landmass. The region consists of the present day Abia, Akwa- Ibom, Bayelsa, Cross- River, Delta, Edo, Imo, Ondo, and Rivers states. The Niger Delta region is oil-rich by nature and has been the centre of international controversy over waste of natural resources, pipeline vandalism, devastating pollution, ecocide, and human rights violations. The nation extracts over 2 million barrels of crude oil from the Niger delta region in a day [15].

2.2 Study Design and Sample Size

The survey research method was adopted to carry out the study. This method was adopted because it is a suitable and efficient way of studying large population.

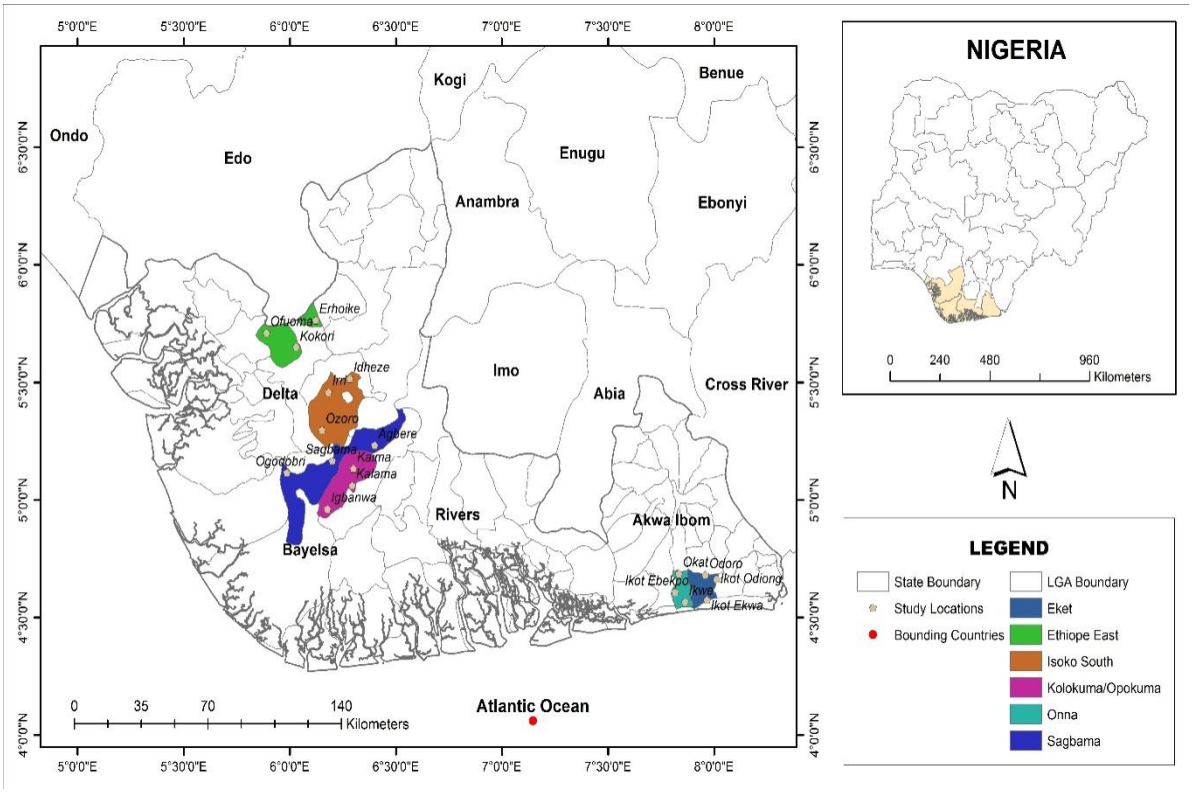

Fig. 1. Overview of the Selected State, LGAs and Communities

To get an optimum sample of the target population (1,773,696) the Taro Yamane (1967) formula for sample size determination was adopted;

$$n = \frac{N}{1 + N\,(e)^2} \quad (1)$$

Where: e= Level of precision (0.05), N= Population**,** n= Sample size**,** 1= Constant

$$n = \frac{1773696}{1 + 1773696\,(0.05)^2}$$

$$n = \frac{1773696}{1 + 1773696 \times 0.0025}$$

$$n = \frac{1773696}{1 + 4,434.24}$$

$$n = \frac{1773696}{4,435.24}$$

n= 399.9 ~

n = 400

The distribution of the sample size was based on the percentage of each of the LGAs of study in the projected population which also determines the amount of questionnaire that was distributed among the LGAs Table 1).

Table 1. Percentage distribution of questionnaire

States	LGAs	Projected Population (2020)	Percentage in Projected Population	Distribution of the Questionnaire
Akwa Ibom	Onna	176,115	10	40
	Eket	590,472	33	132
Bayelsa	Kolokuma/Opokuma	128,411	7	28
	Sagbama	302,728	17	68
Delta	Ethiope East	195,032	11	44
	Isoko South	380,938	22	88
Total		**1,773,696**	**100**	**400**

A total of 400 copies of questionnaire was randomly administered using simple random sampling technique in respondents' selection; however, 375 of the questionnaires were properly filled and subjected to further analysis.

