INTERCONTINENTAL JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY
ISSN 2659 - 1085, VOL 9, NO. 1 JULY, 2025. USA.

MODERN ENVIRONMENTAL MANAGEMENT STRATEGIES AS A DETERMINANT OF NIGERIA ECONOMIC DEVELOPMENT: THE TASK AND RESPONSIBILITIES BEFORE TERTIARY INSTITUTIONS IN NIGERIA.

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Abstract

This study examined modern environmental management strategies as a determinant of Nigeria economic development, also assessing the task and responsibilities before tertiary institutions in Nigeria. In carrying out the study, a descriptive survey design was adopted and the study was carried out in two states in Nigeria, (Akwa Ibom State and Abia State). The targeted population for the study comprised all Environmental Scientists and Economists in Nigeria. A stratified random sampling technique was used to select 40 environmental scientists and 20 economists each from both State and Abia States and that gave a total of 120 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "Modern Environmental Management Strategies Questionnaire (MEMSQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.91, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive statistics used in answering the research questions. The results of the analysis revealed that "Effective Environmental Management practices in Nigeria" was the most noticeable impact of modern environmental management strategies among others. Likewise, the study shows that Technological Advancement" was the highest role of innovative tertiary education in economic development. The study concluded that modern environmental management strategies are pivotal in driving Nigeria's economic development, as they offer sustainable solutions to the country's pressing environmental challenges. One of the recommendations provided was that tertiary institutions should embed modern environmental management strategies into their academic programs in order to equip students with the knowledge necessary to drive sustainable economic development of Nigeria.

Keywords: Environmental Management, Economic Development, Tertiary Institutions and Nigeria.

Introduction

The intricate relationship between environmental management and economic development has garnered significant attention in recent years, particularly in developing nations like Nigeria. As the world's largest economy in Africa, Nigeria faces an array of environmental challenges, including deforestation, pollution, and the impacts of climate change, all of which threaten its economic stability and growth (Adefemi et al., 2020; Adeoye & Kalu, 2021). The pressing need for sustainable practices has led to the emergence of modern environmental management strategies as pivotal components in shaping economic policy and fostering development.

Modern environmental management strategies encompass a range of approaches aimed at integrating environmental concerns into economic decision-making, thereby promoting sustainable development. These strategies not only focus on regulatory compliance but also emphasize the importance of innovative practices, such as circular economy principles, waste minimization, and renewable energy adoption (Ogunbode et al., 2021; Ude et al., 2022). The effective implementation of these strategies is essential for mitigating environmental degradation while simultaneously enhancing

economic performance.

Tertiary institutions in Nigeria play a crucial role in this transformative process. As centers of knowledge generation and dissemination, they are uniquely positioned to educate future leaders and professionals about sustainable practices. Moreover, these institutions can contribute to research initiatives that address specific environmental challenges faced by the country, thereby equipping students with the skills necessary for effective environmental management. The integration of environmental education into curricula is imperative for cultivating a generation of environmentally conscious citizens who can drive sustainable development in various sectors.

Furthermore, tertiary institutions can foster partnerships with government agencies and industries to facilitate the exchange of knowledge and resources, ultimately promoting innovative solutions to environmental issues (Ojo, 2022). This collaborative approach not only enhances the institutions' impact on economic development but also aligns with global sustainability goals, including the United Nations Sustainable Development Goals (SDGs).

In conclusion, the imperative for modern environmental management strategies as determinants of Nigeria's economic development cannot be overstated. Tertiary institutions have significant tasks and responsibilities in this situation, necessitating a re-evaluation of their roles in promoting sustainability and fostering economic resilience. By embracing innovative environmental management approaches and cultivating a culture of sustainability, Nigeria can achieve its economic objectives while safeguarding its natural resources for future generations.

