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PROMOTING CLIMATE CHANGE AWARENESS AMONG COASTAL COMMUNITIES THROUGH ECOLITERACY

Christiana Uzoaru Okorie [1]

[1] Department of Adult and Non- Formal Education, University of Portharcourt, Portharcourt, Rivers State, Nigeria

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Corresponding Author

Christiana Uzoaru Okorie,
Christiana.okorie@uniport.edu.ng

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ABSTRACT

Climate change has continued to impact on the lives and livelihood of coastal communities in Rivers State. Most of the dwellers are unaware of the roles they are playing towards contribution to the climate change impact. They are oblivious of their actions on the environment as part of the anthropogenic cause of climate change. In other to create the awareness of their contribution towards climate change, it requires development of a new systemic thinking called ecoliteracy, that defines human interrelationship, interdependent and connectedness to the environment. This will amount to a necessary step toward mitigating the effects of climate change and promoting healthy and sustainable coastal community environments. Ecoliterate residents of coastal communities, however, are more likely to take action to protect the environment.

Keywords: Climate Change, Climate Change Impact, Ecoliteracy, Coastal Communities

1. INTRODUCTION

Climate change is caused by changes in the climate brought on by an increase in greenhouse gases in the atmosphere. These extra greenhouse gases are primarily produced by human (anthropogenic) activities such as deforestation, construction, waste generation and disposal, overpopulation, use of fossil fuels, industrialization, and so on. All of these human activities raise the temperature of the atmosphere, which causes instability in the atmosphere and, ultimately, variability in today's weather, or climate change. According to Onu & Kelechi in Okorie and Dokubo (2018), one of the main issues affecting the existence of people, animals, crops, and entire ecosystems is climate change. According to the Intergovernmental Panel on

Climate Change IPCC (2001), human actions are already changing the global climate system and will do so in the future because of our reliance on the environment. Nigeria has been dealing with the effects of climatic change for a long time, including flooding, intense temperature increases brought on by extreme heat, loss of livelihood owing to desert encroachment, and more. According to Ayuba, Maryah, and Gwary in Ochoyi (2013), human activities such as urbanization, deforestation, population growth, industrialisation, and the emission of greenhouse gases are the main causes of the ozone layer's depletion and the accompanying global warming and climate change. The continual pressure that humans place on the environment as a result of their insatiable needs increases the effects of climate change. In Johannesburg Declaration on Sustainable Development IPCC (2001), it is stated that:

> "the adverse effects of climate change are already evident, natural disasters are more frequent and more devastating and developing countries more vulnerable; and that while climate change is a global phenomenon, its negative impacts are more severely felt by poor people and poor countries. They are more vulnerable because of their high dependence on natural resources, and their limited capacity to cope with climate variability and extremes".

This is consistent with the observation made by the Intergovernmental Panel on Climate Change IPCC (2007) that "climate change impacts on human societies are predicted to be widespread and potentially catastrophic, including a significant increase in droughts, floods, water shortages, extreme weather events, and decreased agricultural productivity." It was further noted that depending on the pace and extent of the climate change, anthropogenic warming could have some effects that are abrupt or irreversible. It is reasonable to conclude that humans need to develop an ecological identity in order to have a soft spot for the environment and carry out their developmental activities in such a way that the human activities on the environment will reduce climate change impact, thereby promoting environmental sustainability. This is based on the observations that anthropogenic factors are the main determinant of climate change due to the different impacts on the environment. Thomashow (1995) defined ecological identity as more than just environmental knowledge; it also refers to how people interact with one another and their surroundings.

Developing psychological interdependence of care and nurture towards the environment and its associated resources is a prerequisite way of dealing with climate change impact and also promoting healthy and sustainable environment in our various societies. Humans, more specifically adult members of the society who are the major deplete of the environment due to their developmental activities, need to incorporate environmental values into their lives.

