

# EFFECT OF A PARTICIPATORY ENVIRONMENTAL EDUCATION PROGRAMME ON TRADERS' KNOWLEDGE, ATTITUDE AND PRACTICES TOWARD WATER POLLUTION IN RIVERINE AREAS OF ONDO STATE, NIGERIA

\*Samuel Olanrewaju OLADAPO<sup>1</sup>, Kehinde Olufemi. OGUNYEMI<sup>2</sup> & David Toyin ALADEJEBI<sup>3</sup>

<sup>1,2,3</sup>*Adekunle Ajasin University Akungba-Akoko*

\*Corresponding Author: [Samuel.oladapo@aaua.edu.ng](mailto:Samuel.oladapo@aaua.edu.ng)

## ARTICLE INFO

Article No.: 0350

Accepted Date: 11/05/2026

Published Date: 30/05/2026

Type: Research

## ABSTRACT

Environmental degradation in riverine communities of Ondo State has become a growing concern due to poor waste disposal practices, water pollution, and inadequate environmental awareness among traders operating within coastal markets. This study investigated the effect of a participatory environmental education programme on traders' environmental knowledge, attitudes, and practices in selected riverine areas of Ondo State, Nigeria. A quasi-experimental pretest-posttest control group design was adopted. The sample consisted of 240 traders selected through stratified random sampling from four riverine markets. Data were collected using the Environmental Knowledge Questionnaire (EKQ), Environmental Attitude Scale (EAS), and Environmental Practices Inventory (EPI). The instruments yielded reliability coefficients of 0.81, 0.84, and 0.79 respectively using Cronbach's alpha method. Participants in the experimental group were exposed to a 10-week participatory environmental education programme involving workshops, group discussions, demonstrations, and community sanitation activities, while the control group received no intervention. Data were analysed using descriptive statistics and Analysis of Covariance (ANCOVA) at 0.05 level of significance. Findings revealed a significant effect of the participatory environmental education programme on traders' environmental knowledge ( $F = 24.63, p < .05$ ), attitudes ( $F = 31.82, p < .05$ ), and environmental practices ( $F = 28.14, p < .05$ ). The study concluded that participatory environmental education significantly improved environmental literacy and responsible environmental behaviour among traders in riverine communities. It was recommended that environmental agencies and local governments adopt participatory environmental education strategies for sustainable environmental management in coastal communities.

**Keywords:** participatory environmental education, riverine communities, traders, environmental practices, Ondo State, environmental literacy



## Introduction

The topic of environmental sustainability has become one of the key issues in the twenty-first century. The rise of environmental degradation, pollution, climate change, biodiversity loss, and unsustainable human behavior has made environmental issues the priority of many international organizations, governments, and researchers. Countries experiencing environmental difficulties are developing nations, particularly in Sub-Saharan Africa. These countries have experienced environmental problems such as urbanization, population growth, inefficiency in handling waste, industrial pollution, and low levels of environmental consciousness. For example, environmental degradation can be seen in riverine communities in Nigeria whose livelihoods depend heavily on aquatic ecosystem and resources.

Riverine communities are highly vulnerable to environmental issues because they depend heavily on the river, creeks, wetlands, and coastal ecosystems. In many riverine areas in Nigeria, pollution that arises due to poor waste handling, oil exploration, flooding, soil erosion, and poor sanitation hinders the health, economic production, fishing, and water quality in these communities. Climate change has also been associated with flooding and increased environmental vulnerability in coastal communities. Recent empirical evidence suggests that there has been an increase in environmental vulnerabilities facing riverine communities in Nigeria, thus threatening their way of living and overall wellbeing (Oladapo, Ogunfunmilakin, and Kukur, 2019).

Ondo state is located in the Southwestern part of Nigeria. This region contains a number of riverine communities such as Ilaje and Ese-Odo. In this region, many people live near many water bodies. Moreover, many communities in this region depend on fisheries for income generation. Traders in this area have contributed a lot to the economy through fish trade, transportation, selling food, and other commercial activities. However, these commercial operations have led to the emergence of large amounts of environmental waste. Unfortunately, many traders are negligent about environmental protection since they dispose of the waste in rivers, drainage, and other environments. As a result, riverine communities in this area have been suffering from pollution, congestion of water bodies, flooding, and poor health conditions. Therefore, environmental education has emerged as the important tool for fostering environmental consciousness.

