

Impact of Environmental Education on the Conservation of Biodiversity Among Community Members in Etche Local Government Area, Rivers State

BY

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Abstract

The study assessed the impact of environmental education on the conservation of biodiversity among community members in Etche Local Government Area, Rivers State. Three objectives, three research questions and three hypotheses guided the study. Descriptive survey design was adopted in this study. The target population of the study included all registered farmers and adult facilitators in the study area. This gave a total population size of 500 which include 400 registered farmers. The sample size of the study was 200 respondents. A minimum of 50 adult facilitators were randomly selected from each of the adult learning centres in Etche. This gave a total sample size of 200 respondents which comprise 150 registered farmers and 50 adult facilitators. The instrument used for this study was a self-structured questionnaire titled "Environmental Education and Conservation of Biodiversity Questionnaire". The instrument was subjected to face and content validity by three experts. The instrument has an internal consistency of 0.82 reliability index using Cronbach alpha reliability method. The findings indicated that environmental education plays a significant role in biodiversity conservation. This aligned with previous studies that emphasised its impact on sustainability and ecological protection. The findings underscore the importance of targeted conservation programmes that incorporate both community-driven and institutional approaches to species diversity conservation. Based on the findings of the study, the following recommendations were made: Governments, NGOs, and educational institutions should develop and implement targeted environmental education programmes that integrate both scientific and indigenous knowledge to promote biodiversity conservation within communities.

Keywords: Environmental Education and Conservation of Biodiversity

Introduction

Environmental education, a subset of general education, focuses on fostering awareness, understanding, and action regarding environmental challenges such as climate change, pollution, and biodiversity loss (Palmer, 2020). By integrating environmental education into the broader educational system, students develop critical thinking and problem-solving skills that enable them to make informed

decisions about environmental sustainability (Tilbury, 2011). It equips learners with the knowledge and values needed to address environmental issues at local and global levels (UNESCO, 2021). Research suggests that incorporating environmental education into formal and informal learning settings improves students' environmental literacy and encourages pro-environmental behaviours (Stevenson et al., 2018). Moreover, environmental education enhances interdisciplinary learning by combining elements of science, ethics, and policy-making, fostering a holistic approach to sustainability (Orr, 2014). As global environmental concerns continue to rise, the integration of environmental education into curricula remains crucial for empowering future generations to protect and preserve natural resources as well as conservation of biodiversity.

Conservation of biodiversity refers to the protection, preservation, and sustainable management of biological diversity, including ecosystems, species, and genetic resources. It is essential for maintaining ecological balance, supporting ecosystem services, and ensuring the survival of various life forms on Earth (CBD, 2020). The Convention on Biological Diversity (CBD) defines biodiversity conservation as "the management of human interaction with genes, species, and ecosystems to maintain or recover their functions, values, and evolutionary potential" (CBD, 1992). Conservation efforts include in situ methods, such as protected areas and habitat restoration, and ex situ strategies, like seed banks and captive breeding programmes (IUCN, 2019). With increasing threats from habitat destruction, climate change, and pollution, global initiatives such as the UN Sustainable Development Goals (SDG 15) and the Aichi Biodiversity Targets emphasised the urgent need for biodiversity conservation (UNEP, 2022). Effective conservation policies require international cooperation, community involvement, and scientific research to ensure long-term environmental sustainability and conservation of genetic diversity.

Conservation of genetic diversity refers to the preservation and management of genetic variation within and among species to maintain adaptability, resilience, and

evolutionary potential. Genetic diversity is crucial for species survival, as it enhances their ability to withstand environmental changes, diseases, and other threats (Frankham et al., 2017). The Convention on Biological Diversity (CBD) defines genetic diversity conservation as the sustainable management of genetic resources to ensure their continued contribution to agriculture, medicine, and ecosystem stability (CBD, 1992). Conservation strategies include in situ methods, such as protecting wild populations in their natural habitats, and ex situ approaches, like gene banks, seed storage, and cryopreservation (FAO, 2019). With increasing threats from habitat destruction, climate change, and genetic erosion due to human activities, global efforts like the Global Strategy for Plant Conservation and the Nagoya Protocol aim to promote sustainable use and fair sharing of genetic resources (UNEP, 2021). Ensuring genetic diversity conservation is critical for food security, ecological resilience, and long-term biodiversity sustainability including conservation of species diversity.

