Journal of Resources Development and Management
ISSN 2422-8397 An International Peer-reviewed Journal
Vol.90, 2023

Environmental Literacy Education as Enablement for Grassroots Communities in Nigeria's Niger Delta Region to Sustain Their Livelihoods

Caroline L. Eheazu, Ph.D.
Associate Professor of Environmental Literacy and Adult Education
Department of Adult and Non-Formal Education
Faculty of Education, University of Port Harcourt, Nigeria
Email: lc4sure@yahoo.com; Phone: +2348033415900

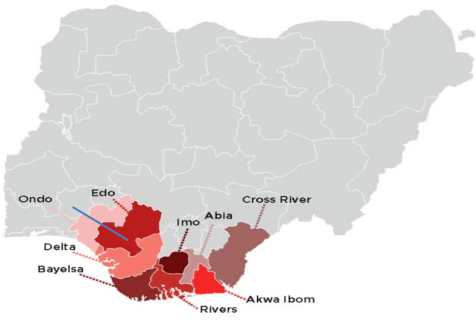
Abstract
Located within the wetlands and estuaries of the River Niger, Grassroots Communities of Nigeria's Niger Delta Region engage mainly in fishing and farming as their livelihoods. Unfortunately, the discovery of oil and gas (fossil fuels) within the location of the communities in the mid-1950s and subsequent protracted exploration and processing of these commodities by Multinational Oil Companies have brought about severe pollution of both the aquatic and terrestrial resources on which the grassroots communities depend for their livelihoods. Efforts to alleviate the resultant impoverishment of the communities by agencies of government and the oil companies have been generally superficial as they lack the involvement of the community members who, on the other hand, do not have the necessary levels of education, awareness and capacity to initiate or demand their participation in the processes that would enable them to sustain their livelihoods and reduce their impoverishment. The grassroots communities certainly need appropriate education programme(s) to empower them with knowledge, skills and awareness that would equip them with capacity for inclusiveness and participation in, as well as to demand for sustainable development programmes/projects for their environment and livelihoods. The purpose of this paper is to unfold the capacity of Environmental Literacy Education (ELE) to achieve these communal needs. The paper also goes further to specify and discuss modalities for actualizing the unfolded capacity of ELE to mobilize the Niger Delta Grassroots Communities towards sustaining their livelihoods.
Keywords: Environmental Literacy Education, Grassroots Communities, Nigeria's Niger Delta Region, Livelihoods, Environmental Pollution.
DOI: 10.7176/JRDM/90-04
Publication date: January 31st 2023

1. Introduction: Some Basic Information on Nigeria's Niger Delta Region

1.1. Location and Delineation

Nigeria's Niger Delta Region (NNDR) is geographically located between latitudes 4.05^0N and 7.55^0N of the Equator and longitudes 4.20^0E and 9.30^0E of the Greenwich Meridian (Shuaibu and Weli, 2017). Although NNDR is usually delineated by reference to its geographical position as an oil rich, vast low-lying region through which the waters of the River Niger flow into the Atlantic Ocean via the Gulf of Guinea, South of Nigeria, nonetheless, there have been at least four different parameters which have been used to define the Region or aspects of it (UNDP, 2006). First is the 'natural' parameter which identifies three States (Rivers, Bayelsa and Delta) as belonging to the *core or natural Niger Delta* as they lie within the main delta of the River Niger. The second parameter is 'zonal'. This identifies a *geographical Niger Delta* comprising the six states of Nigeria's South – South Zone (Rivers, Bayelsa, Delta, Cross River, Akwa Ibom and Edo). The third parameter is 'political', identifying an *oil producing Niger Delta* (for purposes of resource distribution). Here, nine oil producing states in Southern Nigeria are identified; namely, Rivers, Bayelsa, Delta, Cross River, Akwa Ibom, Edo, Abia, Imo and Ondo. Finally, the fourth parameter, which is 'proximity to the coast', identifies a *coastal Niger Delta* consisting of seven states – Rivers, Bayelsa, Delta, Cross River, Akwa Ibom, Ondo and Edo. In spite of the various parametric delineations of Nigeria's Niger Delta Region, it is important to note that the region's constituents have commonality of economic and environmental issues, especially among their grassroots communities. For clarity, the grassroots communities are mostly wet lands rich in oil, gas, flora and fauna (including large concentrations of biodiversity and fresh water fish). These communities which are mainly located within the creeks and the estuaries of the River Niger also experience serious environmental challenges arising from oil and gas exploration and processing (Musa et al., 2013), as well as from human (anthropogenic) actions like illegal petroleum refining, use of chemicals for fishing and so on. This paper concerns grassroots communities in the nine oil producing states that constitute the Region, all of which manifest the issues and circumstances disclosed in subsequent sub-sections of this paper. Plate 1 below shows the location of the Niger Delta Region in Nigeria and the nine states that make up the region.