Statement of the problem

The pressing environmental challenges in Nigeria—ranging from deforestation and pollution to unsustainable waste management—present significant threats to the nation's economic development, impacting public health, agriculture, and resource availability. Despite the urgency, current environmental management strategies remain insufficiently implemented, primarily due to gaps in knowledge, inadequate policy enforcement, and limited institutional commitment. Tertiary institutions in Nigeria hold the potential to bridge these gaps by producing research-based solutions, equipping students with the necessary skills for environmental stewardship, and fostering partnerships with policymakers and industry leaders. However, the question remains whether these institutions are fully prepared to take on these responsibilities, highlighting a need to examine the effectiveness and readiness of tertiary institutions in contributing to sustainable economic development through modern environmental management strategies.

Objective of the study

i. To find out the impact of modern environmental management strategies on economic development of Nigeria.
ii. To examine the roles of innovative tertiary education in economic development of Nigeria.

Research questions

1. What are the impact of modern environmental management strategies on economic development of Nigeria?
2. What are the roles of innovative tertiary education in economic development of Nigeria?

LITERATURE REVIEW

Concept of Environment

The word "environment," derived from the French word "environner," which means to enclose, encircle, or surround, refers to a wide and basic concept that encompasses the exterior surroundings in which living things are found. Therefore, the surroundings or conditions in which living things, such as people, animals, and plants, live can be referred to as an environment. In other words, an environment is the sum of all the elements—living and non-living—and their consequences that affect human existence.

Various definitions define the environment as a complex system of living and non-living things, physical, chemical, and biological aspects, and the relationships that all living things on Earth are a part of. According to Altamirano (2016), the terms "environment" and "space," "territorial," "place," and "ecosystem" are interchangeable. According to Douglas & Marques (2015), an organism's environment encompasses all external elements that impact its existence and growth. According to Tochhawng (2015), the environment is the set of circumstances that surround living things, including people.

Life is governed by the environment, which includes both biotic (living) and abiotic (non-living) elements. More than other animals, humans engage with their surroundings, which are made up of all the physical, biological, and cultural elements that surround an organism and affect its growth and development. Abiotic (non-living) factors, such as light, temperature, water, soil, air, minerals, and natural disasters like hurricanes and earthquakes), biotic (living) factors, such as plants, animals, microorganisms, fungi, and protists, ecosystems (complex networks of relationships between biotic and abiotic factors, such as forests, grasslands, deserts, oceans, rivers, lakes, wetlands, tundras, and coral reefs), and natural resources (which are vital for maintaining life and human activities, including water, air, soil, minerals and fossil fuels.

Living and non-living elements interact and influence one another, making the ecosystem unique in its interconnection. It is also dynamic and ever-changing, with both human activity and natural forces influencing its development. According to Attenborough (2020), the environment encompasses not only the world we live in but also the world we have fashioned through our decisions and actions. Because it provides essential services like food, housing, water, and air, the environment is essential to life and human existence. In addition, it preserves health and well-being, controls climate and weather patterns, and promotes economic growth.

Concept of Environmental Management

Environmental management involves the protection and maintenance of natural resources, from the air we breathe, to the water we drink, to the ecosystems that support life, to the renewable and non-renewable energy and materials that are exploited for modern living, and the disposal of waste. Environmental management, also known as environmental resource management, is the management of the interaction and impact of human societies on the environment. It is not, as the phrase might suggest, the management of the environment itself.

Establishing and preserving circumstances that allow society and nature to coexist is the primary goal of environmental management. This entails procedures that lessen the influence of people on their environment. Degradation factors can be identified and mitigation techniques put into action with the aid of environmental management. It also aids in anticipating the consequences of environmental deterioration in the future and starting procedures to lessen those effects.

There are several ways to look at environmental resource management. It entails the management of all biotic (living) and abiotic (non-living) elements of the biophysical environment as well as the interactions between all living things and their environments. The environment also includes

the interactions between the biophysical environment and the human environment, including the social, cultural, and economic environments. The ethical, financial, social, and technological facets of environmental resource management are crucial. These serve as guiding principles and aid in decision-making.

Dale (2014) defines environmental management as the real choices and activities made in order to evaluate, safeguard, distribute, develop, use, repair, restore, and preserve the environment. Environmental management, according to Wostl (2015), is the process of controlling how human societies and the environment interact in order to preserve the environment and advance sustainable development.

