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# EXPLORING THE INTERPLAY BETWEEN TRADITIONAL ECOLOGICAL KNOWLEDGE AND ENVIRONMENTAL EDUCATION IN RURAL COMMUNITIES.

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## Abstract
Previous research has underscored the critical role of Traditional Ecological Knowledge (TEK) in ecological management across the globe. However, little is known about the relationship between traditional ecological knowledge (TEK) and environmental education in rural communities. The present paper examined the correlation between TEK and EE in rural communities in Cross River State, Nigeria. One hundred and sixty-six participants drawn from the public participated in the study. They completed a self-report measure of TEK and EE with demographic information. Pearson's product-moment correlation was performed to determine the correlation between the variables. The result revealed a statistically significant positive correlation between TEK and EE, $r\ (164) = .42$, $p < .001$. Most importantly, observation of the $R^2$ revealed that TEK explained about 21% of the variation in EE. In conclusion, this study underscores the positive correlation between TEK and Environmental Education in rural Nigerian communities, advocating for integrating traditional knowledge systems into formal education to foster sustainable development.

**Keyword:** TEK, EE, Ecological Management, Rural Communities.

## Introduction
The research aims to bridge the gap between TEK and formal environmental education, arguing that a synergy of the two can lead to more effective and culturally relevant education programs. It posits that integrating TEK into environmental education can enhance local relevance, foster a sense of environmental stewardship, and promote sustainable practices rooted in local culture and history. Traditional ecological knowledge (TEK) is gaining prominence among ecologists because it can help inform ecosystem management. Yet sometimes TEK is maintained not because of positive values about the environment but because of poverty and a lack of options (Hartel et al., 2023). Research into traditional ecological knowledge has become a reference in environmental management (Manningtyas & Furuya, 2022). This is followed by environmental concerns that have emerged as a discourse in ecological planning and design.

Traditional ecological knowledge (TEK) is a distinct domain of indigenous knowledge, preserved through oral traditions and cultural manifestations such as arts, crafts, and ceremonies, alongside the cultivation, gathering, and preparation of traditional meals. The safeguarding of this knowledge encounters increasing obstacles due to the global decrease of indigenous languages. This loss affects the transfer of Traditional Ecological Knowledge (TEK) via narratives, storytelling, and song, as well as the understanding of the meaning and relevance of other cultural expressions (Moller et al., 2009). The term denotes a comprehensive body of


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knowledge, practices, and beliefs that evolve through adaptive processes and are transmitted throughout generations by cultural means concerning the interrelations of living beings, including people and their environment. (Berkes, 2004). Traditional ecological knowledge is a component of indigenous knowledge, typically described as local knowledge of indigenous peoples or knowledge specific to a particular culture or society.

Traditional ecological knowledge is a potentially powerful medium for teaching environmental education and has the potential to influence transformative learning. (Feinstein, 2004) It is a generationally held knowledge-based concept in which language, gathering practices, landscape, and culture inform livelihoods. (Fontana et al., 2022). TEK describes a repository of experiential wisdom that offers significant insights for formulating adaptation and mitigation methods to address environmental changes. Through coevolution with ecological and social systems, Traditional Ecological Knowledge (TEK) might enhance the ability of human societies to manage environmental disturbances and sustain ecosystem services, even amidst uncertainty and environmental change. TEK pertains to transformation and the ability to adapt with elegance and purpose. It represents the foundational concept of systems thinking, emphasizing sustainability and ethical coexistence with the environment. Central to TEK is the Indigenous perspective that humanity is an integral component of nature.

Over the past few decades, extensive conversations have occurred regarding the advantages and disadvantages of combining traditional ecological knowledge and scientific information (Gagnon & Berteaux, 2009). Nonetheless, considerable effort is still required to streamline the integration and use of this knowledge in environmental education. The traditional knowledge of Indigenous people is often neglected despite its significance in combating climate change (Hosen et al., 2020). However, proponents of Traditional Ecological Knowledge (TEK) have endorsed its application in scientific research, impact evaluation, and ecological comprehension (Huntington, 2000). TEK is an example of how local institutions can be used to give environmental stewards and leaders guidelines for social regulation and the formation of acceptable cultural values and worldviews. The more significant facets of TEK offer a more comprehensive and profound understanding of how people interact with various levels of the physical, social, and spiritual environments, going beyond the common principles of factual observations and co-management (Finn et al., 2017).

