# ENVIRONMENTAL ADULT EDUCATION PROGRAMMES FOR ADDRESSING DEPLETION OF AQUATIC RESOURCES IN BAYELSA STATE OF NIGERIA

**Godwin A. NWOGU[1], Korinaki A. TOMMY[2], Abiodun A. FADIYA[3]**
*Department of Adult Education, Federal University, Oye-Ekiti, Nigeria[1,3]*
*Department of Adult Education & Community Development,*
*Ignatius Ajuru University of Education, Nigeria[2]*
*Tel.: +23408035483585*
*Corresponding Author: Godwin A. Nwogu*
*Corresponding Email: godwin.nwogu@fuoye.edu.ng*
*https://orcid.org/0000-0002-3858-8183*

**Abstract**
*The study examined environmental adult education programmes for addressing depletion of aquatic resources in Bayelsa State of Nigeria. Four research questions guided the study. The study adopted a descriptive survey design. Population of the study was 1,441 members of Community Based Organisations (CBOs). Random sampling technique was used to select six Community Based Organisations from each of the three senatorial districts of Bayelsa State. Thereafter, proportionate sampling technique was employed to select the sample size of 432 respondents, representing 30% of the total population. Validated instrument with reliability index of 0.7 tagged: Environmental Adult Education Programmes and Depletion of Aquatic Resources Questionnaire (EAEPDARQ) was used for data collection. Data collected was analysed using mean and standard deviation. Results show that members of community based organisations believed to a high extent that environmental literacy education, civic adult education, and waste management education are environmental adult education programmes that can be used to address depletion of aquatic resources in Bayelsa State of Nigeria. Therefore, the study recommended that environmental adult education programmes should be properly planned and implemented to sensitise the public on carrying out sustainable activities in their environment. Also, that Governments and fishing industries can implement measures such as fishing quotas, size limits, and gear restrictions to reduce overfishing.*

**Keywords:** Aquatic resources, Civic adult education, Depletion, Environmental literacy education, Waste management education.

## Introduction

Environment and its resources sustainability, is of utmost concern and a trending area of discourse in local, national and international conferences held in many countries of the world in the past years. The Nigerian environment is faced with a lot of environmental challenges ranging from deforestation,

erosion, flooding, desertification, climate change, depletion of natural resources as well as extinction of plants and animal species. Naturally, people derive their livelihood from the natural resources that surrounds them hence, natural resources are prerequisite for a sustainable living. In Bayelsa State, most people particularly those who reside in rural communities, depend mainly on their natural environment (soil, water and forest resources) as means of livelihood.

The aquatic environment is significant to humans and other organisms, and contributes to economic growth and development (Efere, 2019). Aquatic resources are fundamental to the livelihood of man and they are vital component for the well-being of all living organisms. They are beneficial to human, for consumption, recreational and cultural purposes. Bayelsa State is surrounded by numerous rivers, lakes, creeks, ponds and swamps which are endowed with different kinds of aquatic animal such as fishes, prawns, crayfish, water snails, crabs, periwinkles and so on, and plant species. The aquatic environments have been greatly disturbed by human activities for millennia, increasingly resulting in the deterioration of the aquatic ecosystem and, ultimately the destruction of aquatic lives. These unsustainable practices, add pressure on the environment and its resources thereby causing species to disappear at an alarming rate (Udoh, 2018). Depletion of natural resources is one major challenge faced by the Nigeria society in the past years. As a result, former president Umaru Musa Yar'dua of the Federal Republic of Nigeria in 2007, inaugurated the National Environmental Standards and Regulations Enforcement Agency (NESREA), a sub-division of the Federal Ministry of Environment, to be responsible for making, regulating and enforcing laws and policies that protects the environment and its resources. Hearing this development, the government of Bayelsa State keyed into this initiative by creating the Efi Lake with the aim of conserving aquatic lives for sustainability and continuity. However, depletion of the aquatic environment and its resources is still persistent due to the failure of the government in carrying out its responsibility of protecting the aquatic environment and its inhabitants.

Degradation of the environment can be attributed to human efforts to secure improved standard of living in terms of food, shelter and other needs for the growing population. By implication, the magnitude of threat to aquatic lives can be linked to human population size. Nigeria is reported to be one the countries with the top most number of people in the world and, has the largest number of persons in Africa (Tommy, 2018). As people who make seafood part of their daily diet are increasing in number, quite a large amount of fishes and other sea animals are caught daily to meet the increasing demand for them. As a result, the aquatic environment constantly face the peril of depleting supply of edible aquatic animals and plant species.

