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Original Article

RAMPING UP ACTION AGAINST CLIMATE CHANGE AMONG RURAL ADULT IN THE GLOBAL SOUTH: THE COMMUNITY EDUCATION PERSPECTIVE

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Abstract In recent years, there has been an increase in the frequency and intensity of weather-related disasters such as droughts, floods, and heat waves. These disasters are a consequence of climate change, which is largely caused by human activities such as deforestation, the burning of fossil fuels, and industrialization. Sub-Saharan Africa is particularly vulnerable to climate change due to its high dependency on agriculture, low levels of development, and limited access to resources and infrastructure. Rural residents in this region, who constitute a significant proportion of the population, are particularly vulnerable to climate change as they rely heavily on natural resources for their livelihoods. This paper will discuss the role of community education in climate change adaptation among rural residents in sub-Saharan Africa.

Keywords: Climate change, Rural adult, Global south, Community Education.

Introduction

Climate change refers to the change of overall weather occurrences and increase in global temperatures. Generally it is understood as, the long-term change in average weather patterns across the world. In nineteen century, humans felt about excessive release of greenhouse gases: carbon dioxide, Chlorofluorocarbon (CFC), Hydroflourocarbon (HFC), Sulphur Hexaflurite (SF_6,), water vapour, methane, N_2O, NF_3 and Ozone into the air, causing rise of global temperatures consequently in persistent changes of the climate. Changes in the earth's climate, due to human activities include increasing air and sea surface temperatures, changing rainfall patterns, ocean acidification, sea-level rise and changes in frequency and intensity of extreme events like acid rain, floods, droughts and tropical cyclones. It also refers to

seasonal changes over a long period with respect to growing accumulation of greenhouse gases in the atmosphere (Eblen and Eblen, 1994).

Climate plays vital role in the formation of natural ecosystems and the human economies and civilizations. Recent studies have shown that human activities since the beginning of industrial revolution-manifested in fossil fuel consumption for power generation, land deforestation for agriculture and urban expansion-have contributed to have increased in concentration of CO_2 in the atmosphere by as much as 40%, from about 280 parts per million in the pre-industrial period, to 402 parts per million in 2016, which in turn has led to global warming (Fien, 1993). The first World Climate Conference was held in Geneva in 1979. Based on this conference, eleven thousand scientists in 153 countries by the leadership of William Ripple, professor of ecology at Oregon State University, have declared a climate emergence and warned that "untold human suffering" is unavoidable without huge shifts in the way we live. Since that day, multiple global bodies have agreed urgent action is needed but emissions of greenhouse gas continue to rise. He further added "Despite 40 years of major global negotiations, we have continued to conduct business as usual and have failed to address this crisis," and "Global surface temperature, ocean heat content, extreme weather and its costs, sea level, ocean acidity and land area are all rising," . "Ice is rapidly disappearing as shown by declining trends in minimum summer Arctic sea ice, Greenland and Antarctic ice sheets, and glacier thickness. All of these rapid changes highlight the urgent need for action (Ely, Anzul, Friedman, Garner & Steinmetz (1991).

All countries, rich and poor, must adapt to climate change. A recent report by the United Nations Intergovernmental Panel on Climate Change spelled out the dramatic consequences of failing to curb the rise in global temperature and adapting to a hotter planet. Adaptation should address risks from climate change and extreme weather, for example by safeguarding agriculture, managing the impact of rising seas, and making infrastructure more resilient. The benefits of adaptation are sometimes difficult to estimate because they depend on specific factors such as how well-adapted a country is to its current climate. Long-term savings from investment in resilience and coping mechanisms—such as better irrigation, improved seed varieties, strengthened health systems, and greater access to finance and telecommunications can be very significant. This is especially true for sub-Saharan Africa, which experiences one-third of the world's droughts and is particularly vulnerable to rising temperatures and extreme weather because of its dependence on rain-fed agriculture. A research shows that a single drought can lower an African country's medium-term economic growth potential by one percentage point. In Ethiopia, however, some farmers' yields rose by up to 40 percent with the development of varieties of wheat that were resistant to rust, a fungal disease.

In Ghana, meanwhile, cocoa farmers made their crops more resistant to drought with improved seed and irrigation and by planting trees to shade their crops from the sun. The benefits of investing in adaptation are not confined to sub-Saharan Africa: countries in all regions of the world can benefit from adapting to a hotter planet. Yet this doesn't mean adaptation can replace mitigation. Without strong mitigation, it will be impossible to stabilize global temperature, and adaptation would become impossibly expensive. The disarmament, demobilization and the integration (DDR) programme, which will teach this men

agricultural skills, give them counseling and literacy classes, and give them $125 worth of supplies for agricultural work, such as farming, or tending livestock, was made available to some of these men by the non-profit action, unharmed violence in an effort to stop these behaviours (Omang, Patrick, Obibessong and Ojong, 2023).