Several essential elements are usually included in the environmental management mechanism. These consist of an environmental policy that describes an organization's dedication to environmental sustainability, planning that entails establishing environmental goals and targets, implementation that carries out plans and allots resources, checking that entails routinely assessing performance in relation to goals and targets, and management review that supports the EMS's ongoing efficacy and appropriateness. Internal environmental audits, employee environmental training programs, and environmental performance targets and indicators are examples of other mechanisms. Benefits including lower risks, improved perception, more productivity, and ongoing advancements might result from these elements.

In order to accomplish shared environmental objectives, governments, corporations, communities, and individuals must collaborate in order to practice effective environmental management. A variety of instruments and tactics are also used, such as laws and policies, awareness-raising and education campaigns, research and development, and community involvement and engagement.

Concept of Environmental Management Strategies

Environmental management strategies refer to a set of actions and approaches that individuals, organizations, governments, and communities implement to address and alleviate environmental challenges. These strategies aim to protect and preserve natural resources, reduce pollution, and promote sustainable practices to ensure a healthier and more sustainable future for the planet. By implementing a combination of these strategies, societies can work toward achieving a more sustainable and resilient environment for current and future generations.

Environmental management, also referred to as environmental conservation, is the process of managing how human activities affect the environment by identifying and controlling the variables that may cause conflicts between preserving the environment and addressing social and economic demands. Protecting, maintaining, managing, or restoring natural ecosystems and the ecological communities that live there is known as environmental conservation. It encompasses all actions taken at the individual, organizational, and governmental levels to safeguard the environment and natural resources.

Since some tactics must be implemented, the significance of environmental management strategies cannot be emphasized enough. By using these tactics, businesses may improve their bottom line and help create a more sustainable future while also lessening their environmental impact, minimizing pollution, and preventing damage to the environment. Environmental strategy, as defined by Aragon-Correa & Ortiz-de-Mandojana (2016), is a company's long-term focus on how to manage environmental practices and build environmental resources and skills to meet the expectations of its stakeholders.

Additionally, there are a number of advantages to using environmental management strategies, such as minimizing the effects on the environment, improving brand image and reputation, cutting costs and increasing efficiency, improving compliance and lowering risk, promoting sustainable

development, boosting stakeholder trust, fostering innovation and competitiveness, ensuring long-term survival, boosting employee engagement and morale, and advancing global sustainability goals. Environmental management strategies are the plans, actions, and procedures that organizations employ to minimize their environmental impact, lower their environmental footprint, and promote sustainable development, according to J. W. S. Longhurst (2020).

To adopt efficient environmental management strategies, firms must integrate environmental issues into their operations, goods, and services. Moreover, environmental management plans play a crucial role in this implementation, as they outline the potential environmental impacts of an action and specify the commitments of those responsible for taking the action to avoid, minimize, and manage these impacts, ensuring they are environmentally acceptable.

Concept of Economy

An economy is a system that decides how to produce and consumer goods and services with limited resources. It is a social sphere that includes the production, trading, and distribution of products and services as well as their consumption. The study of the nature, function, and development of economic institutions—such as businesses, governments, markets, money, households, and other essential institutions and organizations—is the focus of economics, according to Jordan et al. (2024). It encourages contributions from all academic fields and schools of thought that can advance our knowledge of the characteristics, evolution, and operations of actual economic institutions and organizations.

Economy includes the quality of the products and services as well as the efficiency of production and consumption. An economy demonstrates how money is made and spent in a region. Economics is the study of scarcity and how it affects resource utilization, the creation of goods and services, the expansion of production and welfare over time, and a wide range of other intricate problems that are extremely important to society. A country's economy can be defined as the way it creates and consumer goods and services; thus, the term "economy" refers to both the quality of the commodities and services produced and the efficiency with which these processes take place. An economy demonstrates how money is made and spent in a region. It encompasses more than simply the output.