Consequently, destructive fishing practiced by small-scale fishers is one of the prevalent causes of depletion of aquatic resources in Bayelsa State. In the past, fishing activities were carried out in more sustainable ways mainly with the use of canoe, nets and hooks. The introduction of dynamites and other explosives for fishing portends grave danger to not just the aquatic environment but also to the health of people that consume fishes caught from blast. According to Environews Nigeria (2019), fishing with dynamite or blasting is one of the most destructive forms of fishing in that the explosives used, utterly destroys all forms of life found within the area of the blast from fish

eggs and fries to plankton and other species in the water. This method of fishing is pervasive and termed as an illegal act and is therefore banned in most countries. Not only do the dynamites kill all marine life around them, repeated blasting shatter the dead sub-structure of the coral and create dead zones that destroy biodiversity and ecosystems by removing the main life support system for many species.

Fish and other aquatic species are known to be infinite resources in our rivers, nonetheless, there has been a high level of fishing more than these fishes can reproduce or replenish which can be attributed to overfishing. Overfishing makes it impossible for productive fishes to breed and produce young ones as they are being caught in their numbers on daily basis. Furthermore, excessive fishing can have negative effect on the aquatic environment. Kulin (2019) rightly put, overfishing can wreak havoc and destroy the environment and marine ecology and completely disrupt the aquatic food chain. Aquatic animals rely on their environment for food and breeding grounds. For example, plant species in water are relevant for producing nutrients and sometimes act as breeding grounds for fishes and other aquatic lives. If these plants they depend on for survival are destroyed by any means, the lives of these animals are endangered as well. The application of fertilizers especially inorganic or chemical fertilizers to enhance the soil for the production of crops has in most cases, causes damage to the environment. It has led to leeching and run-off of nutrients from the farm land and as well, evaporated as greenhouse gases which has amounted to grave and long term damage to the environment and its resources. According to Rajiv, Dalsukh, Krunal, Brijal and Sunita (2012), chemical fertilizers came as a blessing and at the same time a plague. As a blessing, it has increased the productivity of food and as a plague, it has reduced the nutritional quality and also destroyed the physical, chemical and biological properties of the soil.

Agricultural contaminants can reach rivers, lakes and streams either by groundwater, runoff from farmlands or through drainage ditches hence contaminating the aquatic environment and endangering aquatic lives (Galadima, Garba, Leke, Almustapha, & Adam, 2011). For instance, Dichloro Diphenyl Trichlorothane (DDT) is a synthetic organic compound that was widely used as an insecticide but was later banned in many countries including Nigeria because it was highly concentrated and not suitable for use. Fishes and other aquatic animals may ingest or absorb the chemical which is toxic and may end up killing them and also cause harm to people who eat fishes contaminated by these chemicals. Other times, these chemicals increase aerobic algae and reduces oxygen from the water column which leads to death of fish and many other aquatic organisms. This issue is as a result of over application and continuous application of fertilizers in plants and the soil (Holmyard, 2019).

Pollution is another significant issue that causes depletion of aquatic resources in Bayelsa State. Pollution comes from various sources like sewage disposal, run-off from farm but the most prominent is oil spillage. That has caused a tremendous change in the environment from the time when crude oil was discovered in Oloibiri of Bayelsa State, Nigeria in the year 1959. Exploitation and exploration of crude oil by multinational companies have left most of the rivers and creeks polluted by oil spillage. From 2016 to 2018, the state recorded about a number of oil spill incidence