2. CONCEPT OF CLIMATE CHANGE

Climate change is a global problem that is been experienced by all countries of the world, it is a change in the average weather condition of the planet at a given period. International Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) cited in Ochoyi and Ochoyi (2013) defined climate change as a change in the mean and /or variability of climate properties that persists for an extended period typically decades or longer period, say 35 years. The United Nations Framework Convention on Climate Change (UNFCCC, 2013:7) defines climate change as "a change of climate that is attributed directly or indirectly to human activity that

alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.". This concept emphasizes how humans are a key contribution to climate change, whether directly (by farming, forestry, construction, exploration, and so forth) or indirectly (via technology). The Australian Government's Department of Climate Change and Energy Efficiency DCCEE, (2012) also supports this definition, defining it as a change in the climate that is primarily caused by the observed increase in greenhouse gases produced by humans. These gases absorb heat from the sun in the atmosphere and lessen the amount of heat that escapes into space.

As stated in the Kyoto Protocol and also observed by UNFCC, the discussion of climate change has evolved over time from a scientific perspective that focused on scientifically identifying the causes of climate change (technology), suggestions on mitigation and adaptation measures of how to protect the environment, to issues of sustainable development based on an eco-centric perspective that were promoted at the World Summit on Sustainable Development (WSSD) in 2002. It was noted at the summit that other issues including development, migration, security, unemployment, and so on are more closely related to climate change than to natural environmental degradation. The anthropocentric paradigm as noted by Engels (2015) focused on humans as the major participant in climate change through their various consumption patterns, has impacted the ecocentric debate on climate change currently under discussion. This is in line with IPCC fifth report that attributed climate change to anthropogenic sources and the need to lower Green House Gasses (GHG) emissions from human sources by searching for a low-carbon development policy. Vlassopoulos (2012) noted that the analysis of Climate Change discourse demonstrates that the problem has transcended its initial scientific paradigm of environmental degradation and is now part of something much larger and going beyond it.

This also corroborates with Intergovernmental Panel on Climate Change IPCC (2001) observation that human activities are altering our climate system and will continue to do so. Because for the past century, surface temperatures have increased and that associated impacts on physical and biological systems are increasingly being observed. In the same IPCC (2001) report, it was also documented that climate change is superimposed on the existing climatic conditions and manifests itself through:

1) Changes in average climatic conditions in which some regions may become drier or wetter on average.
2) Changes in climate variability in which rainfall events may become more erratic in some regions.
3) Changes in the frequency and magnitude of extreme events.
4) Changes in sea levels, which are projected to rise by between 0.09 and 0.88 meters by 2100 relative to 1990

In IPCC (2007) report AR4, the awareness of human influence on the climate was explicitly established and this has continued to grow, this evident on the impacts on natural and the human systems all over the world. It was also observed that the anthropogenic emissions of greenhouse gases have wide impacts on human and natural system. Chidumayo et al. (2011) asserted that the most affected by the impact of climate change are the poor and vulnerable communities who depend on the ecosystem services for livelihood and survival. They further pointed out that there is increasing evidence that climate change is affecting forests and forest ecosystems in Africa and as well as the livelihoods of the forest-dependent communities and the national economic activities that rely on vegetation services.

Gemeda and Sima (2015) observed that Africa has been the lowest source of greenhouse gases (GHG) emission owing to the lack of industrial development but are the most vulnerable to the impacts of climate change. According to Besada and Sewankambo (2009), Africa's ability to expand and develop has been hampered by the severely altered weather patterns and climate extreme events that have threatened agricultural production, food security, health, water, and energy security throughout the continent. This is corroborated by Hummel (2015) finding that the majority of African nations will face significant threats to their way of life as a result of climate change because agriculture is the main driver of employment and the gross domestic product of these nations (GDP). The bulk of Nigeria's people, who reside in rural areas, whether they are coastal or upland, depends on land and forest resources for both their subsistence farming and residential fuel needs. This mode of anthropogenic way of depleting forest resources contributes to climate change. Many of the residence of coastal most of the coastal communities are not really aware of the climatic impact of their domestic utilization of forest resources. The destruction of forests has a number of unfavorable effects. In addition to many various kinds of trees and other plants, forests are also home to a vast variety of species, from insects to birds and mammals. The biodiversity, or variety of living things, that results from the conversion of forests to agriculture is significantly reduced (all life forms). Since we rely on other living things to provide us with a number of necessities, biodiversity is crucial for humans.