Plate 1: Nigerian States in the Niger Delta Region



Adapted from: SDN (2020). The Niger Delta

1.2. Demographic Profile of Nigeria's Niger Delta Region Grassroots Communities and their Livelihoods

The Niger Delta occupies 7.5% (69,283km^2) of Nigeria's total land area of 923,768km^2 and is home to approximately 30 million people within the nine states that make up the Niger Delta (SDN, 2018). Ethnically, the Region comprises the Ijaw, Urhobo, Efik, Ibibio, Ogoni, Edo, Yoruba (mainly Itsekiri and Ilaje) and the Igbo (Osuntokun, 2000). Oko & Agbonifoh (201, p. 222) further describe the general demographics of the Niger Delta communities in the following words:

> … only 27 per cent of the residents of the Niger Delta area have access to safe sources of domestic water and 30 per cent of the households have access to electricity. These are below the national average of 31.7 per cent and 38.6 per cent respectively. … Poverty is widespread. This is occasioned by the exceptionally high cost of living associated with petro-economy expectations … in spite of the generally high rate of unemployment estimated at over 30 per cent.

Primordial economic activities of the grassroots communities in the Niger Delta centered on farming, fishing and hunting. That was before the discovery of fossil fuel (petroleum, gas and so on) in the mid-1950s and the subsequent explorations and processing that occasioned oil spills and toxic substances which polluted the land, water and the marine ecosystem on which the said economic activities thrived. As reported by UNDP (2006, p. 74), "nearly 60% of the Niger Delta people depend on the natural environment – living and non - living – for their livelihoods". This report is still true today (2022), especially with the grassroots communities whose livelihoods remain predominantly fishing and farming.

In the area of education in Nigeria's Niger Delta Region, Enyinna (in Oko & Agbonifoh, 2014, p. 222) summarizes the situation as follows:

> … access to formal education is low; while national statistics have it that 76% of Nigerian children attend primary school, in Niger Delta area, the percentage ranges between 30 and 40…

The grassroots communities are likely to be experiencing much more downward trends in school enrolments at different levels of formal education, especially among the migrant fisher folk.

1.3. Environmental Degradation in the Niger Delta: Sources and Impact on the Livelihoods of Grassroots Communities

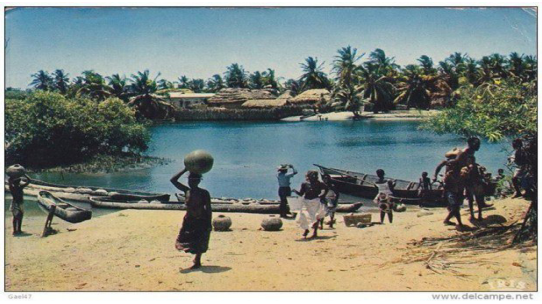
1.3.1. Degradation from Oil Exploration and Processing Activities

Environmental degradation has been defined by the United Nations International Strategy for Disaster Reduction (2004) as reduction or deterioration in quality and capacity of an environment to meet social and ecological objectives and needs as a result of depletion or alteration of elements of the natural environment, such as land, water, habitat, ecosystem and wild life. The Niger Delta region of Nigeria has been the hub of Nigeria's oil wealth and economic development for several decades, accounting for over 90% of the country's oil income (Hakeem, 2014). This followed from the discovery of fossil fuel (petroleum and gas) in Oloibiri (one of the region's grassroots communities) in 1956. Unfortunately, the exploration and processing of the fossil fuel commodities by Multinational Companies have brought about protracted environmental degradation with serious negative impacts on the people's livelihoods in the estuarine zone (occupied by grassroots communities) and beyond. Ite et al. (2013) have listed some of the oil exploration and processing-related activities that destroy the aquatic and land based livelihoods (fishing and farming in particular) to include oil spills, gas flaring, discharges of petroleum-derived chemical wastes. Ugochukwu & Ertel (2008) also included seismic vibrations from dynamite explosions (blasting) during oil exploration as a factor that brings about mortality of fish and other

aquatic organisms including crabs, shrimps and so on.