in Aghoro, Abgura Kalaba, Otuokpoti, and Emirigi communities respectively. Community members particularly those engaged in fishing activities were embittered and lamented over the poor situation of their rivers and death of aquatic lives. Aquatic resources play a vital role in achieving a more prosperous and secure world, contributing to some areas of the Sustainable Development Goals (SDGs) (Nyataya, 2019). Some of which are zero hunger, good health and well-being, economic growth etc. Aquatic animals promote good health and well-being through improved nutrition as they constitute about 30% of animal protein contributing to food security. Millions of people rely on aquatic resources for livelihood especially those living in the riverine areas. Unsustainable fishing practices and overfishing over the last few decades have pushed our rivers to the limit and they may now be on the verge of collapse, increasingly impairing the capacity of our water bodies to provide food thereby, affecting the everyday way of life and source of income of those who depend on them. It is essential and needful that more emphasis is placed on changing the attitudes, values, perceptions, habits and inclinations of human beings through environmental adult education programmes which will inculcate sustained culture of environmental ethics and disciplines capable of begetting environmental friendliness amongst the people. The success or failure of an entity lies greatly on the perception and attitude of the individuals involved. The level to which environmental issues can be successfully curbed is based on the way people see and relate with their environment. Since environmental problems are human problems, they require a change of attitude and complete transformation in the way people behave and the way they use the earth's resources. Therefore, environmental education a precondition for promotion of environmental quality.

Ezechinnah (2019) is of the view that environmental education is a prerequisite for improved public awareness on environmental issues, engender eco-friendly behaviour between human and their environment and as well as develop managerial skills and strategies geared towards the minimization of environmental damages. Efforts have being made by the Nigerian government to see that this menace is solved but to no avail. This is due to the fact that matters relating to environmental quality is squarely focused on environmental front which includes campaigns, rallies, conferences, and other related activities rather than focusing on attitudinal change human beings who are the ones responsible for creating most of these environmental problems. To bring about this attitudinal change, people need to have a modified perception of and positive behaviour towards the environment. Educational administrators and planners can no longer afford to remain aloof or shy away from their responsibilities in the face of global environmental problems, that threatens the earth, thereby putting the lives of millions of people in jeopardy. It becomes imperative to focus on the human front and the environmental front considering that education as a vital instrument of systematic change is fundamental if we are to successfully change people's attitude towards the environment. The lack of knowledge concerning environmental issues and problems amongst the adult population make people without considering the outcome of their actions on the environment (Ndulor & Mbalisi, 2019).

Therefore, environmental adult education arose out of the need to develop a citizenry that is capable of taking actions concerning dire environmental issues. Ezechinnah (2019) posits that it

involves the development of an ecological conscience, a responsible commitment, attitude, values and ethics, knowledge and skills important in solving environmental problems for the survival of the ecosystem. Kerstin and Franz (2018), supported this by stating that these attributes is as a result of the knowledge and understanding gained by the recipients of environmental adult education programmes of how the environment functions, the relationship between man and the environment, how environmental issues arises and how these problems can be solved. The greater part of our natural resources are particularly vulnerable on the grounds that they are affected by anthropogenic activities. Allaby and Park in Nyataya (2019) observed that studies concerning environmental protection have been focused on the contributions of government on environmental preservation through legislation. However, the role of preventing environmental degradation and depletion of its resources, should be seen as the responsibility of all and sundry. It is on this premise that this study was conducted to investigate the role of environmental adult education programmes in curtailing depletion of aquatic resources in Bayelsa State.

Environmental adult education programmes can be described as any planned learning activities directed towards the adult populace with the intent of inculcating in them relevant knowledge and skills required for solving environmental problems and preventing future occurrences (Deniz, 2016; Otamiri, 2021). These programmes are:

**Environmental Literacy Education Programme:** Environmental literacy as defined by Ndulor and Mbalisi (2019) is the competency in perceiving and interpreting the relative health of environmental structure, to take appropriate action to restore, improve and to maintain the health of the ecosystem. It is the knowledge and understanding acquired from a wide range of concepts, problems and issues, a body of cognitive and effective dispositions and the relevant behavioural strategies in applying such knowledge and understanding to make sound and reasonable decisions involving the environment. Although, the environment has already been altered and degraded, environmental literacy education is relevant for curbing environmental issues and to prevent future occurrences. Adults are the working force of any given society and they are seen as the major people who deplete the earth resources in order to meet their daily needs of food, shelter and clothing. As a matter of fact, most of these adults make use of the environment and its resources indiscriminately without minding the adverse effect it may lead to in future.

Most of the problems we encounter in this part of the world is as result of the low level of environmental literacy. The lack of knowledge concerning environmental issues and problems has made it that most people see the environment and its resources as what should be harnessed to satisfy their needs (Ezechinnah, 2019; Faize & Akhtar, 2020). Also, environmental literacy education inculcate in people the knowledge and understanding of the environment, the forces that contributes to its deterioration and how environmental quality will be improved. It is noteworthy that the decisions we take during our everyday endeavours affects the environment. Therefore, it is pertinent for the public to learn and understand how their actions and lifestyle intersect with the environment. It is also aimed at seeking to change human behaviour so as to create a sustainable and environmentally friendly quality of life.