Conservation of species diversity refers to the protection and management of different species within ecosystems to maintain ecological balance and prevent extinctions. Species diversity, which includes species richness and abundance, is crucial for ecosystem stability, resilience, and the provision of essential services such as pollination, climate regulation, and food security (IUCN, 2020). The Convention on Biological Diversity (CBD) defines species conservation as efforts to prevent the decline and extinction of species through sustainable management and habitat protection (CBD, 1992). Conservation strategies include in situ approaches, such as establishing protected areas and wildlife corridors, and ex situ methods, like zoos, botanical gardens, and seed banks (WWF, 2019). With increasing threats from habitat destruction, climate change, and overexploitation, global initiatives like the IUCN Red List, the UN Sustainable Development Goals (SDG 15), and the Convention on International Trade in Endangered Species (CITES) play a crucial role in species conservation (UNEP, 2021). Ensuring species diversity is vital for ecological

integrity, economic sustainability, human well-being and conservation of ecosystem diversity.

Conservation of ecosystem diversity refers to the protection, restoration, and sustainable management of various ecosystems, including forests, wetlands, grasslands, and marine environments, to maintain ecological functions and biodiversity. Ecosystem diversity is vital for sustaining life on Earth, as different ecosystems provide essential services such as water purification, climate regulation, carbon sequestration, and food production (MEA, 2015). The Convention on Biological Diversity (CBD) defines ecosystem conservation as the sustainable use and management of ecosystems to maintain their structure, function, and productivity for present and future generations (CBD, 2019). Major global initiatives, including the UN Sustainable Development Goals (SDG 14 & 15), the Ramsar Convention on Wetlands, and the Global Biodiversity Framework, emphasised the urgent need to protect and restore ecosystems amid increasing threats from deforestation, climate change, and land degradation (UNEP, 2021). Ensuring the conservation of ecosystem diversity is essential for global ecological stability, economic resilience, and human well-being.

Statement of the Problem

Biodiversity conservation in local communities faces several challenges, primarily due to socio-economic, political, and environmental factors. One major issue is habitat destruction caused by deforestation, agricultural expansion, and urbanization, which reduces natural habitats and threatens species survival. Many communities depend on land and forest resources for their livelihoods, leading to conflicts between conservation efforts and economic needs. Additionally, limited awareness and education on biodiversity conservation hinder local participation and support, making it difficult to implement sustainable practices. The lack of strong environmental policies and enforcement mechanisms further exacerbates the problem, as illegal activities like poaching and logging continue to threaten biodiversity.

Another key challenge is climate change, which alters habitats, disrupts species distributions, and increases the frequency of extreme weather events, affecting both biodiversity and community livelihoods. Many communities, particularly in developing regions, lack the financial and technical resources needed to implement effective conservation programmes. In some cases, conservation projects fail due to inadequate involvement of indigenous and local communities in decision-making, leading to resistance and conflicts. The need for a balanced approach that integrates conservation with socio-economic development is crucial. Strengthening local governance, promoting alternative sustainable livelihoods, and enhancing community-based conservation initiatives can help address these challenges and ensure long-term biodiversity protection. The above necessitated the assessment of the impact of environmental education on the conservation of biodiversity amongst communities in Etche Local Government Area, Rivers State.