2.3 Data Analysis

The retrieved copies of questionnaire were coded and subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS-21) for proper analysis. The data of the study were analysed through descriptive and inferential statistics.

3. RESULTS

The rehabilitation and restoration practices for oil spilled impacted communities were presented in Table 2. On the disaster rehabilitation practices, 92 (24.5%) of the respondents noted provision of relief materials to the victims of the oil spilled is the common practice, 103 (27.5%) noted community arrest of the vandals, 119 (31.7%) noted that repair of damaged community infrastructure especially those belonging to the organisations is the common practice while 38 (10.1%) and 23 (6.1) of the respondents perceived payment of compensation to victims and other available practice are common rehabilitation practices respectively. At the individual states, community arrest of vandal (54-33.5%) and (27-30.3%) was perceived as common practice in Akwa Ibom and Bayelsa States respectively while repair of damaged community infrastructure (45-36.0%) was perceived as main rehabilitation practice in Delta state. Considering the restoration practices on the aftermath of oil spilled disaster, 89 (23.7%) of the respondents perceived that planting of plant seed is the common restoration activities, 132 (35.2%) noted that application of fertilizer to improve the soil of the area is the common practice, 67 (17.9%) noted physical replacement of facilities is the common practice while 69 (18.4%) and 18 (4.8%) of the respondents perceived water treatment management and other practice such as introduction and mixing of new soil are the common restoration practice respectively. Across the individual states, the most common practice as perceived by the respondents was the application of fertilizer to improve soil chemistry for Akwa Ibom (56-34.8%), Bayelsa (28-31.5%) and Delta state (48-38.4%).

Table 2. Rehabilitation and restoration program for impacted communities

Variables	Akwa Ibom		Bayelsa		Delta		Total (%)
	N	%	N	%	N	%	
Disaster Rehabilitation Practice							
Provide relief materials to victims	34	21.1	24	27.0	34	27.2	92 (24.5)
Community arrest of vandals	54	33.5	27	30.3	22	17.6	103 (27.5)
Repair of damaged community infrastructure	52	32.3	22	24.7	45	36.0	119 (31.7)
Payment of compensation to victims	18	11.2	10	11.2	10	8.0	38 (10.1)
Others	3	1.9	6	6.7	14	11.2	23 (6.1)
							375 (100)
Disaster Restoration Practice							
Planting of plant seed	25	15.5	24	27.0	40	32.0	89 (23.7)
Application of fertilizer to improve soil	56	34.8	28	31.5	48	38.4	132(35.2)
Physical replacement of facilities	27	16.8	17	19.1	23	18.4	67 (17.9)
Water treatment management	45	28.0	12	13.5	12	9.6	69 (18.4)
Others	8	5.0	8	9.0	2	1.6	18 (4.8)
							375(100)

The analysis of the hypothesis stating that there is no statistically significant variation in the various rehabilitation programs carried out among oil spill impacted communities shows that the Sig.-value was used to determine the levels of significant (where P–Value < α (0.05) reject null hypotheses; P–Value > α (0.05) accept the null hypothesis) were adopted (Table 3).

The analysis of the hypothesis stating that there is no statistically significant different in the restoration programmes among the communities in the study area shows that the Sig.-value was used to determine the levels of significant (where P–Value < α (0.05) reject null hypotheses; P–Value > α (0.05) accept the null hypothesis) were adopted (Table 4). Due to the established difference through the ANOVA analysis, a Post Hoc analysis was conducted using the Duncan test to establish the extent of differences among the individuals state of study (Table 5).

4. DISCUSSION

On rehabilitation practice, the finding of the study indicated that repair of damaged infrastructure was the main rehabilitation practice while other practices include community arrest of vandals,

Table 3. ANOVA Table for disaster rehabilitation activities

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	2.896	2	1.448	1.093	0.336	**H_o Accepted**
Within Groups	492.560	372	1.324			
Total	495.456	374				

Source: Field Survey, 2022

Table 4. ANOVA Table for disaster restoration activities

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	15.810	2	7.905	5.996	.003	**H_1**
Within Groups	490.414	372	1.318			**Accepted**
Total	506.224	374				

Table 5. Post Hoc tests using duncan test for restoration practices

Variable	N	Mean (Concentration)
Delta	125	2.8888_a
Bayelsa	89	3.11236_b
Akwa Ibom	161	3.36025_c

Mean output with different subscript are significant at 0.05 level of significant

provision of relief materials to victim and payment of compensation to victims affected by the oil spilled event. According to Badejo and Nwilo [1], payment of compensations to spill impacted communities is part of the government's drive in enforcing environmental regulations. Oil pollution in coastal environment would be managed effectively if our government could set up regional spill response centres along our coastline.