Civic Adult Education Programme: Civic adult education is a programme for social and public responsibility which is designed to develop understanding and knowledge of public issues and problems facing any nation and its citizens domestically and internationally in political, economic and social area (Duru, Ikpeama & Ibekwe, 2019). Civic adult education within the framework of environmental education for the conservation and preservation of the aquatic environment and its resources, raises the level of commitment and sense of responsibility of people for active participation in actions geared towards conservation and preservation of aquatic lives. Programmes such as civic adult education designed for understanding the ecosystem and its related problems will go a long way in making an adult learner a better citizen who respects his or her living environment and the resources found in the environment.

Such programmes are organised to take care of the needs of the adults in terms of management of the environment especially in the aspect of pollution and destruction of the aquatic ecosystem and its habitants (David & Bodo, 2019). Civic education is an essential tool for raising peoples' consciousness of the fact that their health is connected to the quality of the environment and are therefore motivated to take actions that will ensure its protection and maintenance. Gimah and Bodo (2019) catergorised such actions as:

i. Persuasion: This involves convincing oneself and others on ways of using aquatic resources without damaging other components of the aquatic ecosystem. It also involves discouraging actions that dislodge the diversity of aquatic environment.
ii. Political action: It has to do with enacting legislative bills and policies that will ensure conservation, maintenance and protection of the aquatic environment and its resources.
iii. Legal action: This action involves the institution of law suit against defaulters of laws and policies that guides the conservation and protection of aquatic lives.
iv. Eco-management: it involves participating in activities that will ensure protection, conservation and maintenance of the aquatic resources.

**Waste Management Education Programme:** Economic development and people's pattern of consumption and production have led to a drastic increase in the generation of waste in the environment. Waste pollution is one of the most serious environmental problems affecting rivers, hence, endangering aquatic lives. To reduce the level of waste generation, educating the people is pertinent as it can ensure a change of attitude and behaviour towards waste management (Kulin, 2019; Rogayan & Elyonna, 2019). Raising awareness of how waste debris gets into waterways and how it negatively impact on aquatic environment will help people to understand the gravity of the problem and how they contribute directly or indirectly to the problem. According to Liao and Li (2019) and Debrah, Vidal and Dinis (2021), studies have shown that environmental attitudes of the people are formed roughly at tender age. That is the reason people should be taught how to manage waste through environmental education so as to avail them the opportunity to respect the environment and its resources. With this, the attitude of the people towards environmental issues will be on point since they are directly involved in providing knowledge-based solutions to emerging environmental

problems. Therefore, waste management education programme is aimed at developing in individuals, knowledge for proper disposal of waste which may be achieved through Reduce, Reuse and Recycle (3Rs), thereby ensuring decreased level of generation of plastic waste in the environment.

Bayelsa State is endowed with numerous crisscrossed rivers, streams, lakes, ponds and swamps which house abundant aquatic lives. Many people especially those living in the rural communities depend on these animals for food and income generation. However, due to the unsustainable practices carried out by human beings in the environment, the lives of these aquatic animals are endangered. Although, the Bayelsa State government through conservation and management of wildlife, an initiative of the federal government in 2007 created some protected areas in the state such as the Efi Lake, Edmund Reserve Area, amongst others with the aim of conserving the natural environment and their habitation for sustainability and continuity, depletion of aquatic lives in the area is still a persistent problem. Therefore, this called for the need to examine how environmental adult education programmes can be used to curb depletion of aquatic resources in Bayelsa State.

## Research Questions

The following research questions were guided the study:

1. What are the environmental adult education programmes used to curb depletion of aquatic resources in Bayelsa State?
2. To what extent can environmental literacy education programme be used to curb depletion of aquatic resources in Bayelsa State?
3. How can civic adult education programme be used to curb depletion of aquatic resources in Bayelsa State?
4. How can waste management education programme be used to curb depletion of aquatic resources in Bayelsa State?

## Methodology

*Research Design*

The study adopted descriptive survey design. The design was considered appropriate for this study because it involves the collection of data from a research sample that represents the entire population of the study which can be used for the generalization of the findings of the study.

