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Environmental Friendly Behaviour and the Attainment of Sustainable Communities in Ikom Education Zone-Nigeria.

By

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Abstract

The essence of this study was to investigate environment friendly behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State. To achieve the purpose of this study, two research questions were posed and converted to two null hypotheses that were tested at 0.05 level of significance. Literature was reviewed in accordance with the variables of the study. Survey research design was considered most appropriate for the study. The population of this study consisted of all the farmers, hunters, gathers of forest products and timber dealers residing and operating in Ikom Education Zone of Cross River State. Simple random sampling technique was adopted to select the four local government areas and forty-one communities used for the study. Systematic random sampling technique was also adopted to select the five hundred and twenty (520) respondents used for the study. A thirty-five item four point Likert scale questionnaire was the instrument utilized for the purpose of gathering data for the study. The instrument was properly validated by relevant lecturers. To establish the reliability of the instrument, Cronbach alpha method was employed. In order to test the hypotheses formulated for the study, Pearson product moment correlation and multiple regression statistical tools were used for analysis of data. The results that were obtained from analysis of data and testing of hypotheses in the study revealed that; There is a significant relationship between tree planting and attainment of sustainable communities

there is a significant relationship between water conservation and attainment of sustainable communities. It can be concluded that environment-friendly behaviour contributes positively to the attainment of sustainable communities in the study area.

Background to the study

Sustainable development goal (Number 11) aims to promote the attainment of sustainable cities and communities by ensuring that residents of these communities have access to basic necessities that would make life at least minimally comfortable for every rural dweller. The attainment of sustainable communities requires fostering environmental, social and economic

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wellbeing for present and future generations through rational resource use, community engagement and equitable development practices.

The attainment of sustainable communities connotes the improvement of rural livelihoods through community development initiatives. Obi (2021) asserted that community development as a concept can be traced back to the era where man progressed from the hunting and gathering age to the sedentary age. This marked the period where humans ceased to move from place to place and began to settle down across various locations. Hence, in his attempt to live a sedentary life, he began to think of ways to better his lots and that of the community he belongs. Many communities had in the pre-colonial days constructed roads and bridges, cleared village paths, provided themselves with clean water supply and built market places through communal labour.

Community development involves many issues ranging from the development of the neighborhood community through improved social services, protection and regeneration of natural and built environmental factors through the development of economic and employment opportunities. Over the years, many communities have constructed roads and bridges, cleared village paths, provided themselves with potable water supply, built market places, schools and provision of food. Others include infrastructural development, electricity, health centers, improved housing as well as improved agricultural and storage facilities that have helped in sustaining the community members. Most communities are not able to achieve meaningful development because they lack the basic resources that would bring development or they are not able to harness and utilize the existing resources that would enable them develop their communities.

In the last two decades, the inability of some communities to provide for their basic needs and social amenities has become serious social issues. From a socio-economic perspective, infrastructure and basic amenities like good roads, potable water supply, electricity, health center, markets, transportation, telecommunication, and sports centers can affect development. When all these essential infrastructure and amenities are lacking, development can hardly take place. Other important factors are illiteracy, ignorance and poverty. On the other hand, government's neglect can also affect developmental process that could take place in the community (Williams, 2018).

Community development encompasses the development of agricultural resources, water resources, and forest resources. Others include allied activities like villages and cottage industries and crafts, socio-economic infrastructure, community services and facilities and above all, human resources. This is because community members derive benefits like peace,

shelter, food, income, stable ecosystem, social justice and equity from the management of their natural resources. Eniang (2021) opined that sustainability of communities enhances residents' quality of life, promotes health and safety, and contributes to a more vibrant and sustainable community system. As a result, addressing infrastructure, healthcare, education and social services can positively impact overall community welfare.

It has been observed that over 60% of the population of Cross River State and Ikom Education Zone in particular live in rural communities that are often marginalized and lack social amenities and basic infrastructure. This makes it very difficult to attain sustainable development when a significant number of residents of the study area live in conditions that do not support human growth and development. These conditions include poor road network, lack of public power supply, dilapidated school buildings, lack of employment opportunities, unhygienic environmental conditions among others. These conditions have put many members of these communities in disadvantaged positions to attain their life goals and objectives. The desire to overturn these inhuman conditions and provide services that would help make life a bit comfortable for members of these various communities brought about the concept of Attainment Sustainable Communities (ASC). This usually requires collaboration between communities provide for their basic needs. This initiative has continued to gain wide recognition both nationally and internationally.

This initiative has made it imperative for people to develop behaviours that are considered friendly to the environment in order to ensure the rational use of these resources, which could enhance the attainment of sustainable communities. Akan (2022) identified tree planting as one of the environment friendly behaviours that could enhance the attainment of sustainable communities. Tree planting behavious among members of rural communities could ensure the recovery of lost forested lands, protection of soil from erosion, mitigate climate change, and provide raw materials for various construction activities in a community. This could contribute significantly to the attainment of sustainable communities across location.

Reegan (2020) identified water conservation behavior as one of the environment-friendly behaviours that could be adopted by members of a community to improve their living conditions. Water is an essential life support system. Its distribution across communities is uneven. Considering the fact that, of the earth's total water supply, only less than 1% of the earth's water is potable, the need for effective conservation of water has become imperative. No meaningful development can take place in a place without adequate water supply. Thus, the development of water conservation behaviour could contribute to the attainment of sustainable communities.