Beyond these adverse impacts, the once rich biodiversity of the Niger Delta has also been grossly degraded. As recorded by Afinotan & Ojakorotu (2009), before the emergence of commercial oil production, the Niger Delta Region was essentially a pristine environment supporting substantial subsistence resources for the most sedentary populations which included, among other things, medical herbs and barks, fish and shrimps, crabs and clams, wood for energy and shelter, as well as an arable soil for farming and habitat for exotic wild life (see plate 2 below). There was also the Delta elephant, the wild crested monkey, the river hippopotamus, as well as a colourful array of exotic birds, crocodiles, turtles and alligators. This rich pristine ecosystem has for decades now suffered constant deterioration from oil spills and other pollutants arising mainly from oil and gas exploration and processing activities. The devastating effect on the livelihoods of grassroots communities is reflected in plate 3 below.

Plate 2: A Niger Delta Village before Oil



Source: twitter.com

Plate 3: Bayelsa villagers loose livelihoods to oil spill in the Niger Delta

Source: vanguardngr.com

Furthermore, during floods, which last for over half of the year in some areas, the waters are usually contaminated. This also negatively affects marine life and makes the waters unable to sustain vegetation due to petroleum hydrocarbon pollutants (Chukuezi, 2006). In addition, drinking water is scarce and in the dry season, safe water for bathing is usually not available – a situation that aggravates the risk of water borne diseases. Plate 4 below is an example of several oil polluted water masses in the Niger Delta Region which are barred from use with public notices supported with compliance monitoring security posts.

Plate 4: Water pollution from oil spills in the Niger Delta

Source; DW

1.3.2. Degradation Associated with the Grassroots Communities

Apart from the adverse community impacts of oil exploration and processing discussed above, some environmentally–unfriendly activities of members of the Niger Delta grassroots communities also contribute immensely to various forms of pollution which have unsalutary impacts on the people and their livelihoods. Such anthropogenic sources of environmental degradation include:

i. Use of Chemicals and/or Dynamites in Fishing.

The effect of chemical fishing and oil spillage on aquatic life (destruction of fish) could be seen from plate 5 below. Plate 6 on the other hand, illustrates the effect of "blasting" or dynamite fishing to stun and harvest a pool of fish for easy collection. According to Lauridsen (2013), dynamite fishing destroys the coral reef habitat and kills all marine organisms within a 20 – meter radius of each blast. This practice by fisher folk in the grassroots communities obviously defies sustainability of aquatic livelihood in the Niger Delta as it would elsewhere.

Plate 5: Dead fishes due to chemical fishing and spillage Delta

Source: The Guardian Nigeria.

Plate 6: Dynamite fishing in the Niger

Source: Alamy

ii. Degradation from vandalization of Oil Pipelines and 'Unethical' Refinement of Crude Oil by Community Members.

One of the major sources of oil spilling in Nigeria's Niger Delta Region occurs through vandalization of oil pipelines either as a result of civil disaffection with/protest against the political process or as a criminal activity to obtain crude oil for illegal bunkering (unauthorized sale of crude oil to ships) or unethical refinement (Nwilo & Badejo, 2005). Whatever is the underlying reason for vandalization of oil pipelines in the Niger Delta, the activity leads to making fishing and farming livelihoods unsustainable due to ensuing oil spills. Unethical/illegal refinement of crude oil also leads to unwholesome release of carbon black soot which is dangerous to human health. Plate 7 below shows the open illegal oil refining process and the devastation it elicits on the environment.

Plate 7: An unethical/illegal oil refinery in the Niger Delta

Source: premiumtimesng.com

iii. Dumping of Domestic and Non-Degradable Wastes into Artisanal Sources of Water and the River Niger Estuaries**.**

This practice by Grassroots communities in the Niger Delta is also known to degrade the aquatic habitat and thus promote unsustainability of aquatic livelihoods (fishing, collection of crabs, periwinkles, clams and so on). Plate 3 above also illustrates the adverse environmental effects of dumping the said categories of waste in the artisanal water and the estuaries of the River Niger.