The outcome of the study asserted that application of fertilizer to improve soil chemistry is the major restoration practice among the study area. Aside this practice, other asserted options include planting of plant seed, water treatment management and physical replacement of facilities. The finding shared similarity with the UNEP Report [7], which asserted that sometimes they then add fertilizers, which can supplement the nutrient requirements of bacteria as they break down the pollutants. The soil is then ploughed into windrows (ridges) to enhance evaporation. Imoobe and Iroro [13] opined that oil companies and regulatory officials suggest that some form of restoration, which usually involves planting seeds, is carried out in the mangroves; however, there are little documented materials of restoration activities on oil spill sites in the Niger Delta. According to Imoobe and Iroro [13], ecological restoration of oil spill sites involves passive restoration (natural attenuation and secondary succession) or interventionist restoration (clean-up/removal of oil, bioremediation of the site, introduction of desired species, and ecosystem management).

The statistical analysis to establish that the states studied have similar rehabilitation practices but different restoration program/practice. This confirmed the opinion of Badejo and Nwilo [1] and IUCN Niger–Delta Panel (2013) which indicated that compensation for damages is the major rehabilitation practice across the Niger Delta region; although, in many cases, it is never enough to compensate the individuals. Also, the outcome confirmed the study of Ogbenetega et al. (2021) which asserted that restoration practices to oil pollution varied from community to community as did its impact on the culture and practices.

5. CONCLUSION AND RECOMMENDA-TIONS

Having an effective oil spill management program is paramount to the affected population and the sustainability of the environment both for the present and future use. Having considered various post disaster management practices available in some of the major oil producing states and communities in the Niger Delta region of Nigeria, the study therefore concluded that there is need for synergy among all the multi-agency involves in oil spill management for effective practices and involvement of the community in deriving long lasting post-disaster practices that will ensure both human and environmental recovery and rehabilitation leading to better environmental and human right management. Deployment of capable hands for post disaster activities and stricter monitoring of activities during and after remediation, to ensure that the activities they have implemented are in accordance with regulatory standards.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Nwilo PC, Badejo OT. Impacts and management of oil spill pollution along the Nigerian Coastal Areas. Administering Marine Spaces: International Issues. 2006; 119:1-15.
2. Emelu VO, Emelu C, Babatunde BB, Wali E, Afolabi OO. Associated disaster risk of inadequate corrosion control (cathodic protection) on pipelines in port Harcourt, Nigeria: A quantitative approach. Journal of Engineering in Industrial Research. 2023;4(1):22-30. Available:https://doi.org/10.22034/jeires.2023.1.3
3. Okoye CO, Okunrobo LA. Impact of oil spill on land and water and its health implications in Odu-gboro community, Sagamu, Ogun State, Nigeria. World Journal of Environmental Sciences & Engineering. 2014;1(1):1-21.
4. Ordinioha B, Brisibe S. The human health implications of crude oil spills in the Niger delta, Nigeria: An interpretation of published studies. Journal of the Nigeria Medical Association. 2013;54:10.
5. Adekola J, Fischbacher-Smith M, Fischbacher-Smith Adekola O. Health risks from environmental degradation in the Niger Delta, Nigeria. Environment and Planning C: Politics and Space. 2017; 35(2):334–354.

DOI: 10.1177/0263774X16661720
6. Amnesty International Publication. Nigeria: Petroleum, Pollution and Poverty in the Niger Delta. International Secretariat, London, United Kingdom: Amnesty International Publications; 2010.
7. United Nations Environment Programme, (UNEP). Environmental Assessment of Ogoniland. Nairobi. Kenya: United Nations Environment Programme; 2011.
8. Nriagu J, Udofia EA, Ekong I, Ebuk G. Health Risks Associated with Oil Pollution in the Niger Delta, Nigeria. International Journal of Environmental Research and Public Health, 2016;13:346.
DOI: 10.3390/ijerph13030346
9. Ndeh ES, Okafor JO, Akpan UG, Olutoye MA, Ohieku HI. Effects of Crude oil spillages on agricultural soil in Upenekang Village, Ibeno Lga of Akwa Ibom State, Nigeria. Journal of Multidisciplinary Engineering Science and Technology. 2015;2(12).
10. Ejiba IV, Onya SC, Adams OK. Impact of oil pollution on livelihood: Evidence from the Niger Delta Region of Nigeria. Journal of Scientific Research & Reports. 2016;12(5):1-12.
11. Emelu VO, Eludoyin OS, Oyegun CU. Preparedness and mitigation for oil and gas pipeline vandalization in the Niger Delta region of Nigeria. Environmental Management and Sustainable Development. 2021a;10(4).
DOI: 10.5296/emsd.v10i4.18982
12. Clewell AF, Aronson J. Ecological Restoration; Principles, Values and Structure of an Emerging Profession. Society for Ecological Restoration International. Island Press, Washington, DC. 2007;216.
13. Imoobe TOT, Iroro T. Ecological restoration of oil spill sites in the Niger Delta, Nigeria. Journal of Sustainable Development in Africa. 2009;11(2):54-65.
14. Shittu WJ. Mapping Oil Spill Human Health Risks in Rivers State Niger Delta Nigeria. University of Nottingham; 2014.
15. Ekwo U. C0llaboration-based management of petroleum pipelines rights of way in Nigeria. Newcastle university school of Architecture and landscape; 2011.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/100796