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It is against this background that this research is intended to investigates environmental friendly behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State.

Purpose of the study

The purpose of this study is to investigate environmental friendly behaviours and the attainment of sustainable communities in Ikom Education Zone of Cross River State. In specific terms, the study seeks to;

1. Examine the relationship between tree planting and the attainment of sustainable communities

2. Determine the relationship between water conservation and the attainment of sustainable communities

Statement of the problem

Members of rural communities within the study area are faced with numerous challenges including poor access roads, irregular power supply, inadequate potable water, dilapidated educational facilities, inadequate healthcare facilities, unhygienic environmental conditions, poor housing among others.

The resources in these communities are grossly inadequate to enable them embark on meaningful projects/programs that would help ameliorate their living conditions and improve their living standards. This situation has continued to attract the attention of well-meaning individuals and groups who have made frantic efforts to help link some of these communities to external assistance that could complement the self-help initiatives already embarked upon by members of various communities in the study area. As earlier highlighted, the attainment of sustainable communities is goal eleven (11) of the Sustainable Development Goals (SDG) of the United Nations Organization. This is aimed at fostering holistic development of over 60% of the inhabitants of the study area through the improvement of living standards and provision of viable opportunities for rural dwellers.

The attainment of this goal has become a source of concern to various environmental stakeholders who believe that several communities have the natural and human resource required for their development. They have however attributed the living conditions of members of most communities to unfriendly environmental behaviour that tend to destroy their natural resources and push them further into poverty. They believe that a change in these behaviors could help promote the attainment of sustainable communities. This motivated the researcher to investigate how environmentally friendly behaviours relate with the attainment of sustainable communities in Ikom Education Zone of Cross River State?

Literature review

Concept of environment-friendly behaviour and attainment of sustainable communities The conceptual framework for this study highlighted the relationship between environmentfriendly behaviours and attainment of sustainable communities in Ikom Education Zone of Cross River State. The attainment of sustainable communities is possible when people develop environment-friendly behaviour that would not militate against the conservation of natural resources. The practice of environment-friendly behaviour like tree planting and water conservation, would enormously contribute to attainment of sustainable communities. These behaviours can either promote or hinder the attainment of sustainable communities.

The attainment of sustainable communities emanated from the desire to ensure that communities are empowered to depend less on external assistance and use resources within the communities wisely in order to reduce poverty and improve community livelihood. Hence the attainment of this lofty goal is possible if people learn to develop and practice environment-friendly behaviours that do not promote reckless utilization of community resources.

As a result, the attainment of sustainable communities' rest largely on the behaviour members of rural communities display towards the environment and the resources that are found in it. The emphasis on the helping people to develop environment-friendly behaviour is justifiable because it will very difficult for any community to develop and attain sustainability without effective management and protection of its natural resources. This has led to the call by various stakeholders for behaviour change communication that would help individuals to readjust and realign their perception and attitude towards the conservation and management of natural resources in order to ensure the realization of the goal of attainment of sustainable communities.

The concept of tree planting and attainment of sustainable communities

Tree planting behaviour plays a crucial role in the attainment of sustainable communities by promoting environmental stewardship, enhancing biodiversity, mitigating climate change, and improving overall well-being. Communities that actively engage in tree planting initiatives often experience numerous benefits, including cleaner air, reduced urban heat island effect, increased property values, and enhanced aesthetic appeal (Elias, 2021).

Trees provide habitats for various species, supporting local ecosystems and promoting biodiversity. Trees help in managing storm water runoff, reducing soil erosion, and replenishing groundwater reserves. Sustainability of communities is enhanced when tree planting initiatives are integrated into urban planning, involve community participation, and prioritize native species selection and maintenance practices (Carter, 2020).

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Promoting tree planting for sustainable community development involves educating residents about the benefits of trees, organizing tree planting events, partnering with local organizations, and integrating trees into urban planning to improve air quality, mitigate climate change, provide habitat for wildlife, and enhance overall quality of life. Additionally, involving community members in the process fosters a sense of ownership and pride in their environment. Enhancing tree planting behaviour for community sustainability involves educating community members about the importance of trees in mitigating climate change, improving air quality, conserving water, and supporting biodiversity. Offer incentives such as subsidies, or recognition programs for individuals or groups who participate in tree planting initiatives. Involve community members in the planning and implementation of tree planting projects to foster a sense of ownership and pride in the environment. Provide access to resources such as seedlings, tools, and expertise to make tree planting accessible and achievable for everyone in the community. Collaborate with local organizations, businesses, and government agencies to leverage resources and expertise for larger-scale tree planting efforts. Develop plans for the long-term maintenance of newly planted trees, including watering, pruning, and protection from pests and disease. Establish demonstration projects to showcase the benefits of tree planting and inspire others to take action in their own communities. By implementing these strategies, communities can enhance tree planting behavior and contribute to the sustainability of their environment for future generations (Aidam, 2023).

Obori (2021) asserted that tree planting and tree reserve protection have been endorsed in Northern Ghana as an answer to forest and land deterioration in the past three decades. It is specified that communities observed tree planting as a fairly vital social program with 74% of respondents supporting it. Foremost exciting factors persuading participation in the planting program were free source of seedlings, provision of food aid and free inputs resource. The limitations affecting people's involvement were deprived extension services and deficiency of strong competent groups. They suggested that institutional capacity building to upkeep the extension services at the community level is a requirement for an effective and sustainable estate development program.