*Population of the Study*

The population of the study was 1,441 members of Community Based Organisations (CBOs) in the area of study.

*Sampling Technique and Sample Size*

Six community based organisations were randomly selected from each of the three senatorial districts of Bayelsa State. However, proportionate sampling technique was employed to select the respondents who were members of the CBOs. The sample size of this study was 432 respondents representing 30% of the total population of the study.

*Research Instrument*

The instrument for data collection was a structured questionnaire titled: Environmental Adult Education Programmes and Depletion of Aquatic Resources Questionnaire (EAEPDARQ). The instrument was based on a four-point modified Likert rating scale. Experts in the area of educational evaluation validated the appropriateness of the items, sentence structure and content of the instrument before it was subjected to reliability test to obtain 0.7 index.

*Data Collection*

The administration of the questionnaire copies were done by six (6) trained research assistants employed from the study area. They were trained on the content of the questionnaire and how to administer the questionnaire to the respondents. They explained the reason for the study to the respondents in English Language and also in their native dialect so that those who do not understand English Language properly and, who could neither read nor write can understand. However, the administered, completed and retrieved 432 copies of questionnaire were subjected to analysis.

*Procedure for Data Analysis*

Analysis of the data collected was subjected to descriptive statistics such as mean and standard deviation.

**Results**

**Research Question 1:** What are the environmental adult education programmes that can be used to curb depletion of aquatic resources in Bayelsa State?

**Table 1: Analysis of the environmental adult education programmes that can be used to curb depletion of aquatic resources in Bayelsa State.**

| S/N | Items | CBOs (N=432) | | Decision |
|---|---|---|---|---|
| | | Mean | St. dev. | |
| **1** | Environmental literacy education is a programme in environmental adult education | 3.28 | 0.87 | Agree |
| **2** | Civic adult education programme is an environmental adult education programme | 2.80 | 0.79 | Agree |
| **3** | Waste management education programme is an environmental adult education programme | 3.54 | 0.88 | Agree |
| | **Grand mean** | **3.20** | | **Agree** |

Table 1 revealed the mean response of the environmental adult education programmes used to curb depletion of aquatic resources in Bayelsa State. Item 1 has mean score of 3.28 and standard

deviation of 0.87. Item 2 has mean score of 2.80 and standard deviation of 0.79. Item 3 has mean score of 3.54 and standard deviation of 0.88. With a grand mean of 3.20, the result indicates that environmental literacy education, civic adult education, and waste management education are environmental adult education programmes that can be used to curb depletion of aquatic resources in Bayelsa State.

**Research Question 2:** To what extent can environmental literacy education programme be used to curb depletion of aquatic resources in Bayelsa State?

**Table 2: Analysis of the extent environmental literacy education programme can be used to curb depletion of aquatic resources in Bayelsa State.**

| S/N | Items | CBOs (N=432) | | Decision |
|---|---|---|---|---|
| | | Mean | St. dev. | |
| **4** | I did not know that the environment is experiencing any form of degradation because I cannot read or write. | 3.35 | 0.99 | High Extent |
| **5** | If I participate in environmental literacy education programme, I would learn how to show care and concern for my environment. | 3.39 | 0.92 | High Extent |
| **6** | I could not live friendly with the environment because I have never participated in any literacy education programme. | 3.38 | 0.92 | High Extent |
| **7** | If I have the knowledge of environmental literacy, I will be able to identify things I do that leads to destruction of aquatic resources. | 3.34 | 0.90 | High Extent |
| **8** | I would have been able to sustain the environment if I had a knowledge of environmental literacy. | 3.21 | 1.11 | High Extent |
| | **Grand mean** | **3.33** | | **High Extent** |

Table 2 above shows the mean response of the extent to which environmental literacy education programme can be used as a strategy to curb depletion of aquatic resources in the study. Item 4 has mean score of 3.35 and standard deviation of 0.99. Item 5 has mean score of 3.39 and standard deviation of 0.92. Item 6 has mean score of 3.38 and standard deviation of 0.92. Item 7 has mean

score of 3.34 and standard deviation of 0.90. Item 8 has mean score of 3.21 and standard deviation of 1.11. With a grand mean of 3.33, the result indicates that members of community based organisations believed to a high extent that environmental literacy education programme can be used to curb depletion of aquatic resources in Bayelsa State.

**Research Question 3:** How can civic adult education programme be used to curb depletion of aquatic resources in Bayelsa State?