An economy is a complex system of interconnected exchange, consumption, and production activities that ultimately decide how participants' resources are distributed. The requirements of people who live and work in the economy are met by the creation, distribution, and consumption of commodities and services. An economy is the area where products and services are produced, traded, distributed, and consumed. It is generally understood to be a social domain that places an emphasis on the behaviors, conversations, and tangible manifestations related to the creation, use, and administration of resources.

The creation, distribution, and consumption of goods and services are the main topics of the social science of economics. The analysis of decisions made by people, organizations, governments, and countries about the distribution of scarce resources is the main focus of economics. Numerous other disciplines, such as politics, psychology, business, and law, are impacted by economics. Economics is the study of how individuals and groups divide up limited resources for production, distribution, and consumption.

Concept of Economic Development

Economic development is regarded as important for a country to reduce its poverty by providing more employment, higher incomes, improved goods and services, and latest technologies of production. The process of converting low-income, basic national economies into sophisticated

Industrial economies is known as economic development (Akpan & Bernard, 2024). According to Panth (2020) Economic development is taken to be the structural transformation of an economy by introducing more mechanized and updated technologies to increase labor productivity, employment, incomes, and standard of living of the population. Economic development should be accompanied by improvements in infrastructure, as well as social, political, and institutional factors to facilitate transformation of the economy. Economic development is the process through which economies are transformed from ones in which most people have very limited resources and choices to ones in which they have much greater resources and choices.

The study of macroeconomic variables that impact long-term economic development as well as microeconomic problems that impact people and businesses, especially in developing countries, is the focus of the economics discipline known as economic development. On the one hand, economic output and metrics like gross national income are the primary focus of the concept of economic growth. According to Kumari & Bhanoo 2 (2022), economic development causes the nation's socioeconomic structure to gradually shift. In contrast to economic growth, it also takes into account shifts in the institutional and technological means of production and distribution. Research on "developing economies," or economies with comparatively low per capita resources, is referred to as development economics.

Economic development is predicated on long-term investments in the generation, dissemination and absorption of new ideas, as well as infrastructure. Economic development requires collective action and large-scale investments with long time horizons. Infrastructure projects, a traditional concern of economic development, now extends to the digital realm. Economic development. Can investments in the further development of a technology, such as the use of telecommunications with computers, lead to advances that generate new jobs, sales of additional products internally, and for export? Ručinská, Müller & Nauerth (2016) affirmed that, Economic development describes a process of improving economic and social well-being of people in a specific area. In addition to qualitative and quantitative growth, it includes social and environmental aspects. For this purpose various economic measures with different focus are used to quantify economic development.

Additionally Akpan & Clark (2024) mentioned that Economic development, on the other hand, encompasses qualitative improvements in living standards, infrastructure, education, healthcare, and other critical areas of life. Economic development as the development of capacities that expand economic actors' capabilities. The process of economic development is both multidimensional and highly nonlinear. It entails dynamic change not only in production patterns and technology but also in social, political and economic institutions, as well as in patterns of human development. Economic development is defined as a process that focuses on the growth expressed both qualitatively and quantitatively in a country's economy. Economic development involves providing possibilities in education, health, employment and environmental conservation, leading to an increase in income per capita of each citizen.

Types of modern environmental management strategies

The various types of modern environmental management strategies listed below are a result of the evolution of multidisciplinary approaches, technology, policy, and community engagement to address complex, interconnected environmental challenges that affect ecosystems, economies, and human societies.

- Sustainable Resource Management (SRM)

Sustainable Resource Management (SRM) is a contemporary environmental strategy that encourages the efficient, responsible use of natural resources to meet current needs while preserving them for future generations. It encompasses principles like the circular economy, which minimizes waste through recycling and reuse, and ecosystem-based management, which protects biodiversity by

managing resources in harmony with natural processes. The goal of SRM strategies is sustainable and equitable water use by incorporating techniques such as Integrated Water Resource Management (IWRM). SRM promotes equilibrium between ecological well-being and economic expansion by giving priority to resource preservation and reducing environmental deterioration.