1.4. Efforts at Addressing Environmental Degradation and its Impacts on Nigeria's Niger Delta Grassroots Communities

1.4.1. Efforts by Government (Federal and State) and the Oil Companies

Although, as indicated earlier in this paper, oil exploration and processing in the Niger Delta Region could be traced back to the mid-1950s, nevertheless, it was until the 1990s that Nigeria's governments (federal and state) and the oil firms gave special attention to Corporate Social Responsibility (CSR) initiatives (such as assistance in the task of socio-economic empowerment and fostering of environmental sustainability) in the Region (Amadi & Abdullah, 2012). Even at this, the initiatives were sequel to resentment from the oil producing/host communities, culminating in protracted armed insurgency by some Niger Delta youth groups who demand appropriate resource allocation, empowerment and alternative means of livelihood from government and the operating oil and gas companies that exploited their Wetlands and ultimately transformed them to Wastelands (Zabbey, 2009).

At one time or another, the Federal Government responded by establishing agencies with poverty alleviation responsibility for the Niger Delta, including the Niger Delta Development Board (NDDB), the Niger Delta Basin

Development Authority (NDBDA), the Oil Mineral Producing Areas Development Commission (OMPADEC) and the Niger Delta Development Commission (NDDC). The NDDC is currently (2022) the only one agency existing, while the others are defunct. So far, these government agencies have not effectively accomplished their mandate. Accordingly, the oil and gas Multinational Companies operating in the Niger Delta have been constrained to step in to assist. Regrettably, the emphasis has tended to be on the companies being charitable and 'giving back' to the society through affirmative, philanthropic acts aimed at installing enduring acceptability and legitimacy of businesses and the impacts of their operations (Simon et al., 1972). The situation has been summarized by Musa et al. (2013, p. 109) as follows:

> The CSR efforts are either sectorial and ad hoc or thematic (multi-sectorial, systematic and strategic) in nature and focused on quintessential matters of social and economic empowerment, human capital development, healthy living and provision of basic utilities. Project selection design and implementation are pursued either in a top-down (determined by businesses) or bottom-up (community chosen and driven) fashion. Even today, most of the CSR initiatives of the transnational energy firms in the Niger Delta are underlined by this philosophy of social and economic improvements. Little attention has been paid to preserving the environment and to negative injunction duties (i.e., correcting for the negative social and environmental costs and consequences of oil and gas production in the region).

1.4.2. Involvement of the Grassroots Communities

The fact of the matter of CSR in the Niger Delta is that majority of the affected community people at the grassroots do not understand the above situation and cannot take part in the arguments. They are not even aware of their roles in preserving their environment and livelihood as well as what to ask for from the oil companies whose activities are degrading their environment and impoverishing them. As reported by the UNDP (2006, p. 9), even the few 'bottom-up' (community chosen and driven) projects are selections and preferences of the elite members of the Community Development Committees (CDCs); hence "they have made little impact on the lives of the grassroots people". This situation is understandable in the light of the above demographic facts about the Niger Delta grassroots communities (including low education/literacy levels) which tend to suggest a lacuna in the capacity of the communities to initiate or even demand their participation in processes that would empower them to uphold their basic social, economic and environmental rights. Obviously, the communities require some programmes of education that would empower them through remedying their ignorance and building their capacity to uphold their rights by enhancing their knowledge, skills, confidence, participation and inclusiveness in matters concerning their environment and livelihood assets.

In effect, there is a need to empower the community members (including their leaders) with appropriate knowledge and skills that would equip them with capacity for participatory, inclusive and people centered development of their communities and sustenance of their livelihoods. The education programme would enable the community members, as individuals and cooperating groups, to ultimately realize their potential to understand their environment, what processes are needed for its development, their rights and responsibilities (as partners) in the processes and what to expect from government and the oil companies to drive the processes. In essence, the education programme should make both male and female grassroots community members become self-confident to challenge the imposition of projects they consider unsustainable or incapable of solving their problems of degraded environment, unemployment, poverty, depression and lack of opportunities to live lives of dignity and fulfilment through their sustained livelihoods. It is being proposed here that Environmental Literacy Education (ELE) would help the grassroots communities to achieve the needed empowerment and sustained livelihoods.

2. Purpose of the Paper

The purpose of this paper is to expound the capability of Environmental Literacy Education (ELE) to enable/mobilize the Grassroots Communities in Nigeria's Niger Delta Region to engage positively in activities that would help them sustain their aquatic and terrestrial livelihoods.