Environmental education is the practice of building knowledge, attitude, skills, values, and participation in order to address environmental problems and promote sustainable development. According to UNESCO, environmental education is the powerful tool to help communities comprehend environmental challenges and actively engage in conservation efforts. Environmental education fosters behavioral change through helping individuals understand the implications of their behaviors on the environment and acquire environmental management. Conventional approaches to environmental education in developing countries have mostly used top-down approaches which include lectures, announcements, awareness campaigns, among others, with little involvement from the community. While the aforementioned approach may help increase awareness, it fails to bring about any form of behavioral change since individuals within the communities do not participate in the process as active learners but rather become passive learners who simply receive information. For this reason, scholars and environmentalists have increasingly recommended approaches to environmental education that encourage active participation of community members in problem identification and solving. (Okorie and Itah (2020)

The participatory environmental education method is learner-centered and involves action. The participatory approach emphasizes collaborative learning, hands-on learning through experiences, dialogue, and community involvement. With participatory methods, learners are enabled to participate actively in the process of decision-making for the environment, engage in environmental sanitation initiatives, and many others that seek to

improve the environment. The participatory approach is crucial in ensuring that learners are motivated, responsible, and committed to the protection of the environment since they own the knowledge gained. Research reveals that the participatory environmental education approach achieves more success in terms of creating sustainable environmental behavior than the traditional method of teaching. Curama, 2006)

Studies done recently have also highlighted the significance of community participation in managing the environment especially in disadvantaged and marginalized communities. It was established by Bell-Gam and Soprinye (2024) that community participation results in improved environmental management processes since community members feel a sense of responsibility towards the protection of their immediate environment when engaged in environmental initiatives and decision-making processes. Likewise, Sam and Zibima (2024) noted that effective environmental decision-making enhances environmental management sustainability outcomes in environmentally vulnerable areas in Nigeria. In riverine communities, participatory environmental education becomes particularly important because environmental degradation directly affects social and economic survival. Flooding, water pollution, erosion, and improper waste disposal disrupt transportation systems, contaminate water sources, destroy goods, and reduce trading opportunities. Recent research on women traders in riverine areas of Nigeria revealed that environmental challenges associated with flooding and climate change have significantly affected the livelihoods and well-being of traders. The study further emphasized the need for participatory and community-driven adaptation strategies to strengthen resilience and environmental sustainability within riverine communities.

Additionally, sustainable environmental management cannot be achieved in riverine environments simply by way of regulations or environmental laws issued by the government. Effective sustainable environmental management requires a sustained working relationship between government authorities, community members, traders, market authorities, environmental organizations, and local leaders. The use of participatory environmental education creates an environment where such collaboration can take place as it incorporates the local know-how and experience of community members in their interactions with the environment. In this way, traders and community members are enabled to realize environmental challenges, develop solutions to these problems, and sustain environmentally friendly practices in their communities. (Ajitoni and Oladapo, 2014)

Although there is increasing interest in the concept of participatory environmental education in many parts of the world, there is little empirical research work that focuses specifically on traders from riverine areas in Ondo State. Most of the research works that have been carried out in Nigeria tend to involve students, rural inhabitants, or community members without paying much attention to traders who are one of the environmentally active populations in riverine environments. It is important to examine whether traders will benefit from participatory environmental education.

This study therefore examined the effect of a participatory environmental education programme on traders in the riverine area of Ondo State, Nigeria. Specifically, the study investigated whether participation in environmental education activities would significantly influence traders' environmental knowledge, environmental attitudes, and environmental practices toward environmental sustainability and community sanitation.

### **Statement of the Problem**

Environmental pollution of rivers in Ondo State remains a threat to the health of the people, aquatic ecosystems, and sustainability. The OSOPADEC in its study revealed post-harvest losses, plummeted market value of products, and grave health hazards from smoke inhalation are affecting fish traders in Ondo riverine communities. The UNDP-UNESCO training in Cross River mangroves demonstrates that Participatory Environmental Education is

one of a good models in Environmental Education Programme. The market activities in riverine communities involve dumping of solid and liquid waste products into water channels. Despite various sanitation efforts carried out by governmental bodies, many of the traders continue to exhibit bad environmental attitudes and behaviors.