- Pollution Prevention and Control Strategies

In order to reduce environmental impact and promote sustainable industrial practices, pollution prevention and control strategies—which emphasize reducing pollutants at the source rather than depending on end-of-pipe treatment—include Cleaner Production techniques, which optimize processes to minimize waste and emissions, Best Available Techniques (BAT), which implement the most effective technologies to reduce pollution, and other strategies, like Green Chemistry and Industrial Symbiosis, which encourage eco-friendly material use and by-product sharing among industries.

- Climate Change Mitigation and Adaptation

Addressing the causes and effects of climate change is the goal of both adaptation and mitigation methods. While adaptation prepares societies for the effects of climate change by creating resilient infrastructure and putting Nature-Based Solutions (like reforestation) into place to absorb carbon and lessen vulnerability to extreme weather, mitigation concentrates on lowering greenhouse gas emissions through measures like switching to renewable energy and improving energy efficiency to slow global warming. The role of technological development and innovation has become ever more important against the backdrop of various issues related to society's sustainability, including resource and energy problems and climate change ().When combined, these tactics balance short-term action with long-term environmental health by stabilizing climate conditions and enhancing resilience to unavoidable changes. As mentioned by Cohen-Shacham et al., (2019) Natural-Based Solutions integrate ecosystem restoration, such as reforestation and wetland restoration, to naturally sequester carbon and enhance resilience to climate impacts.

- Environmental Governance and Policy Development

Environmental Governance and Policy Development are strategies that create frameworks for sustainable practices through regulations, policies, and collaborative decision-making. By integrating many stakeholders such as governments, corporations, communities, Participatory Governance fosters transparency and inclusivity in environmental choices, addressing local needs and knowledge. Tools like market-based instruments (e.g., carbon taxes) incentivise pollution reduction, while environmental justice programs attempt to alleviate disparities faced by underprivileged communities. These governance mechanisms establish the accountability and regulatory support necessary for effective, long-lasting environmental management.

- Biodiversity Conservation and Habitat Restoration

In order to promote ecological balance and resilience, biodiversity conservation and habitat restoration prioritize preserving species diversity and restoring damaged ecosystems. While conservation measures like creating protected areas aid in the preservation of important habitats, habitat restoration initiatives like reforestation and wetland rehabilitation assist ecosystems return to their natural functions. These tactics encourage sustainable human resource use, improve biodiversity, and advance ecological services by addressing concerns including fragmentation and invasive species. Together, they protect vital ecosystems and the animals that live there, making the earth healthier. Aronson & Alexander, (2018) mentioned that Restorative ecology emphasizes rebuilding degraded ecosystems, such as wetlands, forests, and coral reefs, to promote biodiversity and ecosystem services.

- Environmental Monitoring and Assessment

Using tools like Remote Sensing and Geographic Information Systems (GIS) to monitor land use, deforestation, and urban growth in detail, and evaluating the ecological effects of new projects through

Environmental Impact Assessments (EIAs), as well as engaging the public through Citizen Science to increase data collection while raising awareness, especially in resource-poor areas, are strategies that are used to systematically track environmental changes, assess ecosystem health, and guide sustainable management decisions. These assessment strategies provide vital information that informs policy, improves compliance, and enhances long-term environmental planning.

Roles of Innovative Tertiary Education in Economic Development of Nigeria

Innovative tertiary education plays a crucial role in the economic development of Nigeria by addressing various dimensions such as skill development, research, entrepreneurship, and industry collaboration. This multifaceted impact is essential for fostering a competitive and sustainable economy.

- **Skill Development and Employability**

The skill gap in Nigeria's job market is immediately addressed by innovative tertiary education. With a curriculum that increasingly involves practical training, colleges equip graduates to meet the expanding needs of various businesses. Students who complete programs that emphasize practical projects, internships, and experiential learning will not only graduate with theoretical knowledge but also with employable skills. Competent graduates have higher employability, which lowers unemployment rates (Adeyemo & Akinyemi, 2020). Institutions and industry partners are working together to update curricula on a regular basis to make sure it remains relevant to the demands of the labor market. This strategy not only helps graduates but also boosts the economy's overall output by supplying a competent labor force that can spur efficiency and innovation across a range of industries.