3. Competencies Derivable from Environmental Literacy Education (ElE) to Enable Grassroots Communities In the Niger Delta to Sustain their Livelihoods

3,1. The Notion and Content of Environmental Literacy (EL)

The term Environmental Literacy (EL) has been explained by the North American Association for

Environmental Education (NAAEE, 2011) as a reference to an awareness of and concern about the environment and its associated problems, as well as the knowledge, skills and motivations to work towards solution of current problems and the prevention of new ones. Roth (1992, p. 16) succinctly described the content of EL as consisting of:

> … a set of understandings, skills, attitude and habits of mind that empowers individuals to relate to their environment in a positive fashion and to take day-to-day and long term actions to maintain or restore sustainable relationship with other people and the biosphere … The essence of EL is the way we respond to the questions we learn to ask about our world and our relationship with it; the ways we seek and find answers to those questions; and the ways we use the answers we have found.

Roth further encapsulated the above content in three levels of EL as follows:

i. Environmental Literacy Level One (ELL_1)
ii. Environmental Literacy Level Two (ELL_2)
iii. Environmental Literacy Level Three (ELL_3)

These levels he called *nominal, functional,* and *operational* respectively, showing an ascending expansion from basic understanding through a broader knowledge and interaction to a higher level of understandings and skills in dealing with the environment and its problems.

3.2. Competencies Offered by Environmental Literacy (EL)

The competencies derivable from EL could be seen from the attributes of an environmentally literate person. Further to its definition of EL cited above, the North American Association for Environmental Education has defined an environmentally literate person as "someone who, both individually and together with others, makes informed decisions concerning the environment, is willing to act on these decisions to improve the wellbeing of other individuals, societies, and the global environment; and participates in civil life" (NAAEE, 2011, pp. 2-3). The Association further adds that those who are environmentally literate possess, to varying degrees, four attributes; namely:

i. knowledge and understanding of a wide range of environmental concepts, problems, and issues;
ii. a set of cognitive and affective dispositions;
iii. a set of cognitive skills and abilities; and
iv. appropriate behavioural strategies to apply the acquired knowledge and understanding in order to make sound and effective decisions in a range of environmental contexts.

Accordingly, NAAEE has identified four interrelated components of EL acquisition as Competencies (abilities), Knowledge, Dispositions and Environmentally Responsible Behaviour. The Association has also identified "contexts" (from local to global) within which these components of EL acquisition are manifested (NAAEE, 2011, p. 6).

3.3. Process and Outcomes of Environmental Literacy Education

Environmental Literacy Education (ELE) could be defined as the process of disseminating the components and competencies of EL outlined above in order to develop in beneficiaries environmental responsible behaviour expected of environmentally literate persons which (Hungerford et al., 1994) have identified as including:

i. Belief in their ability, both individually and collectively, to influence decisions on environmental problems and issues (such as tackling pollution of aquatic and terrestrial environments in the Niger Delta occasioned by oil spills);
ii. Assumption of responsibility for curbing personal environmental degrading activities (like bunkering and illegal/unethical refining of crude oil in the Niger Delta) to avert environmental disasters that make livelihoods unsustainable;
iii. Personal and/or Group involvement (inclusiveness) in Environmentally Responsible Behaviours (such as avoidance indiscriminate waste disposal in artisanal water and the use of dynamites and/or chemicals in fishing in the Niger Delta);
iv. Persuasion – e.g. using informal discussion methods to encourage one another to support a positive environmental position (such as participation in government or oil company plans towards improvement of the socio-economic and environmental protection or reclamation project in the Niger Delta Grassroots Communities);
v. Political action – e.g. writing letters or speaking directly to elected officials on environmental issues; or supporting a candidate perceived to be capable of addressing an environmental issue (such as factors that limit sustainability of livelihoods in the Niger Delta);

vi. Legal action; for instance, reporting violations of pollution/littering, fishing, or hunting laws to the authorities; working with authorities to patrol areas for enforcing environmental laws; providing information or testimony at a legal hearing or participating in a lawsuit against a person/group/company that violated a law aimed at protecting the environment and livelihoods.