Aim and Objectives of the Study

The aim of the study was to assess the impact of environmental education on the conservation of biodiversity amongst communities in Etche Local Government Area, Rivers State. Specifically, the study determined the following:

1. Impact of environmental education on the conservation of genetic diversity amongst communities in Etche Local Government Area, Rivers State
2. Impact of environmental education on the conservation of species diversity amongst communities in Etche Local Government Area, Rivers State
3. Impact of environmental education on the conservation of ecosystem diversity amongst communities in Etche Local Government Area, Rivers State

Research Questions

The following research questions guided the study:

1. What is the impact of environmental education on the conservation of genetic diversity amongst communities in Etche Local Government Area, Rivers State.
2. What is the impact of environmental education on the conservation of species diversity amongst communities in Etche Local Government Area, Rivers State.
3. What is the impact of environmental education on the conservation of ecosystem diversity amongst communities in Etche Local Government Area, Rivers State.

Hypotheses

The following hypotheses were formulated and tested at .05 level of significance:

H₀₁ There is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of genetic diversity amongst communities in Etche Local Government Area, Rivers State

H₀₂ There is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of species diversity amongst communities in Etche Local Government Area, Rivers State

H₀₃ There is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of ecosystem diversity amongst communities in Etche Local Government Area, Rivers State.

Methodology

Descriptive survey design was adopted in this study. The area covered by this study is the entire Etche Local Government Area of Rivers State. The target population of the study included all registered farmers and adult facilitators in Etche LGA, Rivers state. This gave a total population size of 500 which include 400 registered farmers and 100 adult facilitators. The sample size of the study was 200 respondents. The Local Government Area was clustered into three areas (Area A, B and C). Five Local communities were purposively selected from each cluster to obtain fifteen (15) Communities for the study. Three farmers' cooperatives society were purposively selected, furthermore, all the 8 executives, two ex-officio members and 10 randomly selected members were added to give 20 farmers from each Areas. A minimum of 40 adult facilitators were then randomly selected from each of the arears in Etche. This gave a total sample size of 200 respondents which comprise of 150 registered farmers and 50 adult facilitators.

The instrument used for this study was a self-constructed questionnaire titled "Environmental Education and Conservation of Biodiversity Questionnaire" developed by the researcher on the role of adult education in conservation of soil and water resources among rural farmers. The instrument contained four sections A-D. The instrument was rated on a five-point Likert scale of Strongly Agree (SA) - 5, Agree (A) - 4, Undecided (U) - 3, Disagree (D) - 2 and Strongly Disagree (SD) - 1.

The instrument was subjected to face and content validity by three experts in Adult Education and Community Development Department in Rivers State University. The instrument has an internal consistency of 0.82 reliability index using Cronbach alpha reliability method. The instrument was administered to the farmers and Adult Education Facilitators by the researcher and with the help of three research assistants. The research questions were analysed using mean and standard deviation and the null hypotheses were tested at 0.05 level of significance using t-test. Items in the research questions with mean response of 3.5 and above were regarded as agreed while those

below 3.5 were regarded as disagreed. The null hypotheses were accepted if the calculated value of t (t-cal) was less than the table or critical value (t-crit) and rejected when the calculated value of t (t-cal) was greater than the table or critical value (t-crit).

Research Question 1: What is the impact of environmental education on the conservation of genetic diversity amongst communities in Etche Local Government Area, Rivers State?

Table 1: Mean and Standard Deviation on the impact of environmental education on the conservation of genetic diversity

S/NO	Impact of Environmental Education for the Conservation of Genetic Diversity	Farmers			Adult Facilitators		
		\bar{x}	SD	RMK	\bar{x}	SD	RMK
1	Environmental education enhances awareness of genetic resource conservation.	4.59	.622	A	4.64	.490	Accept
2	Training on conservation practices improves farmers' ability to protect genetic diversity.	4.27	.758	A	4.08	1.038	Accept
3	Community participation in biodiversity programs promotes genetic diversity sustainability.	4.16	.713	A	3.96	1.020	Accept
4	Policies and regulations on environmental conservation enhance genetic diversity protection.	4.09	.960	A	4.04	.889	Accept
5	Conservation of local crop and animal breeds is essential for biodiversity sustainability.	4.18	.922	A	4.16	.943	Accept