Most They are not aware that shortage of food, yearly floods, drought, famine, and various health issues related they experience and poverty are as a result of their anthropogenic climate change induced factor.

Additionally, African traditional religion holds numerous environmental living organisms, such as forests, rivers, animals, and more, in high regard. However, many of these elements are gradually going extinct as a result of manmade climate change, which has disrupted their ecosystem. Lack of awareness of how the living elements of the environment are interconnected is the issue with anthropogenic climate change's effects on our traditional culture. Therefore, we must employ eco-literacy to teach individuals of our community that the unsustainable use of one natural resource affects the continuation of another living component of the ecosystem and that all living organisms (plants and animals) in the environment are connected to one another. Residents of the community must resynthesize their economic activities to meet their needs, as well as to produce and spread values in accordance with the fundamental principles of environmental sustainability. This is necessary because human livelihood activities must be coordinated in a way that life and living systems are structured to continue to perform their essential function of supporting both the system's constituent parts.

3. CONCEPT OF ECOLITERACY

Capra said that eco-literacy involves a new sort of "systemic" thinking, thinking in terms of relationships, connectedness, and context in Center for Ecoliteracy. (2013a). She went on to say that being eco-literate entails viewing the living world as a cohesive whole and understanding that the main issues of our day are systemic issues that are all connected and dependent on one another. However, in order to change our economy and way of life and work towards a society that can sustain life, we need a population of citizens who are eco-literate, aware of the interconnectedness of all living things in the environment, and willing to always act on that awareness in order to ensure the survival and continuity of all living elements of the environment. Capra originated the concept of ecoliteracy when she

founded the Center for Ecoliteracy, a nonprofit devoted to educating for sustainable living. According to the Center for Ecoliteracy. (2013), Capra and others have advanced ecoliteracy with an emphasis on the creation of sustainable human communities and civilizations. Capra (1997) coined the term "ecoliteracy," which he defined as the ability to develop sustainable human communities and civilizations while also comprehending how ecosystems are structured. It should be emphasized that the idea of using resources in a way that would ensure their availability in the future was a fundamental component of ecoliteracy. Capra et al. (2013) asserted that understanding the structuring principles of the ecosystem and using them to build sustainable human communities and societies is what is meant by ecoliteracy. In order to strike a balance between human needs and the capacity of the earth to support them, ecoliteracy aims to educate and re-educate individuals on the significance of global ecological awareness. Its objective is to create the intelligent community required for sustainable growth

Eco-literacy is a process that teaches people the value of practicing regenerative culture while interacting with the environment and its constituent parts. As a result, Okorie and Mbalisi (2019) defined eco-literacy as the capacity to understand the structure of natural systems as well as the mechanisms that guarantee the survival of living systems. According to Greenfield's definition in the Center for Ecoliteracy CEL (2013), ecoliteracy is the knowledge of how natural and human systems interact. He said that the idea entails using the environment for socioeconomic purposes in a way that prevents human actions from impairing the environment's ability to sustain itself by preserving and enhancing the diversity of living elements and the health of the natural system. According to Goleman et al. (2012), eco-literacy provides pupils with the knowledge and abilities necessary to tackle complex ecological problems collaboratively. They continued by claiming that eco-literacy encourages ecocentric professionals and empowers students or learners to implement sustainability concepts into professional practice issues. By adopting regenerative culture, an ecoliterate individual can undertake socioeconomic activities in a way that is environmentally friendly and will support environmental sustainability and also promote Capra ecoliteracy philosophy.