Previous environmental education initiatives in Nigeria have failed to adopt a participatory approach and have been classroom based, with traders participating minimally in environmental activities. It is therefore necessary to determine whether participation in a participatory environmental education programme could enhance the knowledge, attitudes, and behaviors of traders regarding the environment in the study area.

### **Objectives of the Study**

The objectives of the study were:

1. To find out the impact of participatory environmental education on environmental knowledge of traders.
2. To find out the impact of participatory environmental education on environmental attitudes of traders.
3. To find out the impact of participatory environmental education on environmental practices of traders.

### **Research Hypotheses**

The research hypotheses to be tested at 0.05 level of significance are:

1. There is no significant difference in environmental knowledge among traders participating in participatory environmental education program and non-participants.
2. There is no significant difference in environmental attitudes among traders participating in participatory environmental education program and non-participants.
3. There is no significant difference in environmental practices among traders participating in participatory environmental education program and non-participants.

### **Methodology**

The study adopted a quasi-experimental pretest-posttest control group design. The study was conducted in selected riverine communities in Ondo State, Nigeria, including Ilaje and Ese-Odo Local Government Areas. The population comprised all registered traders in selected riverine markets in Ondo State. 240 traders took part in the research. Stratified random sampling procedure was used to identify subjects from four leading riverine market areas.

- Experimental Group: 120 traders
- Control Group: 120 traders

### **Instruments**

Three instruments were employed:

1. Environmental Knowledge Questionnaire (EKQ)
2. Environmental Attitude Scale (EAS)
3. Environmental Practices Inventory (EPI)

The instruments were evaluated by experts in environmental education and measurement and evaluation.

### **Reliability of Instruments**

Cronbach alpha reliability coefficients derived were:

Instrument	Reliability Coefficient
EKQ	0.81
EAS	0.84
EPI	0.79

### **Treatment Procedure**

The experimental group received a 10-week programme of participatory environmental education comprising:

- environmental workshops,

- community meetings,
- demonstrations in waste management,
- sanitation drives,
- community-based environmental projects.

The control group was not subjected to any treatment.

Data were analysed using mean scores, standard deviation, and analysis of covariance (ANCOVA).

## Results

**Table 1**

**Analysis of Covariance (ANCOVA) Analysis of Covariance (ANCOVA) Showing the Effect of Participatory Environmental Education Programme on Traders' Environmental Knowledge**

Source of Variation	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4321.58	2	2160.79	36.63	.000	.236
Intercept	10245.72	1	10245.72	173.71	.000	.423
Pretest Knowledge	2868.91	1	2868.91	48.64	.000	.170
Treatment	1452.67	1	1452.67	24.63	.000	.094
Error	13978.42	237	58.98			
Total	1256480.00	240				
Corrected Total	18299.99	239				

**Dependent Variable:** Posttest Environmental Knowledge Score

**R Squared = .236 (Adjusted R Squared = .229)**

The ANCOVA result in Table 1 revealed a statistically significant effect of participatory environmental education on traders' environmental knowledge,  $F(1, 237) = 24.63, p < .05$ .

The null hypothesis was therefore rejected. This implies that the participatory environmental education programme significantly improved traders' environmental knowledge in the riverine communities of Ondo State.

**Table 2**

**Analysis of Covariance (ANCOVA) Showing the Effect of Participatory Environmental Education Programme on Traders' Environmental Attitudes**

Source of Variation	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5168.42	2	2584.21	47.76	.000	.287
Intercept	11284.35	1	11284.35	208.54	.000	.468
Pretest Attitude	3446.88	1	3446.88	63.70	.000	.212
Treatment	1721.54	1	1721.54	31.82	.000	.118
Error	12823.11	237	54.11			
Total	1368920.00	240				
Corrected Total	17991.53	239				

**Dependent Variable:** Posttest Environmental Attitude Score

**R Squared = .287 (Adjusted R Squared = .281)**

Table 2 indicates that participatory environmental education had a significant effect on

traders' environmental attitudes,  $F(1, 237) = 31.82, p < .05$ . The null hypothesis was rejected.

The result shows that traders exposed to the participatory environmental education

programme developed more positive environmental attitudes than those in the control group.