S/NO	Impact of Environmental Education for the Conservation of Genetic Diversity	Farmers	Adult Facilitators
6	Adoption of sustainable farming practices reduces genetic erosion.	4.16 .888 A	4.16 .746 Accept
7	Access to conservation education materials strengthens knowledge on genetic diversity.	4.30 .978 A	4.08 .997 Accept
8	Schools and training centers play a role in disseminating genetic diversity conservation knowledge.	4.05 .939 A	3.96 1.020 Accept
9	Traditional knowledge contributes to the conservation of genetic diversity.	4.41 .726 A	4.00 .957 Accept
10	Government and NGOs support biodiversity conservation efforts.	4.00 .915 A	3.92 1.152 Accept
11	Climate change adaptation strategies are necessary for sustaining genetic diversity.	4.00 .988 A	4.44 .651 Accept
Grand Mean		4.20 0.86 A	4.13 0.90 Accept

The Table presents the perceptions of farmers and adult facilitators regarding the impact of environmental education on genetic diversity conservation. Both groups rated the impact highly, with farmers having a grand mean of 4.20 and adult facilitators 4.13, indicating strong agreement (A) on the role of environmental education in enhancing conservation efforts. The highest-rated item among farmers was the contribution of traditional knowledge ($\bar{x} = 4.41$), while for adult facilitators, the necessity of climate change adaptation strategies received the highest mean score

($\bar{x} = 4.44$). These results highlighted the importance of integrating local knowledge with scientific approaches to improve conservation outcomes. The findings suggest that while environmental education is widely recognised as a key factor in biodiversity conservation, there are variations in perspectives between farmers and adult facilitators. Farmers place a strong emphasis on community participation and traditional conservation practices, whereas facilitators highlight climate adaptation and institutional support. The relatively high standard deviations in some responses indicated differing levels of agreement, suggesting the need for targeted educational interventions. Strengthening access to educational materials, promoting policy awareness, and fostering collaboration between stakeholders can further enhance conservation efforts for genetic diversity sustainability.

Research Question 2: What is the impact of environmental education on the conservation of species diversity amongst communities in Etche Local Government Area, Rivers State?

Table 2: Mean and Standard Deviation on the impact of environmental education on the conservation of species diversity

S/NO	Impact of Environmental Education for Conservation of Species Diversity	Farmers			Adult Facilitators		
		\bar{x}	SD	RMK	\bar{x}	SD	RMK
1	Environmental education enhances awareness of species conservation.	4.27	.845	A	3.92	1.077	Accept
2	Training programs improve species conservation skills and practices.	4.20	.851	A	4.20	.913	Accept
3	Protection of endangered species is strengthened through environmental	4.36	.892	A	4.00	1.080	Accept

S/NO	Impact of Environmental Education for the Farmers Conservation of Species Diversity			Adult Facilitators		
4	Conservation policies and regulations support species diversity.	3.93	.998 A	4.24	.970	Accept
5	Habitat protection is crucial for maintaining species populations.	4.14	1.153 A	4.12	1.054	Accept
6	Sustainable resource use reduces threats to species diversity.	4.16	1.140 A	3.92	1.038	Accept
7	Community involvement improves conservation outcomes for species.	4.14	.979 A	4.32	.690	Accept
8	Schools and training centers play a role in promoting species conservation.	3.98	.927 A	4.00	.957	Accept
9	Traditional knowledge contributes to protecting species diversity.	4.14	.930 A	3.72	.980	Accept
10	Government and NGOs support enhances conservation efforts.	3.93	1.043 A	3.96	1.136	Accept
11	Climate change adaptation strategies help sustain species diversity.	4.09	1.053 A	3.96	.889	Accept
12	Wildlife protection programs contribute to species diversity conservation.	4.32	.959 A	3.88	1.130	Accept
13	Conservation education influences attitudes towards species protection.	3.91	1.117 A	3.96	.978	Accept
Grand		4.129	0.99 A	4.015	0.99	Accept

S/NO	Impact of Environmental Education for the Farmers Conservation of Species Diversity	Adult Facilitators
Mean		