- **Technological Advancement**

Research and development (R&D) is a key function of postsecondary education in Nigeria, with the goal of promoting technological innovation. Universities are information hubs where scientific and technological advancements are conducted. Information technology, healthcare, energy, and agriculture are among the industries that depend on this study. Higher education institutions carry out research that results in inventions that have the power to revolutionize markets and boost output. Nigerian colleges, for instance, have made significant contributions to the development of agricultural technology that enhance crop yields and food security, both of which are critical for rural development and the expansion of the country's economy. Tertiary universities in Nigeria support the general growth of the economy by promoting technical innovation through research (Adeboye, 2019).

- **Entrepreneurship Promotion**

In Nigeria, tertiary institutions are emphasizing entrepreneurship as a means of achieving economic development. Universities have started offering courses that encourage critical thinking, creativity, and business acumen since these abilities help students become job creators rather than just job seekers. This is crucial in a nation where unemployment is high, especially for young people. Graduates with an entrepreneurial education are more equipped to establish businesses, innovate across industries, and help Nigerian economy diversify.

- **Poverty Reduction**

According to Usman & Olawale (2021), one of the best strategies for lowering poverty in Nigeria is postsecondary education. University and polytechnic graduates are more likely to land lucrative positions in industries like finance, healthcare, and engineering, enabling them to make larger

economic contributions through higher levels of savings and spending. In addition, educated people are more willing to invest in their children's education as their salaries rise, which feeds the cycle of upward social mobility and poverty alleviation. In this sense, postsecondary education promotes long-term economic growth by preventing the transmission of poverty from generation to generation.

- Social and Economic Equality

By giving people from different backgrounds the chance to better their social and economic circumstances, access to postsecondary education fosters social and economic equality. Because it puts people from lower-income families on an even playing field with their richer counterparts, education is a potent instrument for eliminating economic disparity. In Nigeria, closing the wealth gap and promoting an inclusive economy depend on providing equal access to postsecondary education.

- Global Competiveness

Umeh (2018) argues that improving the quality of tertiary education in Nigeria is essential for enhancing the country's international competitiveness. Nigerian universities are increasingly forming partnerships with foreign institutions, leading to collaborative research projects and student exchange programs that benefit the economy. Universities that offer high-quality education produce graduates who can compete globally, attracting international students and fostering collaborations with foreign institutions. This not only brings economic benefits through tuition fees and research funding but also helps to raise the profile of Nigerian universities on the global stage.

Impact of Modern Environmental management Strategies on Economic Development of Nigeria

1. Effective Environmental Management practices in Nigeria

Modern environmental management strategies have gained significant traction in Nigeria from 2015 to 2024, aligning with global sustainability goals. These strategies aim to address pressing environmental issues such as deforestation, pollution, and climate change, which have profound implications for economic development. As Nigeria grapples with the dual challenge of rapid urbanization and environmental degradation, effective management becomes critical. By integrating sustainable practices into economic planning, the country seeks to enhance resilience, boost productivity, and create a sustainable economy.

- Policy Framework and Implementation

The establishment of frameworks like the National Environmental Policy and the Climate Change Policy Response in Nigeria has fostered a more structured approach to environmental management. These policies advocate for the integration of environmental considerations into economic decision-making processes. By setting regulatory standards and promoting best practices, the government encourages industries to adopt greener technologies. This shift not only mitigates environmental impacts but also positions Nigeria as a more attractive destination for eco-conscious investments, thereby stimulating economic growth.

- Sustainable Agriculture and Food Security

One of the most significant areas impacted by modern environmental management is agriculture, which is crucial for Nigeria's economy. Strategies promoting sustainable agricultural practices, such as organic farming and agroforestry, have enhanced productivity while conserving resources. By focusing on sustainable land management, farmers can improve soil fertility and resilience to climate change.