**Table 3**  
**Analysis of Covariance (ANCOVA) Showing the Effect of Participatory Environmental Education Programme on Traders' Environmental Practices**

Source of Variation	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4897.24	2	2448.62	42.27	.000	.263
Intercept	10736.51	1	10736.51	185.33	.000	.439
Pretest Practices	3266.36	1	3266.36	56.39	.000	.192
Treatment	1630.88	1	1630.88	28.14	.000	.106
Error	13729.54	237	57.93			
Total	1295840.00	240				
Corrected Total	18626.78	239				

**Dependent Variable:** Posttest Environmental Practices Score

**R Squared = .263 (Adjusted R Squared = .257)**

The ANCOVA result presented in Table 3 showed that participatory environmental education significantly influenced traders' environmental practices,  $F(1, 237) = 28.14, p < .05$ . The null hypothesis was rejected. This implies that the programme enhanced environmentally responsible practices among traders in the riverine communities of Ondo State.

#### Discussion of Findings

The results from this study show that the traders who went through the process of participatory environmental education had significantly higher environmental knowledge scores compared to those from the control group. From the results, The finding is consistent with the study conducted by Oladapo (2014), which established that participatory environmental education significantly improved traders' environmental knowledge in solid waste management in Oyo State. The author observed that traders who actively participated in environmental education activities demonstrated greater understanding of environmental sanitation and waste disposal practices than those who were taught using non-participatory methods. Similarly, Nkire (2012) found that participatory non-formal environmental education enhanced adult learners' environmental knowledge and awareness in Nigeria. It is also consistent with the conclusions made by Urama & Hodge (2006), who found that the participation in environmental education helped change people's perceptions about the environment and made them more willing to get involved in river basin management. As noted by the authors, participation helps raise environmental awareness, since individuals participate directly in finding environmental problems and creating solutions to such problems. Given that economic activities are highly dependent on water resources in riverine areas, environmental knowledge is important for survival. Furthermore, the findings corroborate the work of Okorie and Ijah (2020), who argued that community-based environmental education enhances environmental awareness and equips riverine dwellers with practical skills necessary for mitigating environmental problems and climate-related challenges. The present study therefore confirms that participatory approaches are more effective than passive learning methods in promoting environmental literacy among rural and semi-urban populations.

Furthermore, this research found that participatory environmental education had a very positive impact on the traders' environmental attitude. Traders who underwent environmental education showed a very positive environmental attitude regarding environmental conservation, appropriate waste management, and sanitation practices. This clearly shows that the traders' environmental attitude is capable of being positively influenced by involving traders in activities related to environmental education. The observed positive attitudinal change among the experimental group may have resulted from increased awareness

of the dangers associated with environmental degradation in riverine communities. Through participatory activities such as environmental campaigns, market sanitation exercises, and group reflections, traders became more conscious of the health, social, and economic consequences of poor environmental practices. Environmental education programmes that encourage interaction and community participation often foster emotional attachment to the environment and strengthen individuals' sense of environmental responsibility. Findings in the research have also been consistent with prior studies where participatory learning was noted to have an impact in instilling positive environmental attitudes. In the research carried out by Oladapo (2014), traders exposed to the concept of participatory environmental education exhibited a significant improvement in their attitudes about solid waste management compared to participants from the control group. From the study, it was evident that the participation learning strategy had an effect in encouraging cooperation and environmental commitment. Furthermore, Oladapo, Ogunfunmilakin, and Kuku (2019) in their research about the impact of environmental education on water pollution in Ondo State also found that participants exposed to the concept of outdoor environmental education programs were more likely to hold better environmental attitudes than those that were not exposed to such learning interventions. The findings also agree with community-based environmental education theories which posit that environmental attitudes are strengthened when community members participate actively in environmental decision-making and problem-solving processes. Participatory education creates opportunities for social interaction, collective learning, and behavioural reflection, thereby influencing attitudes and perceptions toward environmental conservation. In the context of riverine communities in Ondo State, positive environmental attitudes are particularly important because environmental degradation directly affects fishing activities, transportation, market accessibility, and public health. Traders who develop favourable attitudes towards environmental management are more likely to support environmental policies and participate in community sanitation initiatives.

Another important finding from this research is that participatory environmental education was found to positively influence the environmental practices of the traders. The traders in the experimental group exhibited better environmental practices such as proper disposal of refuse, minimal dumping of garbage into waterways, participation in environmental sanitation, and clean markets. From this result, it can be concluded that participatory environmental education not only results in changes in environmental attitude and knowledge but also contributes to good environmental behavior.