**Table 3: Analysis of how civic adult education programme can be used to curb depletion of aquatic resources in Bayelsa State**

| S/N | Items | CBOs (N=432) | | Decision |
|---|---|---|---|---|
| | | Mean | St. dev. | |
| **9** | Civic adult education does not motivate community members to speak against sustainable fishing methods. | 2.21 | 0.41 | Disagree |
| **10** | Knowledge of punishments on fisher folk who default the sustainable fishing methods is got through civic adult education. | 2.73 | 0.78 | Agree |
| **11** | Civic education programme will encourage community members to be more involved in actions against destructive fishing activities. | 2.89 | 0.43 | Agree |
| **12** | Knowledge on how to report defaulters to relevant authorities could be achieved through civic adult education. | 2.69 | 0.46 | Agree |
| **13** | Encourages participation in actions against water pollution from oil companies in my area. | 2.91 | 0.44 | Agree |
| | **Grand mean** | **2.68** | | Agree |

Table 3 above shows the mean response of how civic adult education programme can be used to curb depletion of aquatic resources in Bayelsa State. Item 9 has mean score of 2.21 and standard deviation of 0.41. Item 10 has mean score of 2.73 and standard deviation of 0.78. Item 11 has mean score of 2.89 and standard deviation of 0.43. Item 12 has mean score of 2.69 and standard deviation of 0.46. Item 13 has mean score of 2.91 and standard deviation of 0.44. With a grand

mean of 2.68, the result indicate that members of community based organisations agreed that civic adult education programme can be used to curb depletion of aquatic resources in Bayelsa State.

**Research question 4:** How can waste management education programme be used to curb depletion of aquatic resources in Bayelsa State?

**Table 4: Analysis on how waste management education programme can be used to curb depletion of aquatic resources in Bayelsa State.**

| S/N | Items | CBOs (N=432) | | Decision |
|---|---|---|---|---|
| | | Mean | St. dev. | |
| **14** | If I had acquired knowledge and skills through waste management education programmes I would have known the right way of disposing my waste. | 3.41 | 0.41 | Agree |
| **15** | I did not know that dumping nylon bags and plastic containers into the river will trap and kill aquatic animals since I have not participated any waste management education programme. | 3.29 | 0.47 | Agree |
| **16** | I would have been able to recycle and reuse plastic containers and nylon bags if i participate in waste management education programme. | 2.82 | 0.38 | Agree |
| **17** | Waste management education programme will help to reduce waste generation in the environment. | 3.22 | 0.37 | Agree |
| **18** | Waste management education programme will encourage people to participate in sanitation and clean -up exercises within their environment. | 3.17 | 0.42 | Agree |
| | **Grand mean** | **3.18** | | **Agree** |

Table 4 above shows the mean response of how waste management education programme can be used to curb depletion of aquatic resources in Bayelsa State. Item 14 has mean score of 3.41 and standard deviation of 0.41. Item 15 has mean score of 3.29 and standard deviation of 0.47. Item 16 has mean score of 2.82 and standard deviation of 0.38. Item 17 has mean score of 3.22 and standard deviation of 0.37. Item 18 has mean score of 3.17 and standard deviation of 0.42. With a

grand mean of 3.18, the result indicate that members of community based organisations agreed that waste management education programme can be used to curb depletion of aquatic resources in Bayelsa State.

**Discussion of Findings**

Finding indicates that members of community based organisations believed to a high extent that environmental literacy education programme can be used to curb depletion of aquatic resources in Bayelsa State. The findings in this study is in agreement with reports from Gimah and Bodo (2019), who confirmed that without environmental adult education and a strong plan to create terrestrial and marine protected areas, the environment will continue to suffer degradation. Hence, they further said environmental literacy education programme is key in creating environmental awareness and curbing depletion of aquatic life. In another related study, David and Bodo (2019), observed that human activities and pollution are among the biggest threats to global health, and they are capable of depleting the soil fertility, contaminate the air as well as destroy aquatic life. The findings of this study has further affirmed the existing position of studies on the importance of our environment and the role individual literacy can play in bringing about sustainable environment. However, Gimah and Bodo (2019), succinctly submits that this will depend on the knowledge of environmental education of the people and how they apply it. Similarly, the findings also relate to the discovery of Rannikko as cited in Chen and Tsai (2016) that environmental awareness played a key role in the birth of environmental movements and in the orientation of their activities. Thus, environmental literacy is required by every member of the society for the proper use of our natural resources without contaminating the environment.