Today, environmental degradation poses a foremost risk to the human being both in rural and urban contexts. The significance and need for environmental education as a tool for environmental management and preservation cannot be exaggerated in such a setting since environmental literacy, attitude development, and involvement in ecological behavior are the end products of this discipline. In an urban area-Nairobi, Kibera and Kasarani represented the different settlements where a study intended to establish the association between attitudes and level of participation in environmental undertakings. The study established that there is no significant difference between the attitude and level of participation in environmental activities while there is a positive relationship between attitude and ecological behavior

among secondary school students in Kasarani and Kibera Divisions (Boiyo, 2019). Pawar and Rothkar (2022) explained in their article 'forest conservation and environmental awareness' that forest protection is the repetition of planting and sustaining forested landscapes for the value and sustainability of future generations. This forest conservation comprises the maintenance of the natural properties within a forest that are useful to the humans and environment.

In tropical areas, land use/cover changes have resulted in losses of 89% in the estimated value of eight ecosystem services, including climate regulation, water flow regulation, erosion control, and moderation of disturbance and nutrient cycling. Further, the concentration of higher education institutions in cities and the need to expand university facilities often lead to the removal of trees from campuses. For example, in Nigeria, at the University of Ibadan Campus, 323 trees of different species were removed from the Faculty of Education area due to the construction going on and the perceived threats of old trees to the buildings. Places where trees are removed often experience rapid loss of tree cover, leading to reduced provision of environmental services, such as shade, moderation of heat, and carbon capture (Brian, 2022).

To date, there is a growing interest in greening university campuses and workplaces due to the perceived positive effects of trees on people's well-being. Tree planting provides various goods and services and has been perceived as a panacea to a variety of problems, including climate change, biodiversity loss, and resilience of ecosystem loss. Turner-Skoff and Cavender (2022) argued that the presence of trees cools buildings, adds value to properties in a neighborhood, and improves students' attention and test scores. Recently, Kuo and coworkers (2023) have found significant and positive relationships between school greenness and achievement in 450 public schools in Washington State among sixth-graders. These authors concluded that tree canopy within 250 metres of a school predicted better performance in both reading and mathematics test scores. Additionally, in northern cities where the presence of trees on campuses has been largely studied and is therefore considered an integral part of campus landscapes, the barriers to extending tree planting, and the willingness to pay for their preservation and maintenance, have also been assessed.

In countries where the spatial expansion of cities has profoundly led to the loss of trees and green spaces, assessing the participation of community members in tree planting today is essential, as it can stimulate and support projects and policies oriented toward the establishment and the preservation of urban forestry. Many university campuses are established on large lots, where trees, lawns, and flowers can still be planted to make campuses greener, cleaner, and more attractive, as well as air purification. Therefore, understanding the factors that shape people's willingness to participate in tree planting and pay for their maintenance can be the main driving force of green infrastructure implementation within a community; in this case, on campuses. People's willingness to

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participate in tree planting can also depend on various factors including the ecosystem services expected. From this point of view, the vision behind tree planting can result in differences among social groups. For example, in the Philippines, students engaged in tree planting to combat and slow down the effect of global warming, while smallholder farmers in Nigeria and Burkina Faso planted trees out of economic interest to sustain their livelihoods and support local afforestation projects (Elim, 2022).

Sustainable selection of species for planting is a multifaceted concept, reflects a variety of motivations, and involves a wide array of different practices in landscape design. Within this concept, optimal selection of tree taxa refers to selecting well-adapted tree species that help form a self-sustaining landscape that can persist and are manageable in the long term with low resources (water, nutrients, carbon expenditures, or maintenance time and cost) and provide the desired level of ecosystem services such as support of native biodiversity, being attractive to local people or reinforcing the character of the landscape and attain these benefits in the long term. Tree planting is critical for a sustainable future as it can slow the climate crisis by capturing CO₂ and help restore landscapes and their microclimate; on the other hand, trees are affected by climate-related stresses, which alter their self-sustaining abilities in the landscape. Other concerns related to achieving sustainable tree communities are linked to specific growing environments and microclimates that impact planting conditions and survivability of plant materials]; and to compete among native, non-native and invasive species. Each landscape site offers a variety of specific local site growing environments, but regarding the roadside environment, these are typically defined by potentially difficult conditions. Sustainable tree planting of well-adapted tree species should ensure a tree's vitality, benefits, and longevity, even in an unfavorable environment (Vincent, 2021).

Trees along roads represent non-forest woody vegetation which significantly contributes to the formation of the landscape. There are benefits of roadside trees such as the provision of a habitat for animals, significant reduction of noise levels and concentrations of particulate matter and other gaseous air pollutants emitted by vehicle activity on the nearby road, windbreak or cooling effect contributing to better microclimate along the roads, reduction of CO₂ in the atmosphere by fixing carbon during photosynthesis, or contribution to aesthetically pleasing landscape character including positive influence on the human psyche, including stress and fatigue restoration not limited to drivers. The positive aspect of trees also drives the species selection by tree managers. In the case of the Czech Republic, mature vegetation along the roads has formed the character of the landscape for centuries. The deliberate creation of greenery along the roads in the area of the current Czech Republic has been documented from the 18th century on. Tree species choices for planting along important roads were then mostly driven by aesthetic, orientation, or other reasons rather than direct economic gains from trees. Linden, horse chestnut, maples, or poplars were used in particular.