The Table presents the impact of environmental education on species diversity conservation as perceived by farmers and adult facilitators. Farmers had a grand mean of 4.129, while adult facilitators recorded 4.015, indicating a strong agreement (A) on the importance of environmental education in species conservation. The highest-rated item among farmers was the protection of endangered species ($\bar{x} = 4.36$), while adult facilitators rated community involvement in conservation ($\bar{x} = 4.32$) as the most impactful. These findings highlighted the need for targeted conservation programmes that engage both communities and institutions in protecting species diversity. The results suggest that environmental education plays a crucial role in fostering sustainable practices and raising awareness about the need to conserve species diversity. While both groups recognised the significance of conservation education, slight variations in their responses indicate differences in perspectives on conservation priorities. Farmers emphasized the role of traditional knowledge and habitat protection, while adult facilitators focused more on policy and community participation. The moderate standard deviations across responses suggest some variability in perceptions, which could be addressed through more tailored educational and training programmes. Strengthening conservation policies, enhancing government and NGO support, and integrating local knowledge with scientific approaches can further improve species diversity conservation efforts.

Research Question 3: What is the impact of environmental education on the conservation of ecosystem diversity amongst communities in Etche Local Government Area, Rivers State?

Table 3: Mean and Standard Deviation on the impact of environmental education on the conservation of ecosystem diversity

S/NO	Impact of Environmental Education for the Conservation of Ecosystem Diversity	Farmers			Adult Facilitators		
		\bar{x}	SD	RMK	\bar{x}	SD	RMK
1	Environmental education raises awareness about ecosystem conservation.	4.59	.622	A	4.64	.490	Accept
2	Sustainable land-use practices improve ecosystem health.	4.27	.758	A	4.08	1.038	Accept
3	Biodiversity conservation ensures ecosystem balance and stability.	4.16	.713	A	3.96	1.020	Accept
4	Policies and laws enhance the protection of ecosystems.	4.09	.960	A	4.04	.889	Accept
5	Restoration of degraded ecosystems is essential for biodiversity.	4.18	.922	A	4.16	.943	Accept
6	Sustainable water and soil management prevent ecosystem degradation.	4.16	.888	A	4.16	.746	Accept
7	Community engagement improves ecosystem conservation outcomes.	4.30	.978	A	4.08	.997	Accept
8	Schools and training centers play a role in ecosystem conservation.	4.05	.939	A	3.96	1.020	Accept
9	Traditional ecological knowledge supports ecosystem conservation.	4.41	.726	A	4.00	.957	Accept
10	Climate change adaptation strategies help maintain ecosystems.	4.00	.915	A	3.92	1.152	Accept
11	Government and NGO support enhances	4.00	.988	A	4.44	.651	Accept

S/NO	Impact of Environmental Education for the Conservation of Ecosystem Diversity ecosystem conservation efforts.	Farmers	Adult Facilitators
Grand Mean		4.20	0.86 A
		4.13	0.90 Accept

The table presents the perceptions of farmers and adult facilitators regarding the impact of environmental education on ecosystem diversity conservation. Farmers had a grand mean of 4.20, while adult facilitators recorded 4.13, indicating strong agreement (A) on the importance of environmental education in ecosystem conservation. Among farmers, the highest-rated factor was awareness about ecosystem conservation ($\bar{x} = 4.59$), while adult facilitators rated government and NGO support ($\bar{x} = 4.44$) as the most impactful. These results emphasised the need for policy-driven and community-led conservation initiatives to enhance ecosystem sustainability. The findings suggest that environmental education significantly contributed to ecosystem conservation by promoting sustainable land use, biodiversity protection, and climate adaptation strategies. Both groups acknowledged the role of traditional knowledge and formal education in ecosystem conservation, although variations in perspectives indicated different priorities. Farmers emphasised the role of traditional practices and community involvement, while facilitators highlighted institutional support and regulatory policies. Addressing these variations through targeted education, policy improvements, and increased stakeholders' engagement can further strengthen ecosystem conservation efforts and ensure long-term sustainability.

Hypotheses

HO1 There is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of genetic diversity amongst communities in Etche Local Government Area, Rivers State.