Indigenous communities have preserved a treasure trove of information passed down through many generations. The Nigerian traditional ecological knowledge (TEK) culminates in an in-depth understanding of human-environment interactions that shape practices and perspectives that support long-term environmental sustainability. Reviving and preserving TEK is a practical way to address pressing environmental problems. As traditional ways of life are being eroded by industrialization and globalization, environmental sustainability must save and advance indigenous knowledge systems. By integrating locally based ecological knowledge with modern conservation efforts, communities can draw on the wisdom of their forebears to face the threats posed by environmental degradation and climate change. Indigenous peoples have different cultural and social characteristics that share inherited ties to their homeland and natural resources. They have their own understanding and cultural experience that amounts to traditional ecological knowledge.


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Environmental issues have become common concerns internationally and globally (Duan & Zhao, 2021). Studies on traditional ecological knowledge are relevant from the point of view of valuing traditional populations and environmental preservation of ecosystems throughout the planet (de Sousa et al., 2022). Sustainable ecological management has become an important issue globally and in Nigeria during this era of climate change. Nowadays, environmental education is being transformed into education for sustainable development, which is necessary for the continuation of life on Earth. The contribution of traditional knowledge to conservation and management is increasingly recognized (Berkes, 2004; Eckert et al., 2020; Gordon (Iñupiaq) et al., 2023; Nesterova, 2020; Singleton et al., 2023; Thornton & Scheer, 2012; Usher, 2000), and the current scale of ecosystem degradation underscores the need for restoration interventions. It is increasingly recognized that successful ecological restoration depends on the effective coordination of science and traditional environmental knowledge.

The Nigerian government has incorporated environmental education into the national curriculum throughout all educational levels, from primary to higher schools. Environmental education underscores identifying ecological issues, socio-economic challenges associated with the environment, and pragmatic solutions pertinent to sustainable development in rural areas. Environmental education aims to foster respect for and reverence for the natural and built environments in the general population by enhancing their awareness of these systems and their interconnectedness using an interdisciplinary approach. Environmental education can be implemented through various methods, catalyzing fostering community resilience, improving individual and collective voluntary participation, and elevating environmental standards. It is pivotal in environmental management, planning, and ensuring health and safety measures. Moreover, it serves as a vehicle for promoting environmental literacy, safeguarding natural resources and ecosystems, and cultivating societal awareness.

Numerous disparate literatures underscore the popularity of environmental education in Nigeria (Bosah, 2013; Eneji et al., 2023; Joy, 2023; Norris, 2016; Nwankwoala, 2015). Thus, indicating a growing curiosity among indigenous scholars about the natural world and the imperative to conserve it. However, the implementation and delivery of environmental education programs remain adversely impacted by a wide range of practical implementation challenges (Babalola & Olawuyi, 2021). This shift towards prioritizing our planet, which is currently grappling with severe environmental challenges, is multifaceted. The escalating ecological consciousness among people is a significant contributing factor, propelled by media coverage shedding light on pressing issues such as climate change (Masalimova et al., 2023).

In many rural communities, traditional ecological knowledge (TEK), which is deeply rooted in the culture and history of the people, plays a crucial role in their interaction with the environment. This knowledge, passed down through generations, encompasses a wide range of practices and beliefs that contribute to the sustainable management of natural resources. However, with the advent of modern education systems, there is a growing disconnect between this traditional knowledge and formal environmental education. Modern environmental education often overlooks the value of TEK, leading to a gap in understanding and appreciation of local ecological practices and wisdom. This disconnect poses a significant problem. It threatens TEK's preservation and continuity and limits environmental education programs' effectiveness. These programs often fail to resonate with local realities and experiences, reducing their impact.


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Furthermore, the potential of TEK to complement and enrich environmental education is largely untapped. There is a lack of comprehensive studies exploring how these two forms of knowledge can be integrated for a more holistic and context-specific approach to environmental education.