On the contrary, fruit trees prevailed among tree plantings along roads of minor importance in the past (Rosicky, 2022).

Trees play a critical role for people and the planet. The presence of trees and urban nature can improve people's mental and physical health, children's attention and test scores, the property values in a neighborhood, and beyond. Trees cool our urban centers. Trees are essential for healthy communities and people. The benefits that trees provide can help cities and countries meet 15 of the 17 internationally supported United Nations Sustainable Development Goals. This critical review provides a comprehensive argument that trees should be considered an important part of the equation by project managers and civic leaders as we collectively work toward reaching these sustainability goals. We live in an era influenced by humans to the point that the Earth's systems are now altered. In addition, a majority of the world's population live in cities. To meet the needs of people in a changing world, The United Nations General Assembly created the United Nations Sustainable Development Goals (UN SDG) to improve the quality of life for people. These broad goals outline the greatest challenges of our time (Lindsay, 2021).

The author further reported that an effective strategy to assist in meeting these goals is to plant and protect trees, especially in communities where the majority of people live. Trees promote health and social well-being by removing air pollution, reducing stress, encouraging physical activity, and promoting social ties and community. Children with views of trees are more likely to succeed in school. Trees promote a strong economy and can provide numerous resources to the people that need them. While communities are getting hotter, trees can reduce temperatures. They provide habitat and food for animals. Finally, trees are valuable green infrastructure to manage storm water. Money spent on community forestry has a high return on investment.

Tree planting plays a vital role in enhancing the sustainability of communities. Trees help to mitigate climate change by absorbing carbon dioxide, thereby reducing greenhouse gas emissions. They also improve air quality by filtering pollutants and producing oxygen. Trees contribute to the local economy by providing resources such as timber, fruits, and nuts. Additionally, they can increase property values and attract tourism. Tree planting initiatives bring communities together, fostering a sense of pride and ownership. They also provide opportunities for education and skill-building, such as learning about native species and proper tree care. Trees support biodiversity by providing habitat and food for various species. They also help to regulate water cycles, reduce soil erosion, and mitigate the risk of natural disasters like floods and landslides. Access to green spaces and trees has been linked to improved mental and physical health. Trees can reduce stress, promote relaxation, and encourage outdoor physical activity. Overall, tree planting initiatives are essential for creating resilient and sustainable communities, both environmentally and socially. They contribute to

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long-term environmental stewardship while improving the quality of life for residents (Jones, 2022

Water conservation and attainment of sustainable communities

Water conservation is essential for achieving sustainable communities. By implementing practices like reducing water waste, promoting efficient water use in agriculture and industry, and investing in water recycling and purification technologies, communities can ensure the availability of clean water for current and future generations. Sustainable water management also involves protecting water sources, such as rivers, lakes, and aquifers, from pollution and overuse. Additionally, raising awareness about the importance of water conservation and encouraging community participation in conservation efforts are crucial steps toward creating sustainable communities that prioritize the responsible stewardship of 7this precious resource. Water conservation behavior is crucial for the attainment of sustainable communities. By promoting responsible water usage, communities can preserve this essential resource for future generations. This includes initiatives such as fixing leaks, using water-efficient appliances, practicing xeriscaping, and raising awareness about the importance of water resources to ensure environmental, economic, and social well-being in the long term (Smith, 2019).

Water resources conservation is the activity of planning, developing, distributing, managing and optimum use of water resources. According to Fry (2020), it is a subset of water cycle management. Ideally, water resource management planning has regard to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands. As with other resource management, this is rarely possible in practice. According to Food and Agricultural Organization (2015), agriculture is the largest user of the world's fresh water resources, consuming 70 percent. As the world population rises it consumes more for (currently exceeding 6 percent is expected to reach 9 percent by 2050), the industries and urban development's expand, and the emerging biofuel croups trade also demand a share of freshwater resources, water scarcity is becoming an important issue.

An assessment of water resource management in agriculture was conducted in 2017 by the international water management institute in Sri Lanka to see if the world had sufficient water to provide food for its growing population or not. It assessed the current availability of water for agriculture on a global scale and mapped out locations suffering from water scarcity. It found that a fifth of the world's people more than 1.2 billion, live in areas of physical water scarcity, where there is not enough water to meet all their demands. A further 1.6 billion people live in areas experiencing economic water scarcity where the lack of investment in water or insufficient human capacity makes it impossible for authorities to satisfy the demand for water (Walmsh, & Pearce, 2020). According to Fry (2019), water is an essential resource for all life on the planet. Of the water resources on earth, only three percent of it is fresh and

two-thirds of the freshwater is locked up in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used.