This approach not only ensures food security but also increases farmers' incomes, contributing to poverty alleviation and overall economic development.

1. Renewable Energy Initiatives

The push for renewable energy sources, particularly solar and wind, reflects a major shift in Nigeria's energy strategy. Environmental management has prioritized investments in clean energy technologies to reduce reliance on fossil fuels. The implementation of solar power initiatives, especially in rural areas, has improved access to electricity, fostering economic activities and entrepreneurship. By diversifying the energy mix and reducing energy costs, Nigeria can stimulate growth in various sectors, including manufacturing and services.

- Management and Economic Opportunities

Modern waste management strategies have transformed Nigeria's approach to dealing with solid waste, which has been a significant environmental challenge. Initiatives such as recycling and waste-to-energy projects have not only reduced pollution but also created new economic opportunities. The development of a circular economy encourages local businesses to innovate in waste management practices, leading to job creation and economic diversification. As communities become more involved in waste management, they also foster a sense of ownership and responsibility towards their environment.

1. Eco-Tourism as an Economic Driver

The integration of environmental management strategies has also bolstered eco-tourism in Nigeria. By preserving natural landscapes and promoting biodiversity, the country attracts tourists interested in sustainable travel. Eco-tourism not only generates revenue but also creates jobs in local communities. Investments in protected areas and national parks, coupled with responsible tourism practices, have the potential to enhance local economies while promoting environmental conservation.

- Climate Change Adaptation and Resilience

As Nigeria faces the adverse effects of climate change, modern environmental management strategies emphasize adaptation and resilience. Programs aimed at enhancing community resilience to climate-related disasters, such as floods and droughts, have become increasingly vital. By investing in infrastructure and promoting climate-smart agricultural practices, Nigeria can reduce economic losses and protect livelihoods. These strategies not only safeguard vulnerable populations but also ensure the sustainability of key economic sectors.

- Public Awareness and Education

Raising public awareness about environmental issues has been a cornerstone of modern management strategies. Educational campaigns and community engagement initiatives encourage individuals and businesses to adopt sustainable practices. Increased awareness leads to a cultural shift towards environmental stewardship, which is crucial for long-term economic development. A well-informed populace is more likely to support and participate in sustainable practices, thereby enhancing collective action for environmental protection.

- International Collaboration and Investment

Nigeria's modern environmental management strategy has drawn international partnerships and

investments. Cooperation with foreign governments, NGOs, and global organizations has facilitated the transfer of knowledge and technology. These partnerships frequently result in funding opportunities for sustainable projects, which can have a significant impact on local economies. Nigeria's alignment with international sustainability goals improves its standing in the world and draws foreign direct investment, which further stimulates economic growth.

- Conclusion and Future Outlook

In summary, from 2015 to 2024, modern environmental management strategies had a significant impact on Nigeria's economic development. The country prioritizes sustainability in order to address pressing environmental issues and to create avenues for economic growth. The integration of environmentally friendly practices across a range of sectors, from agriculture to energy, positions Nigeria for future prosperity and resilience. As the country continues to navigate these complexities, continued commitment to modern environmental management will be crucial to achieving sustainable economic development.

METHODOLOGY

In carrying out the study, a descriptive survey design was adopted and the study was carried out in two states in Nigeria, (Akwa Ibom State and Abia State). The targeted population for the study comprised all Environmental Scientists and Economists in Nigeria. A stratified random sampling technique was used to select 40 environmental scientists and 20 economists each from both State and Abia States and that gave a total of 120 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "Modern Environmental Management Strategies Questionnaire (MEMSQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.91, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive statistics to answer research questions.

RESULTS AND DISCUSSIONS

Research Question 1

The research question sought to find out the impact of modern environmental management strategies on economic development of Nigeria. To answer the research percentage analysis was performed on the data, (see table 1).

Table 1:
Percentage analysis of the impact of modern environmental management strategies on economic development of Nigeria.