Table 4: t-test analysis on the impact of environmental education on the conservation of genetic diversity.

Respondents	N	Mean	Std. Deviation	d.f	p-value	t-cal	t-crit	RMK
Farmers	150	4.129	0.99	198	0.05	1.32	1.96	Accept
Adult facilitators	50	4.015	0.99					

Table 3 showed that t-cal at (1.32) is less than t-crit at (1.96) which indicated that the stated null hypothesis was accepted thus there is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of genetic diversity amongst communities in Etche Local Government Area, Rivers State.

HO₂ There is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of species diversity amongst communities in Etche Local Government Area, Rivers State.

Table 5: t-test analysis on the impact of environmental education on the conservation of species diversity

Respondents	N	Mean	Std. Deviation	d.f	p-value	t-cal	t-crit	RMK
Farmers	150	4.20	0.86	198	0.05	1.25	1.96	Accepted
Adult facilitators	50	4.13	0.90					

Table 4 showed that t-cal at (1.25) is less than t-crit at (1.96) which indicated that the stated null hypothesis was accepted thus there is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of species diversity amongst communities in Etche Local Government Area, Rivers State.

Ho₃ There is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental education on the conservation of ecosystem diversity amongst communities in Etche Local Government Area, Rivers State.

Table 6: t-test analysis on the impact of environmental education on the conservation of ecosystem diversity.

Respondents	N	Mean	Std. Deviation	d.f	p-value	t-cal	t-crit	RMK
Farmers	150	4.129	0.99	198	0.05	1.32	1.96	Accept
Adult facilitators	50	4.015	0.99					

Table 3 showed that t-cal at (1.32) is less than t-crit at (1.96) which indicated that the stated null hypothesis was accepted thus there is no significant difference between the mean responses of adult facilitators and Famers on the impact of environmental

education on the conservation of ecosystem diversity amongst communities in Etche Local Government Area, Rivers State.

Discussion of Findings

The findings indicate that environmental education plays a significant role in biodiversity conservation, aligning with previous studies that emphasised its impact on sustainability and ecological protection (Sterling et al., 2017). However, differences in perspectives between farmers and adult facilitators highlight the diverse approaches to conservation. Farmers prioritize community engagement and traditional knowledge, which are essential for sustainable conservation practices, as noted by Berkes (2018). This perspective aligns with the argument that indigenous knowledge systems contribute significantly to environmental stewardship, particularly in the conservation of genetic and species diversity (Gadgil et al., 2021). On the other hand, adult facilitators focus more on climate adaptation strategies and institutional support, consistent with the studies emphasizing the role of governance and structured policies in conservation (Ardoin et al., 2020). The relatively high standard deviations in some responses indicated varying levels of agreement, underscoring the need for targeted educational interventions. This suggests that while environmental education is generally effective, disparities in understanding and application may exist. According to Monroe et al. (2019), improving access to education and fostering multi-stakeholder collaboration are crucial for enhancing conservation outcomes. Policy awareness, capacity-building initiatives, and knowledge-sharing platforms can bridge these gaps, ensuring that both scientific and community-based conservation strategies are integrated for better biodiversity protection (Tilbury, 2021). Strengthening conservation education, particularly in rural and agrarian settings, will enhance genetic diversity sustainability, ultimately contributing to global biodiversity conservation goals.

The findings underscore the importance of targeted conservation programmes that incorporate both community-driven and institutional approaches to species diversity