Molden (2017) maintained that much effort in water resource management is directed at optimizing the use of water and in minimizing the environmental impact of water use on the natural environment. The observation of water as an integral part of the ecosystem is based on integrated water resource management, where the quantity and quality of the ecosystem help to determine the nature of the natural resources. Pearce (2020) suggested that sustainability is the process of improving the quality of human life within the limitation of the global environment. Sustainable water resource management therefore, involves solutions for improving quality water and also improving human welfare that does not result in degrading the environment. Successful water resource management requires accurate knowledge of the resource available, the uses to which it may be put, the competing demands for the resource measures to and processes to evaluate significance and worth of competing demands and mechanism to translate policy decisions into action on the ground. Anukwa (2017) asserted that for water to be considered as a resource is particularly difficult since sources of water can cross many national boundaries and the uses of water include many that are difficult to assign financial value to and may also be difficult to manage in conventional terms.

According to Chartres (2021), water is a major ingredient in all socio-economic development. The peculiar management of water makes it resources very significant especially for man. Very literally "no water means no life". Water constitutes up to 90 percent of the body cells for humans, without water for 14 days, the body becomes dehydrated and life becomes endangered. So, one can safely say that water is a priceless resource that must be properly managed to ensure community survival and development. Chartres further maintained that water is very useful to the community as water is required. For drinking and domestic purpose for agriculture, manufacturing and processing, for industries, for industries for navigation, transportation and recreation for survival of aquatic life, for survival of aquatic life, for generating electricity

According to the World Bank (2020), one of the biggest concerns for our water-based resources in future is the sustainability of the current and even future water resource allocation. As water becomes more scarce, the importance of how it is managed grows vastly. Finding a balance between what is needed by humans and is needed in the community is an important step in the sustainability of water resources. According to Grafton (2021), the field of water resources management will have to continue to adapt to the current and future issues facing the allocation of water with the growing uncertainties of global climate change and the long term impacts of management actions, the decision-making will be even more difficult. It likely that ongoing climate change will lead to situations that have not been encountered.

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As a result, new management strategies will have to be implemented in order to avoid setbacks in the allocation of water resources.

Dammo (2018) stated that in Nigeria, surface water quantity and quality deterioration, inadequate water supply by water providers, increased rate of population growth and above all the consequences of climate change has resulted in increasing demand for freshwater resources. This usually comes from the negligible groundwater sources, which was estimated at only 28.90% of the total fresh water of the country. In the semi-arid region of northern Nigeria, the interplay of climatic, geological and anthropogenic characteristics makes surface water virtually inadequate. As a result, many people have been forced to invest and venture into ground water resources exploitation for domestic and agricultural use.

According to World Health Organization (2017), it is worth mentioning that those projected to face water scarcity are mostly people relying on various rivers for their water supply in arid and semi arid areas of the world. The contaminated water resource used for human purpose and poor sanitation are associated with transmission of diseases such as diarrhea, cholera, hepatitis A, typhoid, dysentery cord polio. Other diseases caused by contaminated water are traceable to vulnerable communities (poor people) because they live in environments accessible to breeding insect vectors that carry parasite such as trypanosomiesis. Water is a unique natural resource among all resources available on earth. There is no life without water. It is essential for all the important activities like food production; industries involved in energy production and manufacturing, but it is a finite resource. It plays an important role in economic development and the general wellbeing of the country. Water is a regional resource, but water shortage is becoming a global issue due to increasing population, economic growth and climate change. Development of new sources of water beside its efficient use, together with conservation measures, should be an important component of any country's national water plans (Lalzad, 2019).

Martins (2022) asserted that, attitude can determine to a large extent the process of learning morals, trade and reaction to both living and non-living things. The way an individual think, perceives, feels, values and acts towards the environment will definitely influence his or her contribution towards water conservation.

Water is a critical resource for human survival because many crucial activities depend on its availability. As the first United Nations World Water Development Report stated that "of all the social and natural crises that humanity faces, the water crisis has the most harmful effect on survival and sustainability in the planet" Recently, water scarcity has become a global problem that can be the result of either water resource depletion or poor management to

provide it. Particularly, deficient integrated water resources management is one of the main environmental problems that pose a harmful effect on society. On the face of this, environmental education is fundamental to promote social consciousness orientated to the protection, conservation, and sustainable water management. The development of environmental education programs is a worldwide necessity and may become a powerful tool to build sustainable societies. Water is required as a raw material for almost every human activity. The sustainability of communities relies largely on the quality of available water within such communities (Jones (2021).

Global warming is expected to further heighten water distress. This necessitates a deep-rooted fundamental approach for constructing adaptable and integrated water management policies and practices that would promote the sustainability of various communities (Abia, 2021). Water efficiency measures involve reducing the amount of water used in various sectors, such as agriculture, industry, and households. This can include measures such as the use of water-efficient technologies, including low-flow faucets and showers, and the implementation of water-efficient practices, such as irrigation scheduling and leak detection. Water recycling and reuse involves the treatment and reuse of wastewater for non-potable purposes, such as irrigation, industrial processes, and toilet flushing. Water recycling and reuse can help to reduce the demand for freshwater resources and promote resource efficiency. This will contribute meaningfully to the attainment of sustainable communities. This is testament to the fact that water is an essential resource required by mankind to carry out various activities that would ensure his survival and well-being. The conservation of water will significantly contribute to the sustainability of communities across various regions (Elias, 2021).