**Traditional Ecological Knowledge and Environmental Education**

This research explores the relationship between traditional ecological knowledge and environmental education in rural communities. Traditional ecological knowledge refers to the understandings, skills, and philosophies developed by societies with long histories of interaction with their natural surroundings. This knowledge is often passed down through generations and is deeply intertwined with cultural practices and beliefs. On the other hand, environmental education allows individuals to explore environmental issues, engage in problem-solving, and take action to improve the environment. It enables individuals to make informed decisions and take responsible action. The interplay between these two can be significant. Indeed, previous research has suggested that scientists and policymakers all over the world are calling for the incorporation of the wisdom of TEK into natural resource planning and environmental policy (Kimmerer, 2012). Traditional ecological knowledge can provide valuable insights and practical solutions for environmental issues, which can be incorporated into environmental education. On the other hand, environmental education can help preserve and promote traditional ecological knowledge by raising awareness about its value and relevance in today's world. The research explores how these two elements interact and how they can be integrated for more effective and culturally relevant environmental education in rural communities. The main objective of this research is to understand the correlation between traditional ecological knowledge, which is often passed down through generations in rural communities, and formal and informal environmental education. This could lead to more effective and culturally relevant education programs and promote sustainable living and conservation practices.

**Method**

This study employed a cross-sectional survey design. Participants included one hundred and sixty-six (n=166) individuals from rural communities in Cross River State, Nigeria. Participants were between 18 and 60 years old. There were more males than females in the sample. A structured questionnaire was designed to gather data on participants' Traditional Ecological Knowledge (TEK) and their Environmental Education (EE). The questionnaire included sections on demographic information, TEK, and EE. Items were rated on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Random sampling was used to select participants to ensure a representative sample of the rural population.

**Result**

Data were coded and entered into a statistical software package for analysis. Descriptive statistics (means, frequencies) were used to summarize the data. Pearson correlation analysis was conducted to ascertain the correlation between TEK and EE. The data retrieved from the respondents were analyzed with the statistical package for social sciences (SPSS version 26).

Table 1 shows a correlation between the main variables


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| Variables | *M* | *SD* | *1* | *2* |
|---|---|---|---|---|
| 1, TEK | 4.2 | 0.8 | .12** | |
| 2, EE | 3.8 | 0.7 | .33 | .42** |
| $R^2$ | .21 | | | |

*Note. N = 166*, ** = $p < .01$ (two-tailed). TEK= Traditional Ecological Knowledge; EE = Environmental Education

A Pearson's product moment correlation was performed to determine the correlation between traditional ecological knowledge and environmental education. The result revealed that the relationship is linear, both variables were normally distributed as calculated by Shapiro-Wilk's test ($p > .05$), and there were no outliers. There was a statistically significant, moderate positive correlation between TEK and EE, $r$ (164) = .42, $p < .001$. Most importantly, observation of the $R^2$ revealed that TEK explained about 21% of the variation in EE among the samples.

**Discussion**

The current study investigated traditional ecological knowledge (TEK), which is the indigenous knowledge system that could determine overall environmental knowledge among rural communities in Nigeria. Data from one hundred and sixty-six participants drawn from rural communities in Cross River State, Nigeria, were analyzed. The results of this study indicate a significant positive correlation between Traditional Ecological Knowledge (TEK) and Environmental Education (EE) among participants in rural communities of Cross River State, Nigeria. The moderate to strong correlation ($r = 0.56$, $p < 0.001$) suggests that individuals with a higher level of TEK tend to have better environmental education. Thus, traditional knowledge systems are crucial in enhancing environmental awareness and education. This finding aligns with a previous study by (Shen et al., 2012)., which indicated that villagers with high traditional practices had more positive attitudes toward conservation and more actively participated in conservation than villagers with low traditional practices. Similar results have shown a significant relationship between pre-service teachers' environmental education and their attitudes toward a sustainable environment (Gülçiçek, 2021). Additionally, the mean TEK score of 4.2 (SD = 0.8) and EE score of 3.8 (SD = 0.7) indicate that participants generally possess a strong understanding of both traditional ecological practices and environmental education. This highlights the importance of integrating indigenous knowledge into formal environmental education curricula to foster sustainable practices and environmental stewardship.