From the above analysis of the process and outcomes of Environmental Literacy Education (ELE), it stands clear that the development of environmental literacy is a multi-focal process. Succinctly put, the process begins with basic environmental knowledge inculcation and acquisition. This basic knowledge component is based on the idea that before an individual can act on an environmental problem, that individual must first understand the problem (Pooley & O'Connor, 2000). The next step is training of the individual towards the application of their acquired knowledge to investigate and evaluate environmental issues and apply appropriate solutions. Finally, the individual must be equipped to be able to choose which course of action is best in a given situation. The said multi-focal process is applicable, if appropriately designed, at every level of education, including basic formal and non-formal as well as higher education. This presupposes that ELE could take place through every form of education, formal, non-formal and informal. In all, considerable attention must be paid to stressing the importance of viewing the environment within the context of human influences and environmental literacy as a vital goal for society (UNCED, 1992; United Nations, 2002).

All in all, ELE has inherent capacity to motivate its beneficiaries into ***social action*** which, in the light of the above analysis of the environmentally responsible behaviour of expected of environmentally literate persons involves, among other things, people volunteering to come together to tackle an issue(s) for such common good as sustenance of their livelihoods (The New Economic Foundation, 2015).

4. Environmental Literacy Education (ELE) Programme for Grassroots Communities in Nigeria's Niger Delta Region

From the above discourse on the content, process and expected outcomes of ELE and the demographic profile of the Niger Delta grassroots communities, it is obvious that employment of ELE for the communities to engage in activities (including social action) that would help them to sustain their livelihoods would involve three main target groups; namely, (i) pupils and students in formal education institutions; (ii) the less educated grassroots populations and (iii) leaders of the communities (including the more educated CDC chairmen and members who are in direct contact with the oil and gas companies, the government and development agencies, and who, ostensibly, act in representation of the grassroots populations). Accordingly, ELE would have to adopt Formal, Non-formal and Informal modes for appropriate content dissemination to accommodate the various educational qualifications/exposures of the target groups as follows:

4.1. The Formal Mode

This would involve appropriate inclusions in the syllabuses of basic literacy, primary, secondary and tertiary education institutions within the Niger Delta of what Roth (1992) referred to as the *nominal, functional* and *operational* contents of EL (already highlighted in this paper). The formal mode will ensure that children of the grassroots communities in mobile and regular primary schools (for migrant fisher folk and farmers children respectively) as well as adolescents/adults at the basic literacy, secondary and tertiary levels of education will have the opportunity to acquire necessary knowledge to understand their environment and the skills to address its problems both as individuals and as groups along the lines suggested by Hungerford et al. (1994) outlined above. The oil and gas companies and the government (through the NDDC) should fund the engagement of ELE specialists to implement the content of this mode as well as provide the necessary Information and Communication Technology (ICT) apparatuses that would be involved in the teaching/learning processes for both the regular and mobile schools.

4,2. The Non-Formal Mode:

The non-formal mode of ELE is an alternative to the school or institutionally based formal mode. Accordingly, it is not systematized or hierarchically arranged like in a school curriculum, but would address individual, group, communal and corporate needs for awareness of environmental issues and challenges and the commitment and responsibility of all Stakeholders to address them. The programme would be implemented virtually *in situ* or centrally, as many of the grassroots people involved may not be able to leave their places of domicile. Accordingly, fish market centres, fishing ports, school halls, basic literacy centres, industrial locations, and so on would serve as veritable centres for Non-Formal ELE. The content of the programme would be tailored to achieve inculcation of the necessary skills and behavioural changes already outlined in this paper and would aim at meeting the hitherto unaddressed environmental degradation issues affecting the livelihoods of the grassroots communities by promoting individual and group participation, inclusiveness, self-confidence, and synergy with the CDCs in the designing and implementation of livelihoods sustainable projects. Furthermore, the programme content would also be geared towards enhancing the beneficiaries' economic engagements as well as their

partnership with the oil and gas companies, government and development agencies for effective remediation of environmental pollution affecting the livelihoods of the grassroots communities and prevention of further occurrences.

The Non-formal ELE would take the forms of awareness creation seminars, conferences, workshops and short training programmes to be designed and organized by commissioned environmental literacy education and community development experts/professionals from higher education institutions to be jointly funded by the government, development agencies (example the NDDC) and the operating oil and gas corporations.