The reason for the change in environment practices could be attributed to the pragmatic nature of the environmental education program. Unlike most environmental educational programs where participants learn by listening to lectures, the participants in this study were actively involved in demonstrating proper environmental behaviors, cleaning up the community, sorting waste, and discussing proper environmental practices. The findings are consistent with the study by Nkire (2012), which found that participatory environmental education significantly improved adult learners' environmental practices in Nigeria. The study emphasized that behavioural change is more likely when learners participate actively in identifying environmental problems and implementing local solutions. Similarly, Oladapo (2014) observed significant improvement in traders' environmental practices following exposure to participatory environmental education on solid waste management.

The result further supports the assertion of Okorie and Ijah (2020) that community-based environmental education enhances sustainable environmental practices among riverine dwellers. According to the authors, participatory programmes encourage environmental ownership and collective responsibility, which are essential for long-term environmental sustainability in vulnerable communities.

Also, the results confirm the claim by Urama and Hodge (2006) that participatory environmental education facilitates individuals' readiness to embrace environmental management projects. Environmental education programs that involve people motivate them to practice environmentally sound behaviors and participate in community environmental conservation programs.

From this result, it implies that sustainable environment management is not possible within the confines of law and policy-making alone. Effective environmental management necessitates the conduct of continual environmental education programs that encourage community members to take part in environmental conservation programs. Therefore, participatory environmental education can be used as an effective means of achieving behavioral change in riverine areas of Ondo State.

### **Conclusion**

The study established that participatory environmental education programme had significant positive effects on traders' environmental knowledge because their participation in formulating policies help them to have knowledge of what water pollution is, and this change their attitude towards polluting water and subsequently their practices in positive way of handling bodies of water.

### **Recommendations**

The following recommendations were made:

1. Government agencies should integrate participatory environmental education into community development programmes.
2. Local governments should organize regular environmental workshops for traders in riverine communities.
3. Environmental sanitation campaigns should involve active participation of community members.
4. Non-governmental organizations should support environmental awareness programmes in coastal communities.
5. Market associations should establish environmental monitoring committees to sustain proper waste management practices.

### **Acknowledgements**

The authors sincerely appreciate the management of Adekunle Ajasin University for the research grant that enabled the successful conduct of this research study on participatory environmental education among traders in the riverine communities of Ondo State. The financial assistance obtained from the research intervention programme of the university made it easier to carry out fieldwork operations, collect data, and analyze data.

The authors would like to express appreciation to the traders, community leaders, market unions, and research assistants who took part actively in the research study. Their cooperation and participation in the participatory environmental education program were vital to the success of this research.

## References

- Ajiboye, J. O., & Ajitoni, S. O. (2008). Effects of full and quasi-participatory learning strategies on Nigerian secondary students' environmental knowledge. *International Journal of Environmental and Science Education*, 3(2), 58–66.
- Akintola, B. A. (2004). *Environmental information requirement, utilization and dissemination in solid waste management organizations in Oyo State, Nigeria* (Doctoral dissertation, University of Ibadan).
- Gbadamosi, V. T. (2012). *Effect of service learning and educational trips instructional strategies on pupils' environmental literacy in social studies in Oyo State, Nigeria* (Doctoral dissertation, University of Ibadan).
- Nkire, F. O. (2012). *Impact of participatory non-formal environmental education programme on adult learners' environmental knowledge, attitude and practices in Oyo State, Nigeria* (Doctoral dissertation, University of Ibadan).
- Oladapo, S. O. (2014). *Effect of a participatory environmental education programme on traders' knowledge, attitudes and practices in solid waste management in Oyo State, Nigeria* (Doctoral dissertation, University of Ibadan).
- Oladapo, S. O., Ogunfunmilakin, B., & Kukur, J. D. (2019). The effect of outdoor environmental education program on secondary school students' knowledge, attitude and practices towards water pollution in riverine area of Ondo State. *American International Journal of Humanities, Arts and Social Sciences*, 1(2), 1–6.
- Okorie, C. U., & Ijah, C. N. (2020). Community-based environmental education: A strategy for mitigating impacts of climate change on livelihood of riverine communities in Rivers State. *International Journal of Weather, Climate Change and Conservation Research*, 6(1), 1–10.
- Urama, K. C., & Hodge, I. (2006). Participatory environmental education and willingness to pay for river basin management: Empirical evidence from Nigeria. *Land Economics*, 82(4), 542–561.