IMPACTS	FREQUENCY	PERCENTAGE
Effective Environmental Management Practices in Nigeria	78	21.14**
Policy Framework and Implementation	21	5.69
Sustainable Agriculture and Food Security	19	5.15
Renewable Energy Initiatives	24	6.51
Management and Economic Opportunities	65	17.62
Eco-Tourism as an Economic Driver	45	12.19
Climate Change Adaptation and Resilience	41	11.11
Public Awareness and Education	37	10.03
International Collaboration and Investment	27	7.32
Conclusion and Future Outlook	12	3.25*
TOTAL	369	100%

** The highest percentage frequency
* The least percentage frequency

SOURCE: Field survey

The above table 1 presents the impact of modern environmental management strategies on economic development of Nigeria. From the result of the data analysis, it was observed that the highest the impact of modern environmental management strategies on economic development of Nigeria is "Effective Environmental Management practices in Nigeria" 78(21.14) while "Conclusion and Future Outlook" 12(3.25) was rated the least impact. The result therefore is in agreement with the research findings of Umeh (2018) who argues that improving the quality of tertiary education in Nigeria is essential for enhancing the country's international competitiveness and that also, modern environmental management strategies have gained significant traction in Nigeria. These strategies, according to him aim to address pressing environmental issues such as deforestation, pollution, and climate change, which have profound implications for economic development.

Research Question 2

The research question sought to find out the roles of innovative tertiary education in economic development of Nigeria. To answer the research percentage analysis was performed on the data, (see table 2).

Table 2:
Percentage analysis of roles of innovative tertiary education in economic development of Nigeria.

ROLES	FREQUENCY	PERCENTAGE
Skill Development and Employability	76	22.62
Technological Advancement	98	29.17**
Entrepreneurship Promotion	64	19.05
Poverty Reduction	21	6.25*
Social and Economic Equality	32	9.52
Global Competiveness	45	13.39
TOTAL	336	100%

** The highest percentage frequency
* The least percentage frequency

SOURCE: Field survey

The above table 2 presents the roles of innovative tertiary education in economic development of Nigeria. From the result of the data analysis, "Technological Advancement" 98(29.17) was rated the highestroles of innovative tertiary education, while "Poverty Reduction" 21(6.25) was rated the least roles. The result therefore is in agreement with the research findings of Adeboye. (2019), who stated Tertiary universities in Nigeria support the general growth of the economy by promoting technical innovation through research and that higher education institutions carry out research that results in inventions that have the power to revolutionize markets and boost output.

Conclusion

It can be concluded that Modern environmental management strategies are pivotal in driving Nigeria's economic development, as they offer sustainable solutions to the country's pressing environmental challenges. Factually, the tertiary institutions however play a critical role in this transformation by equipping future leaders with the knowledge and skills to implement sustainable practices. Also, "besides other ones, effective Environmental Management practices in Nigeria" is the most noticeable impact of modern environmental management strategies. Beyond reasonable doubt, "Technological Advancement" is the highest role of innovative tertiary education in economic development of Nigeria. Furthermore, through research, education, and partnerships with industries and government, these institutions can facilitate innovation and contribute to the nation's long-term economic growth. By embracing their responsibilities in this capacity, tertiary institutions in Nigeria can ensure a future where economic progress is harmonized with environmental stewardship, securing a sustainable legacy for future generations.

Recommendations

i. Tertiary institutions should embed modern environmental management strategies into their academic programs in order to equip students with the knowledge necessary to drive sustainable economic development of Nigeria.
ii. Universities should prioritize research focused on innovative environmental solutions, particularly in areas like renewable energy, waste management, and climate adaptation, to address Nigeria's unique challenges.

iii. Tertiary institutions should collaborate with industries and government agencies to implement sustainable practices, share expertise, and develop technologies that promote both economic growth and environmental protection.
iv. It is advised that the Nigerian universities should lead public awareness campaigns to educate communities on the importance of environmental sustainability and its impact on economic development.
v. Tertiary institutions must set an example by adopting green practices on their campuses, such as energy-efficient buildings and waste reduction initiatives, to demonstrate the practical benefits of environmental management strategies.

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