Integrated Water Resources Management (IWRM) involves the coordinated development and management of water resources, balancing social, economic, and environmental objectives. IWRM promotes a holistic approach to water management, which includes stakeholder engagement, the integration of environmental and social considerations, and the use of a range of management tools, such as water allocation, water pricing, and water quality management. Nowadays, the society and the people's livelihood are suffering because of the disturbance in the sustainability of ecosystems especially exploitation of water resources. Affecting one component of our ecosystems can affect the available resources, economic growth, and social aspects. Humanity needs to be guided successfully by taking sustainable actions within the available environmental resources. Water is an irreplaceable resource, vital to sustaining life, driving ecosystems, and supporting socio-economic development worldwide. Yet, despite its fundamental importance, the world faces daunting water-related challenges, primarily arising from human activities, including over-extraction, pollution, and climate change. Addressing these challenges is not merely an environmental obligation but a foundational pillar for achieving many of the United Nations' Sustainable Development Goals (Eric, 2020).

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Moreover, the ripple effect of water conservation extends to numerous other Sustainable Development Goas (SDGs). Consider SDG 2, which aims for "Zero Hunger." Efficient and sustainable water use in agriculture, which currently accounts for approximately 70% of global freshwater withdrawals, is fundamental to ensuring food security. Through practices like rainwater harvesting, drip irrigation, and watershed management, we can produce food more sustainably, reducing water inputs without compromising yields. This not only aligns with SDG 2 but also contributes to SDG 15, "Life on Land," by reducing land degradation and desertification caused by improper water use (Kingston, 2021). The author further stated that SDG 3, which aims for "Good Health and Well-being," is likewise intimately connected to water conservation. Polluted water sources, often a result of inadequate wastewater treatment or industrial emissions, result in millions of deaths annually. By promoting conservation, we emphasize the need for cleaner water sources, inherently advocating for better wastewater management and pollution controls. Such efforts directly translate to reduced waterborne diseases and enhanced public health (Hanson, 2023).

Furthermore, water conservation plays a pivotal role in combating climate change, central to SDG 13. Wetlands, rivers, and lakes act as carbon sinks, absorbing significant amounts of carbon dioxide. Over-extraction or mismanagement of these water sources can disrupt their ability to function effectively in this capacity. Additionally, efficient water use reduces the energy consumed in water treatment and transportation, subsequently lowering greenhouse gas emissions. Water conservation is not just an isolated endeavor to save a precious resource but is intertwined deeply with the holistic vision of the SDGs. By emphasizing water's pivotal role, we underscore the need for integrated and collaborative solutions that recognize the intrinsic relationship between water and the myriad aspects of sustainable development. Whether directly through SDG 6 or indirectly by bolstering efforts in health, food security, or climate action, water conservation remains a cornerstone in our collective journey towards a more equitable and sustainable future (Kingston, 2021).

The establishment of Sustainable Development Goal 6 (SDG 6) "Ensure availability and sustainable management of water and sanitation for all" confirms the importance of water and sanitation in the global political agenda. SDG 6 addresses the sustainability of water and sanitation access by focusing on the environmental aspects of freshwater ecosystems and resources – including their quality, availability and management. SDG 6 recognizes that social development and economic prosperity depend on the sustainable management and sharing of freshwater resources and ecosystems, and that achievement of this goal is essential for achieving the entire 2030 Agenda. SDG 6 acknowledges that ecosystems and their inhabitants, including humans, are water users and that their activities on land can compromise the quality and availability of fresh water. Water-related ecosystems addressed in SDG 6 include wetlands, rivers, aquifers and <u>lakes</u>, which sustain a high level of biodiversity and life. These ecosystems are also vital for providing multiple benefits and

services, such as hydropower, irrigation, humidity and precipitation, habitats for aquatic life and water purification. Well-managed water-related ecosystems contribute to addressing competing demands for water, mitigate climate change risks and causes, and help build community peace and trust. They are therefore essential for achieving sustainable development, peace, security and human health and well-being (Brian, 2022).

Promoting water conservation is crucial for building sustainable communities. Implementing efficient irrigation systems, encouraging low-flow fixtures, educating about responsible water usage, and incentivizing conservation efforts can all contribute to sustainable water management, ensuring a better future for generations to come. Water conservation and community development are closely linked as they both contribute to the sustainability and well-being of communities. Efficient water management practices, such as reducing wastage, reusing water, and adopting water-saving technologies, help ensure the availability of clean water for both current and future generations. This not only preserves natural resources but also mitigates the impact of water scarcity on communities. Access to clean water is fundamental for community development. It enables improved health outcomes, supports agriculture and livelihoods, and fosters economic growth. Additionally, community engagement in water conservation efforts can enhance social cohesion and empower individuals to take ownership of their local environment. When combined, water conservation and community development initiatives create a virtuous cycle, where the conservation of water resources contributes to the overall resilience and prosperity of communities, while community development efforts foster a culture of sustainability and responsible resource management (Odok, 2022).

Research questions

The following research questions are raised to guide the study;

- i. How does tree planting relate with the attainment of sustainable communities?
- ii. How does water conservation relate with the attainment of sustainable communities?

Research methodology

The research design used for the study is survey, this study can be attained using survey research design. This research design investigates situations as they exist at the time of an investigation. Brian (2023) asserted that survey research design is a methodological approach used to gather data from a specific population by asking questions and collecting responses. The study assesses environmental friendly behaviours and the attainment of sustainable communities in Ikom Education Zone of Cross River State.