**Implications, Limitations, Suggestions for Further Studies**

The positive correlation between TEK and EE has several important implications: Policy Development: Policymakers should consider integrating TEK into environmental education policies and programs to enhance their effectiveness. Curriculum Design: Educational institutions should incorporate traditional ecological knowledge into their curricula to foster a deeper understanding of sustainable practices among students. Community Engagement: Encouraging the involvement of community elders and local knowledge holders in environmental education initiatives can help bridge the gap between traditional and formal education systems. Despite the insightful findings, this study has several limitations, including reliance on a sample from a specific geographic area (Cross River State), which may limit the generalizability of the results to other regions of Nigeria or other countries. Also, using self-reported questionnaires introduces bias due to participants' subjective perceptions and potential


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social desirability effects. Notably, the study's cross-sectional nature does not allow for the examination of causal relationships between TEK and EE. However, it is suggested that longitudinal studies be conducted to examine the causal relationship between TEK and EE over time and to expand the research to include diverse geographic regions and populations to enhance the generalizability of the findings.

## Conclusion

In conclusion, this study highlights a significant positive correlation between Traditional Ecological Knowledge and Environmental Education in rural communities of Cross River State, Nigeria. The findings underscore the value of incorporating traditional knowledge systems into formal environmental education to promote sustainable development. Despite its limitations, this study provides a foundation for future research and policy development to enhance environmental education by integrating indigenous knowledge.

## References

Babalola, A., & Olawuyi, D. S. (2021). Advancing environmental education for sustainable development in higher education in Nigeria: Current challenges and future directions. *Sustainability (Switzerland)*, *13*(19). https://doi.org/10.3390/su131910808

Berkes, F. (2004). Rethinking community-based conservation. In *Conservation Biology* (Vol. 18, Issue 3). https://doi.org/10.1111/j.1523-1739.2004.00077.x

Bosah, V. O. (2013). Environmental education in Nigeria: Issues, challenges, and prospects. *Mediterranean Journal of Social Sciences*, *4*(15 SPEC.ISSUE). https://doi.org/10.5901/mjss.2013.v4n16p159

de Sousa, W. L., Zacardi, D. M., & Vieira, T. A. (2022). Traditional Ecological Knowledge of Fishermen: People Contributing towards Environmental Preservation. In *Sustainability (Switzerland)* (Vol. 14, Issue 9). https://doi.org/10.3390/su14094899

Duan, S., & Zhao, R. (2021). A study of the influence of campus ecological environment integrated art education on learning attitudes and effectiveness. *Revista de Cercetare Si Interventie Sociala*, *73*. https://doi.org/10.33788/rcis.73.4

Eckert, L. E., XEMŦOLTW– Claxton, N., Owens, C., Johnston, A., Ban, N. C., Moola, F., & Darimont, C. T. (2020). Indigenous knowledge and federal environmental assessments in Canada: Applying past lessons to the 2019 Impact Assessment Act. *Facets*, *5*(1). https://doi.org/10.1139/FACETS-2019-0039

Eneji, C. V. O., Otu, B. D., Ita, C. I., Onnoghen, U. N., Ojong, A. A., Esuabana, S. B., Petters, J. S., Arop, L. O., Essien, C. K., Omini, E. E., & Monity, M. F. M. (2023). Products Evaluation of Environmental Education Curriculum/Program Implementation in the University of Calabar, Nigeria. *International Journal of Learning, Teaching and Educational Research*, *22*(4). https://doi.org/10.26803/ijlter.22.4.22

Feinstein, B. C. (2004). Learning and transformation in the context of Hawaiian traditional ecological knowledge. *Adult Education Quarterly*, *54*(2). https://doi.org/10.1177/0741713603260275

Finn, S., Herne, M., & Castille, D. (2017). The value of traditional ecological knowledge for the environmental health sciences and biomedical research. *Environmental Health Perspectives*, *125*(8). https://doi.org/10.1289/EHP858

Fontana, N. M., Pasailiuk, M. V., & Pohribnyi, O. (2022). Traditional ecological knowledge to traditional foods: The path to maintaining food sovereignty in Hutsulshchyna. *Frontiers in Sustainable Food Systems*, *6*. https://doi.org/10.3389/fsufs.2022.720757

Gagnon, C. A., & Berteaux, D. (2009). Integrating traditional ecological knowledge and ecological science: A question of scale. *Ecology and Society*, *14*(2). https://doi.org/10.5751/ES-02923-140219

Gordon (Iñupiaq), H. S. J., Ross, J. A., Cheryl Bauer-Armstrong, Moreno, M., Byington (Choctaw), R., & Bowman (Lunaape/Mohican), N. (2023). Integrating Indigenous Traditional Ecological Knowledge of land into land management through Indigenous-academic partnerships. *Land Use Policy*, *125*. https://doi.org/10.1016/j.landusepol.2022.106469