4.3. The Informal Mode of ELE

In Informal education, generally, learning takes place spontaneously, unintentionally and/or accidentally. It is education that occurs outside an institutionalized or school setting and which is usually informative. It could take place anywhere and anytime. However, differences exist in delivery methods and materials between one mode of informal education and another, based on the objectives to be achieved and the nature of the exposure of the target beneficiaries (Eheazu, 2016). In the context of the topic of this paper, the informal environmental literacy education being discussed is the type that would focus on the yet unaddressed livelihoods sustenance needs of members of grassroots communities in Nigeria's Niger Delta Region. The ultimate aim would be "to transform the communities from powerless unassisted victims to powerful development partners and thus to change the dynamics of power between themselves and government and oil companies" (SDN, 2018, p.4). The radio, the television, bill boards and mobile megaphones (where practicable) are among the channels to impact learning via the Informal mode of ELE. Well designed radio jingles and talks, television dramas, large attractive posters at strategic areas, as well as information passed through mobile mega phones and loudspeakers could provide requisite ELE to the communities' members at work or at home on the need for them to become active in matters concerning the preservation and rehabilitation of their environment and sustenance of their livelihoods. Here again, the services of environmental literacy and community development educators as well professional artists would be required to design and implement the Informal ELE programmes. The government, oil and gas companies and development agencies should fund the programmes. Additionally, the oil and gas companies should also install gas turbines to provide electricity in the grassroots communities to facilitate the success of the radio and television programmes suggested in this mode of learning.

5. Conclusion

Nigeria's Niger Delta Region is endowed with oil and gas (fossil fuel) deposits which provide Nigeria with her greatest source of national income. Regrettably, the exploration and processing activities of Multi-National oil and gas companies and their stakeholders have brought about serious degradation of the environment with negative consequences on the livelihoods of grassroots communities in the Region. Arrangements to reduce the resultant sufferings and poverty of these communities by government through establishment of some development agencies over time did not make the expected impact. This is partly because even the few 'bottom-up' (community selected and operated) projects designed ostensibly to improve the lots of the grassroots communities were the choices/preferences of the middle-class members of the Community Development Committees (CDCs). There has been minimal or even no consultation with the grassroots community members who, on the other hand, could not challenge their exclusion from the designing of projects due to ignorance and lack of the requisite knowledge and awareness of their rights and privileges as affected people (as highlighted earlier in this paper with reference to the biographical profile of the communities). The situation craves for provision of an appropriate education programme that would enable the grassroots community members, as individuals and cooperating groups, to understand their environment, their rights and responsibility to be part of the processes and proposals towards remedying various degradations that have adversely affected their livelihoods. Such education programme would also equip the grassroots population with the necessary skills, knowledge and capacity to engage in the social action of operating together or in groups to tackle the situations bedeviling their livelihoods. The author of this paper sees Environmental Literacy Education (ELE) as possessing the potential to achieve the said goals. After a pragmatic elucidation of the content, process, desirable competences and expected outcomes of ELE with particular reference to development in the target beneficiaries of the environmental behaviour that would imbue them with confidence to seek answers to their livelihood problems, this paper hereby pertinently concludes that ELE indeed serves as enablement for grassroots communities in Nigeria's Niger Delta Region to sustain their livelihoods. The paper has also gone further to highlight and discuss modalities for achieving ELE among the various segments of the Niger Delta grassroots population.

6. Recommendation

The detailed discussions above on the topic of this paper and the conclusion arrived at, make it irresistible to recommend that:

i. Environmental Literacy Education (ELE) should be adopted to equip and motivate grassroots communities in Nigeria's Niger Delta region towards desirable activities to sustain their aquatic and terrestrial-based livelihoods.
ii. Experts in ELE, Community Development, Curriculum Design and other related professions should be invited to take part in the planning and implementation of the different modes of the ELE programmes appropriate for the various segments of the grassroots community members.
iii. Sources of funding the ELE programmes should include Government and its relevant agencies (eg. the NDDC), the oil and gas companies operating in the communities (as part of their CSR), as well as donor agencies like the UNDP and 'Friends of the Earth'.

References

Afinotan, L.A. & Ojakorotu, V. (2009). The Niger Delta Crisis: Issues, Challenges and Prospects: *African Journal of Political Science and International Relations,* 3(5): 191-198.

Amadi, B.O., and Abdullah, H. (2012). Poverty Alleviation through Corporate Social Responsibility in Niger Delta, Nigeria, *Asian Social Science Journal;* 8(4): 57-67.

Chukuezi, C. (2006). Oil Exploration and Human Security in Nigeria: A Challenge to Sustainable Development. *Journal of Sustainable Development in Africa;* 8(3), p. 161-171.