The study was carried out in Ikom Education Zone of Cross River State. The study area is located in Central Senatorial District of Cross River State, which comprises six local government areas namely: Abi, Boki, Etung, Ikom, Obubra, and Yakurr local government

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areas respectively. It lies between latitudes 5° 45' North and 5°55¹ North of the Equator and longitudes 8°30¹ East and 8°34¹ East of the Greenwich Meridian with an area of 8237 km². The study area has a population of 1,207, 643 million people (National Population Commission, 2023). Ikom Education Zone is bounded to the north by Ogoja, Obudu and Obanliku Local Government Areas of the State, to the South by Biase and Akamkpa Local Government Areas of the State, to the east by Republic of Cameroun, and to the west by Ebonyi State.

The culture of the people has created a lot of tourist attractions. There are monoliths at Nkarasi in Ikom local government area, where an annual festival is held at the end of every dry season. There are other tourist attractions in the study area such as Agbokim waterfalls. The fall is beautifully enveloped by a rainbow like aura of colours and is estimated to be capable of generating hydroelectric power to meet the needs of the eastern states of Nigeria (Obanya, 2018).

There is also the Kanyan Park in Boki Local Government Area which extends from Kanyan to the foot of Obudu Plateau and its environs. The reserve has a total la'nd mass of 7209km². Its unique natural features which include rugged mountains and rolling hills explain why the park has been described by UNESCO as one of the best in the world. The park inhabits animals such as gorillas, chimpanzees, monkeys, birds among others. The study area also hosts the famous Leboku new yam festival

The major occupation of the people is farming. The farming pattern ranges from subsistence to cash crops such as cassava, rice, yam, cocoa, plantain, banana, and oil palm. They also raise livestock such as goats, sheep and pigs as well as poultry. They also engage in fishing. Some of the inhabitants engage in petty trading and a handful of them are civil servants and politicians (Ubana, 2020).

In terms of education, there are numerous educational institutions in the study area covering from primary to tertiary levels. Prominent among them are the Cross River University of Technology, Obubra campus in Obubra Local Government Area, the Federal Polytechnic, Ugep and the School of Nursing, Itigidi in Abi Local Government Area. The people are predominantly Christians although there are also traces of Islam and Traditional religion in the study area.

The population of this study consisted of all the farmers, hunters, gatherers of forest products and timber dealers residing and operating in Ikom Education Zone of Cross River State. The actual population of this study is 396,324 persons representing 32.8% of the total population

of Ikom Education Zone who are still actively involved in activities that are directly linked with the forest within the area covered in this study.

The sample population based on local government areas in Ikom Education Zone of Cross River State is presented in Table 1.

Sampling technique

The simple random sampling technique was adopted in selecting four local government areas out of the six that constitute Ikom Education Zone. The researcher is familiar with the names of the Local Government Areas in the area of study. The names of the six local government areas were written on pieces of paper and folded into ball-like shapes, which were put into a small container and properly mixed. The researcher blindly picked four paper-balls from the container without replacement. The local government areas whose names appeared on the picked pieces of paper were selected for the study.

Secondly, the proportionate simple random sampling technique was adopted in selecting forty-one (41) communities representing 15% of the communities in the four local government areas selected for the study. Thirdly, the systematic sampling technique was adopted in selecting the respondents used for the study. The researcher numbered the houses in each selected community and every fiftieth house representing 2% of households was selected. In each selected household, two adult residents within the study population were selected for the study. These persons constituted the sample respondents for the study.

Sample. The sample consisted of five hundred and twenty (520) respondents presented in Table2.

S/N	LGA	No. of	Population	Sample
		communities		
1.	Boki	14	16, 601	166
2.	Etung	6	6, 148	61
3.	Obubra	10	14,917	149
4.	Yakurr	11	14,409	144
	Total	41	52,075	520

Table 2: Sample distribution by local government areas

Source: Field survey, 2023

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Cronbach Alpha reliability estimate of research instrument (n=50)							
S/N	Variables	No. o	of X	SD	Cronbach		
		items			alpha (α)		
1.	Tree planting	5	15.312	2.624	.74		
2.	Water conservation	5	16.934	2.812	.75		

Results and DiscussionIn this section, the results obtained from analysis of data based on each formulated hypotheses is presented. It also covers the interpretation of the results obtained. The hypotheses were all tested at 0.05 level of significance.

H01

There is no significant relationship between tree planting and the attainment of sustainable communities. The independent variable in this hypothesis is tree planting while the dependent variable is attainment of sustainable communities. Pearson product moment correlation statistical tool was utilized for data analysis. The result obtained from analysis of data and testing of this hypothesis is presented in Table 6.

The result of analysis of data presented in Table 6 shows that the calculated r-value of -.460 is higher than the p.value of .000 at .05 level of significance with 514 degree of freedom. This implies that the null hypothesis is rejected. As a result, there is a significant relationship between tree planting behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State.

H₀₂

There is no significant relationship between water conservation and the attainment of sustainable communities. Water conservation is the independent variable in this hypothesis while attainment of sustainable communities is the dependent variable. Pearson product moment correlation statistical tool was employed for data analysis. The result of this analysis is presented in Table 8.

The result of analysis of data presented in Table 8 shows that the calculated r-value of .514 is higher than the p.value of .000 at .05 level of significance with 514 degree of freedom. This implies that the null hypothesis is rejected. As a result, there is a significant relationship between water conservation behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State.