Orr (1992) defined eco-literacy as a type of literacy that places a strong emphasis on the creation of resilient human communities. Given this, Capra (2013: 5) underlined that ecoliteracy necessitates a new, "systemic" way of thinking with five components which include:

1) Thinking in terms of relationships, connectedness, and context which implies seeing the living world as an integrated whole;
2) Recognising that the major problems of our time are systemic problems that are all interconnected and interdependent and that they need corresponding systemic solutions.
3) Understanding that the solutions do not solve any problem in isolation but deal with it within the context of other related problems;
4) Emphasising that teaching eco-literacy is the great challenge for education in the twenty first century, that it is an enterprise that transcends all our differences of race, culture, or class; and knowing that
5) The Earth is our common home, and creating a sustainable world for our children and for future generations is our common task. Capra (2013:5).

According to Stone and Barlow (2005), the inhabitants and leaders of the future must comprehend how the natural world functions. They must be able to see the connections between human activity and nature, as well as possess the morals and

abilities necessary to act wisely in light of this understanding. They need to have a thorough understanding of sustainability. They must be ecoliterate, to put it another way. Nurfajriani et al. (2018) pointed out that environmental harm is getting worse every day. The over overuse of natural resources and disregard for environmental rejuvenation is a result of human conduct. Therefore, it is essential to comprehend the fundamentals of ecosystems and use these fundamentals to create a sustainable society, a concept known as ecoliteracy. Capra (2018) emphasised that ecoliteracy is urgently required if we are to create resilient, sustainable human societies. Effective training results in the acquisition of knowledge, skills, and attitudes. Information, comprehension, and skills acquired through education or experience are collectively referred to as knowledge. To do the tasks at hand, one needs knowledge and abilities. Every human endeavor requires the necessary abilities and information to complete a task. The psychological outcome of perception, learning, and reasoning is knowledge. Thus, Agsari et al. (2018) stressed that every person needs to be eco-literate. People with an understanding of the environment will be able to balance development and progress with the environment to build a society and environment that coexist in harmony. Rosyid et al. (2019) supported this view by emphasizing that eco-literacy is necessary to develop locals who are knowledgeable about environmental biophysics and related issues, foster engagement in resolving environmental issues, and inspire people to discover solutions.

4. CORE COMPETENCIES OF ECOLITERACY

Center for Ecoliteracy in 2011 developed set of "core competences" of ecoliteracy to support young people in creating and residing in sustainable communities, the core competences as reported by Capra (2011) are skills link to the mind (learning to know), heart (learning to be), hands (learning to do), and spirit (learning to do) (learning to live together). she further explained the core competencies of ecoliteracy using the head (cognitive), the heart (emotional), the hand (active) and the spirit (connectional) as follow:

Head (Cognitive)

1) Approach issues and situations from a systems perspective
2) Understand fundamental ecological principles
3) Think critically, solve problems creatively, and apply knowledge to new situations
4) Assess the impacts and ethical effects of human technologies and actions
5) Envision the long-term consequences of decisions

Heart (Emotional)

1) Feel concern, empathy, and respect for other people and living things
2) See from and appreciate multiple perspectives; work with and value others with different backgrounds, motivations, and intentions
3) Commit to equity, justice, inclusivity, and respect for all people

Hands (Active)

1) Create and use tools, objects, and procedures required by sustainable communities
2) Turn convictions into practical and effective action, and apply ecological knowledge to the practice of ecological design
3) Assess and adjust uses of energy and resources

Spirit (Connectional)

1) Experience wonder and awe toward nature
2) Revere the Earth and all living things
3) Feel a strong bond with and deep appreciation of place
4) Feel kinship with the natural world and invoke that feeling in others

The head, heart, hand and spirit explanation of ecoliteracy is a wholistic narration of human interrelationship, interdependence and interconnectedness of man and the environment. It is imperative that we alter the unsustainable way we live on the planet, and in order to do so, we require an entirely new set of skills that enable us to operate effectively in a complex environment. This requires a holistic understanding of ecosystems, society, and humans through environmental thinking that takes into account their interdependence with the natural world. The process of interaction and the relationship between an individual and their environment give rise to environmental thinking. The individual's mental processes for meeting his requirements are influenced by his natural and social environment, which gives rise to his problems and environmental challenges due to climate change.