Finding indicate, that members of community based organisations agreed that civic adult education programme can be used to curb depletion of aquatic resources in Bayelsa State. That is, civic adult education programme can be used as an instrument of motivation for advocacy for sustainable fishing practices, acquiring knowledge of punishments for defaulters, for campaign against destructive fishing, for knowledge on how to report defaulters to relevant authorities and encourages participation in actions against water pollution. The finding corroborate reports from Bodo and Bodo (2019), who submits that every country has its own legislation on the environment and that it is the civic responsibilities of citizens to ensure they abide by these laws. Ndulor and Mbalisi (2019), posits that it is only fair that those whose actions have contributed to the degradation of natural environment such as depletion of aquatic life, deforestation, gas flaring, and other forms of pollution to participate in actions to resolve and improve its quality through conservation practices, pollution prevention and reduction and protection of the ecosystem. As a civic obligation, learning about environmental issues and deciding how to take positive action, adults can become stewards of the environment, as well as leaders within their communities. These actions not only decrease the impact communities have on the environment, but also provide opportunities for individuals to apply their environmental learning in real-world contexts, preparing them to become active and engaged citizens (Norris & Oyasande, 2017). Consequently, it is the civic duty of every individual to safeguard the

environment. Hence, everyone has the responsibility to ensure they adhere to environmental laws that serve as effective instrument for environmental planning, protection, pollution, prevention and control.

Finding also revealed that waste management education programme can be used to curb depletion of aquatic resources in Bayelsa State. The finding revealed that this can be achieved through the acquisition of skills for proper waste disposal, awareness on the effect of waste like plastics and nylons materials on aquatic resources, promotion on the need to reuse plastic containers to reduce waste generation in the environment and encourages participation of community members in sanitation and clean-up exercises in their communities. The finding is in agreement with the study by Onyango (2017), which explained that with waste management education programme, the pollution of water sources and rivers (aquatic life) could be minimised. Abalo, et al. (2017) added that participation of community members is important to solving environmental problems, and communities can solve these problems through awareness creation and community sensitization programmes in order to minimize the contaminations of water sources and rivers (which sustain aquatic lives). They further submits that community participation was born out of the need of placing community members at the centre of the planning process with regard to environmental related problems. Supporting this finding, Saadoun (2015) explained that environmental pollution caused by pollutants from petroleum sources are toxic to all forms of life and harm both terrestrial and aquatic ecosystems. The researcher posited that it is with only proper knowledge of environment-related knowledge such as proper waste disposal methods that the continuous pollution of marine habitats can be reduced. From the forgoing, waste management education programme is essential for the continuous protection and sustenance of aquatic resources and life. This implies that environmental adult education in all ramification is key to preventing the depletion not just aquatic resources and life, but also other forms of environmental pollution and degradation.

## Conclusion

From the study findings, it is clear that Community Based Organisations (CBOs) members and leaders firmly believed that environmental literacy education, civic adult education as well as waste management education programmes can be used to curb depletion of aquatic resources in Bayelsa State. The study findings implies that it is only fair for individuals and communities who have continued to suffer from all the effects of loss of aquatic resources, to put their efforts collectively in solving these problems associated with depletion of aquatic resources. Thus, environmental adult education programmes has been described as a desirable tool for change and to create awareness in individuals and communities on the need for environmental knowledge and skills needed in helping to prevent loss of aquatic resources and the degradation of the environment in totality. Therefore, it is only by promoting the sustainability of biodiversity that aquatic resources can be conserved and preserved for the present and future generation.

**Recommendations**

From the findings and conclusion, the following recommendations are made:

1. Educating people about the importance of aquatic resources and the need for their conservation is essential. Governments, NGOs, and other organisations can raise awareness through campaigns, workshops, and other educational initiatives.
2. Community members should encourage the adoption of sustainable fishing practices, such as using fishing gear that minimises bycatch or using aquaculture methods that minimise environmental impact as this will help conserve aquatic resources.
3. Pollution, such as plastic waste and chemical pollutants, can have a detrimental impact on aquatic resources. Hence, reducing pollution through proper waste management, the use of sustainable products, and other measures can help preserve aquatic ecosystems.

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