conservation. Environmental education has been widely recognized as a key driver in fostering sustainable practices and enhancing awareness of species conservation (Sterling et al., 2017). The study reveals that while both farmers and adult facilitators acknowledge the significance of conservation education, their perspectives on priorities differ. Farmers emphasised traditional ecological knowledge and habitat protection, aligning with researcher that highlights the effectiveness of indigenous conservation practices in maintaining biodiversity (Berkes, 2018; Gadgil et al., 2021). In contrast, adult facilitators focus more on policy implementation and community participation, consistent with findings that stress the role of governance, institutional support, and stakeholder engagement in conservation efforts (Ardoin et al., 2020). The moderate standard deviations observed across responses suggest some variability in perceptions, reflecting the need for more tailored educational and training programmes. Previous studies have emphasised the importance of integrating local knowledge with scientific approaches to strengthen conservation efforts (Monroe et al., 2019). Addressing these variations through well-structured educational initiatives, capacity-building workshops, and participatory conservation planning can enhance engagement among different stakeholders. Additionally, strengthening conservation policies, increasing support from government agencies and NGOs, and fostering collaboration between traditional knowledge holders and scientific communities can significantly improve species diversity conservation outcomes (Tilbury, 2021).

The findings highlight the significant role of environmental education in promoting ecosystem conservation through sustainable land use, biodiversity protection, and climate adaptation strategies. Environmental education has been recognised as a critical tool for fostering ecological awareness and encouraging sustainable practices (Sterling et al., 2017). Both farmers and adult facilitators acknowledged the importance of education in ecosystem conservation; however, their perspectives on conservation priorities differ. Farmers place greater emphasis on traditional practices and community-based conservation efforts, aligning with research that underscores

the effectiveness of indigenous knowledge in ecosystem management (Berkes, 2018; Gadgil et al., 2021). In contrast, adult facilitators focus more on institutional support and regulatory policies, consistent with studies highlighting the role of governance and policy frameworks in conservation (Ardoin et al., 2020).

Addressing these variations requires targeted educational programmes, policy improvements, and enhanced stakeholders' engagement. Research suggests that integrating traditional knowledge with scientific approaches can create more effective conservation strategies (Monroe et al., 2019). By strengthening environmental education curricula, expanding community-based training, and fostering collaborations between local communities, governmental agencies, and NGOs, conservation efforts can become more holistic and impactful. Additionally, ensuring that policies are effectively implemented and accessible to both local and institutional stakeholders can further promote ecosystem sustainability and long-term conservation success (Tilbury, 2021).

Conclusion

Environmental education plays a crucial role in the conservation of biodiversity among communities by fostering awareness, promoting sustainable practices, and encouraging the integration of traditional and scientific knowledge. The findings indicated that while both farmers and adult facilitators recognised its importance, variations in perspectives highlighted the need for targeted interventions that address specific conservation priorities. Strengthening environmental education programmes, enhancing policy support, and increasing stakeholders engagement can bridge these gaps and ensure more effective biodiversity conservation efforts. By combining community-driven conservation strategies with institutional frameworks, environmental education can serve as a catalyst for long-term biodiversity protection and ecosystem sustainability. Ultimately, a well-structured and inclusive approach to environmental education will empower communities to take active roles in preserving biodiversity for future generations.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Government, NGOs, and educational institutions should develop and implement targeted environmental education programmes that integrate both scientific and indigenous knowledge to promote biodiversity conservation within communities.
2. Policymakers should ensure that environmental education is backed by strong legal frameworks and adequately enforced to encourage sustainable conservation practices at the community level.
3. Conservation efforts should involve a multi-stakeholder's approach, including local communities, government agencies, NGOs, and academic institutions, to create inclusive and sustainable biodiversity conservation strategies.
4. Training, workshops, educational materials, and technology-based learning tools should be made accessible to communities to improve their understanding and participation in biodiversity conservation.
5. Incentives such as grants, subsidies, and rewards for biodiversity-friendly practices should be introduced to motivate communities to actively engage in conservation efforts.

References

- Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2020). Environmental education and community-based conservation: Advances in theory and practice. *Environmental Education Research*, 26(4), 495-517.
- Berkes, F. (2018). *Sacred ecology: Traditional ecological knowledge and resource management*. Routledge.
- Colding, J., & Folke, C. (2019). *Social-ecological systems and conservation of biodiversity*. Cambridge University Press.