5. PROMOTING CLIMATE CHANGE AWARENESS AMONG COASTAL COMMUNITIES THROUGH ECOLITERACY

Coastal communities are home to species and habitats that help humanity and natural ecosystems in a variety of ways. There are many ways that climate change may impact coastal regions. Sea level rise, variations in storm frequency and intensity, increases in precipitation, and rising ocean temperatures all have an impact on coasts. Also, when carbon dioxide (CO2) levels in the atmosphere rise, the seas take up more of the gas, contributing to ocean acidification. The coastal and marine ecosystems could be significantly impacted by this increase in acidity. Climate change's effects are anticipated to make the issues already present in coastal areas worse. Several regions are already concerned about addressing issues like coastline erosion, coastal flooding, and water pollution that have an impact on both man-made infrastructure and coastal ecosystems. Managing land, water, trash, and ecosystems in a way that addresses the increased stress brought on by climate change may necessitate new methods. Creating awareness of climate change among coastal communities requires the development of individuals who possess the understanding of importance of maintaining the ecosystem, capability to sustainably use environmental resources within their locality and also ready to take actions in their daily lives that will reduce climate change impact. Members of the coastal communities depends on the aquatic resources (fishes, shrimps, lobsters, crabs, periwinkles, and so on) for livelihood; some deplete the forest resources for both commercial 9 logging) and domestics use (firewood). Majority generate waste and dump them along the coast or even directly into the rivers. All these practices in one way or the other contribute to climate change directly or indirectly. However, coastal community members who are ecoliterate are more likely to take action to protect the environment. Muh (2017) pointed out that ecoliteracy is the ability to comprehend an ecosystem based on previously acquired knowledge, to comprehend the growing awareness of the value of sustaining an environment, and finally to be able to act in their everyday lives in accordance with their own capacities. Promoting climate change awareness among coastal communities through ecoliteracy requires the development of:

1) Empathy for all forms of life within the coastal community: The coastal community members rely on the aquatic and forest resources within their

locality for livelihood. They have the believe that these resources are not exhaustible, they harvest these resources in exploitative way. Most of the aquatic species are going into extinction or overtaking by non-native or indigenous species. Their continuous exploitative use of the coastal community resources such as excessive cutting down of forest trees contribute to climate change impact. Therefore, developing empathy for these resources will led to sustainable use of the resources that will mitigate climate change impact.

2) Knowledge of conservation of aquatic and forest resources within the coastal communities: In the traditional setting in some communities in Nigeria, traditional conservation of environmental resources is rooted in their traditional believe system. There are indigenous believe that regard some environmental resources as sacred, the sacred species (such as fish, crocodile, crabs, lobsters, and so on) are untouched in such communities. Tapping into spiritual connections, community members have to promote knowledge of conservation of aquatic resources will help to reduce the climatic impact of their exploitative way of utilization of the resources.
3) Concern: Raising coastal community members attitude and feelings toward the sustainable use of the environmental resources will increase their concern for climate change mitigation. Many of the community dwellers are not aware of their contributions towards global warming and climate change and this made them to feel less concern about how they utilise the environmental resources.
4) Action to promote the sustainability of aquatic and forest resources within the coastal community. The real action in question are everyday actions that show a caring attitude, like responsible fishing and gathering of sea foods, environmentally friendly ways of harvesting forest trees and other forest resources, participating in environmental conservation activities and other friendly environmental behaviours.

6. CONCLUSION

Most of the coastal community members in Rivers State are not aware of their contributions towards climate change impact, they always have the believe that climate change impact is caused only by multinational companies' activities in their area. Creating the awareness of their impact through ecoliteracy is imperative because it will enable them to understand and appreciate their interdependency, interrelationship and interconnectedness to the environment and its associated resources. This will promote sustainable environmental behavior and usage of the environmental resource among the residents, thereby reducing climate change impact on their livelihood.

CONFLICT OF INTERESTS

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