Eheazu, B.A (2016). *Situational Challenges of Environmental Degradation in Nigeria: Adult Education as a Response* (University of Port Harcourt Valedictory Lecture; No. 6); Choba, Port Harcourt: University of Port Harcourt Press.

Hakeem, I. (2014). Challenges of Corporate Social Responsibility in the Niger Delta Region of Nigeria, *Afe Babalola University Journal of Sustainable Development, Law and Policy*; 3(1) 60-71.

Hungerford, H.R., Volk, T., Wilkie, R., Champeau, T., Marcinkowski, T., Bluhm, W., May, T. and Mckeown-Ice(1994).*EnvironmentalLiteracyFramework;*https://www.tandfonline.com/ doi/abs/10.1080/00958964.1990.10753743.

Ite, A.E., Ibok, U.J., Ite, M.U. & Petters, S.W. (2013). Petroleum Exploration and Production: Past and Present Environmental Issues in the Nigeria's Niger Delta. *American Journal of Environmental Protection,* 1(4): 78-90.

Lauridsen, M. (2013). Dynamite Fishing: A Lethal Threat to Tourists and Marine Life. *Marine Pollution Bulletin,* 66(2):2-3.

Musa, A., Yusuf, Y.Y., McArdle, L. & Banjoko, G. (2013). Corporate Social Responsibility in Nigeria's Oil and gas industry: The Perspective of the Industry, *International Journal of Process Management and Benchmarking;* 3(2): 101 – 135.

NAAEE (North American Association for Environmental Education) (2011). *Excellence in Environmental Education: Guidelines for Learning;* Rock Spring GA: NAAEE.

Nwilo, P.C. & Badejo, O.T. (2005). Oil Spill Problems and Management in the Niger Delta. *International Oil Spill Conference Proceedings*; 567-570. https://DOI:10-790/2169-3358-2005-1-567.

Oko, A.E.N. & Agbonifoh, B.A. (2014). Corporate Social Responsibility in Nigeria: A Study of the Petroleum Industry and the Niger Delta Area, *International Review of Social Sciences and Humanities;* 6(2):214-238.

Osuntokun, A. (2000). *Environmental Problems of the Niger Delta;* Lagos: Friedrich Elbert Foundation.

Pooley, J.A. & O'Oconnor, M. (2000). Environmental Education and Attitudes; *Environmental Behaviour;* 32(5):55-61.

Roth, C.E. (1992). *Environmental Literacy: Its roots, evolution and direction in the 1990s;* Columbus Ohio, USA: ERIC Clearing House for Science, Mathematics and Environmental Education.

SDN (2020). The Niger Delta (Map). https://www.stakeholderdemocracy.org/the-niger-delta/.

SDN (Stakeholder Democracy Network) (2018). *Community Empowerment Model (CEM)*; https// www. stakeholderdemocracy.org/.../CEM on 10th May, 2018.

Shuaibu, V.O. & Weli, V. (2017). Relationship between PM 2.5 and Climate Variability in Niger Delta, Nigeria. *American Journal of Environmental Protection,* 5(1): 20-24. DOI: 10.12691/env-5-1-4.

Simon, G.J., Powers, W.C. & Gunnemann, P.T. (1972). The responsibilities of corporations and their owners, in Beauchamp, T.L. and Bowie, N.E. (eds.), *Ethical Theory and Business;* Englewood Cliffs, NJ: Prentice Hall.

The New Economics Foundation (2015). What is Social Action? https://www.neweconomics.org.

Ugochukwu, C.N. & Ertel, J. (2008). Negative Impacts of Oil Exploration on Biodiversity Management in the Niger Delta Area of Nigeria. *Impact Assessment and Project Appraisal,* 26(2), 139-147.

UNCED (United Nations Conference on Education and Development) (1992). *Agenda 21: Programme of Action for Sustainable Development (Rio Declaration on Environment and Development);* New York: United Nations.

UNDP (United Nations Development Programme) (2006). *Niger Delta Human Development Report:* Abuja: UNDP Office.

United Nations (2002). *Report of the World Summit on Sustainable Development,* (Johannesburg, South Africa,

26 August – 4 September), New York: United Nations.
United Nations International Strategy for Disaster Reduction (2004). Environmental Degradation; https://en.wikipedia.org/wiki/environmental degradation.
Zabbey, N. (2009). Pollution and Poverty in the Niger Delta Region-what is the Responsibility of oil companies in Nigeria; www.cehrd.org.