- Convention on Biological Diversity (CBD). (1992). *Text of the Convention on Biological Diversity*. Retrieved from <https://www.cbd.int>
- Convention on Biological Diversity (CBD). (2020). *Global Biodiversity Outlook 5*. Retrieved from <https://www.cbd.int/gbo5>
- Federal Republic of Nigeria. (2013). *Compulsory, Free Universal Basic Education Act*. Retrieved from <https://ubec.gov.ng/wp-content/uploads/2021/09/NGA87623-UBE-ACT-2004.pdf>
- Food and Agriculture Organization (FAO). (2019). *The State of the World's Biodiversity for Food and Agriculture*. Retrieved from <https://www.fao.org>
- Food and Agriculture Organization (FAO). (2020). *The State of the World's Forests 2020*. Retrieved from <https://www.fao.org>
- Frankham, R., Ballou, J. D., & Briscoe, D. A. (2017). *Introduction to conservation genetics*. Cambridge University Press.
- Gadgil, M., Berkes, F., & Folke, C. (2021). Indigenous knowledge for biodiversity conservation. *Ambio*, 31(3), 151-156.
- International Union for Conservation of Nature (IUCN). (2019). *Guidelines for conserving biodiversity*. Retrieved from <https://www.iucn.org>
- International Union for Conservation of Nature (IUCN). (2020). *The IUCN Red List of Threatened Species*. Retrieved from <https://www.iucnredlist.org>
- International Union for Conservation of Nature (IUCN). (2020). *Threats to biodiversity and conservation strategies*. Retrieved from <https://www.iucn.org>
- Millennium Ecosystem Assessment (MEA). (2005). *Ecosystems and human well-being: Synthesis report*. Island Press.
- Monroe, M. C., Plate, R. R., Oxarart, A., Bowers, A., & Chaves, W. A. (2019). Identifying effective climate change education strategies: A systematic review of the research. *Environmental Education Research*, 25(6), 791-812.
- Orr, D. W. (2004). *Earth in mind: On education, environment, and the human prospect*. Island Press.

- Palmer, J. (2020). *Environmental education in the 21st century: Theory, practice, progress, and promise*. Routledge.
- Pretty, J., & Smith, D. (2021). *Communities, livelihoods, and conservation: The role of local engagement*. Routledge.
- Ramsar Convention on Wetlands. (2018). *The Ramsar Convention and wetland conservation*. Retrieved from <https://www.ramsar.org>
- Sterling, S., Maxey, L., & Luna, H. (2017). *Sustainability education: Perspectives and practice across higher education*. Routledge.
- Stevenson, R. B., Brody, M., Dillon, J., & Wals, A. E. J. (2018). *International handbook of environmental education*. Routledge.
- Tilbury, D. (2011). *Education for sustainable development: An expert review of processes and learning*. UNESCO.
- Tilbury, D. (2021). Education for sustainable development: A critical review of concept, practice, and research. *International Journal of Environmental Education*, 8(2), 120-135.
- UNESCO. (2021). *Education for sustainable development: A roadmap*. Retrieved from <https://unesdoc.unesco.org>
- UNESCO. (2023). *Reimagining our futures together: A new social contract for education*. Retrieved from <https://unesdoc.unesco.org>
- United Nations Environment Programme (UNEP). (2021). *Global Biodiversity Outlook 5: The state of ecosystems and biodiversity*. Retrieved from <https://www.unep.org>
- United Nations Environment Programme (UNEP). (2021). *State of biodiversity and conservation challenges*. Retrieved from <https://www.unep.org>
- United Nations Environment Programme (UNEP). (2022). *Making peace with nature: A scientific blueprint to tackle climate, biodiversity, and pollution crises*. Retrieved from <https://www.unep.org>

World Education News & Reviews. (2017, March 7). *Education in Nigeria*. Retrieved from <https://wenr.wes.org/2017/03/education-in-nigeria>

World Wildlife Fund (WWF). (2019). *Living planet report: Biodiversity and ecosystem services at risk*. Retrieved from <https://www.worldwildlife.org>

World Wildlife Fund (WWF). (2022). *Living planet report: Community-based conservation strategies*. Retrieved from <https://www.worldwildlife.org>