Gülçiçek, T. (2021). The Relationship between Pre-Service Early Childhood Teachers' Environmental Education Self-Efficacy Beliefs and Their Attitudes towards Sustainable Environment. *Academia Eğitim Araştırmaları Dergisi*, *6*(2). https://doi.org/10.53506/egitim.901759

Hartel, T., Fischer, J., Shumi, G., & Apollinaire, W. (2023). The traditional ecological knowledge conundrum. In *Trends in Ecology and Evolution* (Vol. 38, Issue 3). https://doi.org/10.1016/j.tree.2022.12.004

Hosen, N., Nakamura, H., & Hamzah, A. (2020). Adaptation to climate change: Does traditional ecological knowledge hold the key? *Sustainability (Switzerland)*, *12*(2). https://doi.org/10.3390/su12020676

Huntington, H. P. (2000). Using traditional ecological knowledge in science: Methods and applications. In *Ecological Applications* (Vol. 10, Issue 5). https://doi.org/10.1890/1051-0761(2000)010[1270:UTEKIS]2.0.CO;2

Joy, O.-T. E. (2023). Assessment of the Impact of Outdoor Classrooms in Environmental Education in Nigeria. *Journal of Environmental Impact and Management Policy*, *41*. https://doi.org/10.55529/jeimp.41.1.7

Kimmerer, R. W. (2012). Searching for synergy: Integrating traditional and scientific ecological knowledge in environmental science education. *Journal of Environmental Studies and Sciences*, *2*(4). https://doi.org/10.1007/s13412-012-0091-y

Manningtyas, R. D. T., & Furuya, K. (2022). Traditional Ecological Knowledge versus Ecological Wisdom: Are They Dissimilar in Cultural Landscape Research? In *Land* (Vol. 11, Issue 8). https://doi.org/10.3390/land11081123

Masalimova, A. R., Krokhina, J. A., Sokolova, N. L., Melnik, M. V., Kutepova, O. S., & Duran, M. (2023). Trends in environmental education: A systematic review. In *Eurasia Journal of Mathematics, Science and Technology Education* (Vol. 19, Issue 2). https://doi.org/10.29333/ejmste/12952

Moller, H., O'B Lyver, P., Bragg, C., Newman, J., Clucas, R., Fletcher, D., Kitson, J., McKechnie, S., & Scott, D. (2009). Guidelines for cross-cultural Participatory Action Research partnerships: A case study of a customary seabird harvest in New Zealand. *New Zealand Journal of Zoology*, *36*(3). https://doi.org/10.1080/03014220909510152

Nesterova, Y. (2020). Rethinking Environmental Education with the Help of Indigenous Ways of Knowing and Traditional Ecological Knowledge. *Journal of Philosophy of Education*, *54*(4). https://doi.org/10.1111/1467-9752.12471

Norris, E. I. (2016). Actualizing the Goals of Environmental Education in Nigeria. *Journal of Education and Practice*, *7*(8).

Nwankwoala, H. N. L. (2015). Causes of Climate and Environmental Changes: The Need for Environmental-Friendly Education Policy in Nigeria. *Journal of Education and Practice*, *6*(30).

Shen, X., Li, S., Chen, N., Li, S., McShea, W. J., & Lu, Z. (2012). Does science replace traditions? Correlates between traditional Tibetan culture and local bird diversity in Southwest China. *Biological Conservation*, *145*(1). https://doi.org/10.1016/j.biocon.2011.10.027

Singleton, B. E., Gillette, M. B., Burman, A., & Green, C. (2023). Toward productive complicity: Applying 'traditional ecological knowledge' in environmental science. In *Anthropocene Review* (Vol. 10, Issue 2). https://doi.org/10.1177/20530196211057026

Thornton, T. F., & Scheer, A. M. (2012). Collaborative engagement of local and traditional knowledge and science in marine environments: A review. *Ecology and Society*, *17*(3). https://doi.org/10.5751/ES-04714-170308

Usher, P. J. (2000). Traditional ecological knowledge in environmental assessment and management. *Arctic*, *53*(2). https://doi.org/10.14430/arctic849.