Discussion of findings

This section presents the findings that were obtained in the study based on each formulated hypothesis. Tree planting and attainment of sustainable communities.

The finding obtained from analysis of data and testing of hypothesis one in the study revealed that the null hypothesis was rejected. The implication of this finding is that there is a significant relationship between tree planting behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State.

The finding of this study is in agreement with that of Carter (2020) who reported that tree planting plays a crucial role in promoting sustainability within communities. Sustainability of communities is enhanced when tree planting initiatives are integrated into urban planning, involve community participation, and prioritize native species selection and maintenance practices.

The finding of this study also supported that of Pawar and Rothkar (2022) who asserted that trees are vital for human life because they offer a varied range of services such as absorbing carbon or acting as carbon sink, generating oxygen which is important for life's existence on earth. They are also known as earth lung, aiding to regulate hydrological cycle, world's climatic condition, water purification, providing habitat to wildlife, decreasing global warming, absorbing poisonous gases and noise, reducing pollution, preserving soil, and mitigating natural threats like floods and landslides. However, currently forest cover is quickly diminishing due to various causes such as development of agriculture, urbanization, road construction, industrial plants and factories that constitute the major and severe danger to the forestry that lead to serious destruction of the environment.

Water conservation and attainment of sustainable communities

The finding obtained from analysis of data and testing of hypothesis three in the study revealed that the null hypothesis was rejected. The implication of this finding is that there is a significant relationship between water conservation behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State. The reason for this finding could be that, water serves various purposes to individuals, families and groups within a community. The quality of water available to members of a community could significantly contribute to their growth and development. As human conducts have continued to contaminate water bodies, the volume of water in terms of its quality and quantity has been reduced. This has led to severe water shortages in most communities. This has informed the need for people to develop more positive attitude and commitment towards the conservation of water. This has in turn improved water availability and subsequently contributed to the development of these communities.

This finding is in agreement with that of Kingsley (2023) who reported that water plays an important role in the world economy, as it functions as a solvent for a wide variety of chemical

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substances and facilitates industrial cooling and transportation. Water conservation is the practice of using water efficiently to reduce unnecessary water usage. Water conservation is the need of the hour, and attitudes towards conserving the resources is what is sure to become a priority in the coming years (Willis & Stewart, 2021). Water is a fundamental natural resource needed for multiple uses such as irrigation, drinking, washing, and cleaning, and also critical to the normal functioning of ecosystems. However, scarcity of this important resource is one of the most pressing environmental problems facing humanity in the 21st century.

The finding of this study also supported that of Abia (2021) who asserted that, the global water crisis ranging from extremities of excessive rainfall to scarcity and distress poses a grave threat to larger international development. This includes severe effects on public health, equitable socio-economic growth and global trade. The increasing climate change calamities, issues around water availability, accessibility and security call for an active and inclusive dialogue between various stakeholders in water management. In terms of its abilities and resources to effectively deal with these issues, the developing world faces a greater burden not only in tackling these catastrophes but also in contributing to the success of global goals and commitments towards sustainable growth and development. Global warming is expected to further heighten water distress. This necessitates a deep-rooted fundamental approach for constructing adaptable and integrated water management policies and practices that would promote the sustainability of various communities.

process repeats endlessly, preventing soil from recovering sufficiently to support healthy ecosystems.

Table 6: Pearson product moment correlation analysis of the relationship between tree planting and attainment of sustainable communities in Ikom Education Zone of Cross River State (N = 516)

Variables	х —	SD	Cal.r	P.value	
Tree planting	15.09	.70			
			.460	.000	
Attainment of sustainable	25.90	1.22			
communities					

*Significant at .05; df = 514

Table 8: Pearson product moment correlation analysis of the relationship between water conservation and attainment of sustainable communities in Ikom Education Zone of Cross River State (N = 516)

Variables	х —	SD	Cal.r	P.value
Water conservation	14.90	1.14		
			.514	.000
Attainment of sustainable	25.90	1.22		
communities				
*Significant at 05 , $16 - 514$				

*Significant at .05; df = 514

Conclusion

The study aimed to investigate and present findings on environment friendly behaviour and attainment of sustainable communities in Ikom Education Zone of Cross River State. The findings obtained from analysis of data and testing of hypotheses in the study revealed that there was a significant relationship between tree planting, water conservation and attainment of sustainable communities. It can be concluded that environment-friendly behaviour contributes positively to the attainment of sustainable communities in the study area.

Implication of the findings

The findings obtained in the study have the following implications;

i. An improvement in the behaviour of residents towards tree planting will continue to contribute positively to the attainment of sustainable communities

ii. The behaviour of residents of the study area towards water conservation is not adequately promoting the attainment of sustainable communities

Recommendations

The following recommendations were made based on the findings obtained from analysis of data and testing of hypotheses in the study;

1. Residents of the study area should be adequately sensitized on the need to continue to

maintain and subsequently promote their behaviour towards tree planting in order to attain sustainable communities

2. Members of communities within the study area should be regularly sensitized on the need to continue to develop positive behaviour towards water conservation as a means of attaining sustainable communities

Suggestion for further research

Based on the limitations inherent in this study, the researcher strongly suggests that;

i. The same study should be repeated in the study area to include other environment friendly behaviour not covered in this study

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