Global Dimensions on Climate Change

The first decade of the 21st century was the warmest since records began in 1801 . It was on average 0.2°C warmer than the previous record for the warmest decade (1991-2000) and approximately 0.4°C warmer than the 1961-1990 average. Observations show that both atmospheric and ocean temperatures are rising. Effects of global warming that are already apparent are declining sea ice extent and sea level rise, changes to weather patterns, including indications of more frequent and more intense extreme weather events , and changes to precipitation . Some impacts of climate change are already apparent in, for example, altered distribution patterns of infectious disease vectors, such as ticks and mosquitoes, and the extension of crop growing seasons. But the impacts of climate change cannot be considered in isolation from other human influences on local environments, such as land-use change, land degradation, population growth and rising urbanisation.

Understanding how climatic change interacts with other environmental, economic and societal pressures is fundamental to improving our ability to assess what the future nature and scale of climate change impacts may be, and how we should respond. Human activity is changing our climate There is a robust and diverse body of scientific evidence which suggests that the global climatic changes observed over the past 50 years are largely attributable to human activities, predominantly through the burning of fossil fuels, land use changes and agricultural practices, all of which increase atmospheric concentrations of greenhouse gases (GHGs) (Falk and Dierking, 2000). Inherent natural variability in the climate system, variations in solar irradiance and volcanic activity are other factors which influence climatic conditions over a range of timescales. However, assessments of their relative influences over the past century conclude that natural factors alone cannot account for the observed warming, particularly in the latter half of the century (Glesne, 1999). In 2009, global atmospheric concentrations of GHGs reached the highest levels ever recorded, with carbon dioxide (CO2) at 386.8ppm, methane (CH4) at 1803 ppb and nitrous oxide (N2 O) at 322.5 ppb which equate to 38%, 158% and 19% above pre-industrial values respectively (Grillon, 1994). Levels of CO2 in the atmosphere are at their highest concentration for at least 800,000 years, primarily due to burning of fossil fuels but also as a result of land-use change, including degradation of the world's forests.

Changing land use and agricultural activities have also significantly increased the levels of methane and nitrous-oxide emissions (Henry, 2000). The Intergovernmental Panel on Climate Change (IPCC) has concluded that most of the observed changes in global average temperatures since the middle of the 20th century are very likely due to the observed increase in anthropogenic Green House Gases (GHG) concentrations. The scale of future climate changes will be strongly influenced by the volume of GHG emissions in the future and by climatic "feedback effects" which could amplify or reduce the warming effects of GHGs. These feedback effects include changes in the Earth's reflectivity due to melting sea ice and snow cover, potentially significant releases of

methane as frozen ground warms, and changes in cloud cover.

Climate Change in Sub-Saharan Africa

Climate change is having a significant impact on the social, economic, and environmental systems of sub-Saharan Africa. The region is experiencing rising temperatures, changes in rainfall patterns, and an increase in the frequency and intensity of extreme weather conditions, such as floods and droughts. These changes are impacting agricultural productivity, food security, and health, among other things. Rural residents in sub-Saharan Africa are particularly vulnerable to the impacts of climate change. They are often reliant on subsistence agriculture and rely heavily on natural resources such as water and forests for their livelihoods. Climate change is affecting their access to these resources, resulting in food insecurity, water shortages, and loss of income. Women are particularly vulnerable due to their roles in household food production. Jobs, improved nutrition and incomes are the immediate benefits of land and soil restoration. The result from adopting the strategies proposed here will manifest in the importance of soil restoration (Agbor, Ambe, Ojong, Etan, Mbu and Ephraim, 2023).

Impact of global change on livelihood

Climate change is already being observed. A wide range of evidence suggests that many natural systems are already being affected by regional climate change, particularly by temperature increases. The three principal datasets of global surface temperatures that combine land and sea surface temperature observations all show similar warming trends. Global surface temperature increased, on average, by approximately 0.74°C over the 100-year period 1906–2005. Warming observed over both land and oceans suggests that the average temperature rise is not an accumulation of local warming arising from small-scale effects such as urban heat islands (Hodgkinson and Innes, 2001). This surface temperature warming trend is closely corroborated by satellite data collected over the past 30 years measuring temperature change in the lower atmosphere (the 'troposphere'). These temperature increases are unevenly distributed and are generally greater over land than the oceans. The Arctic has warmed at almost twice the global average over the past 100 years (Hopkins, Damlamian and Ospina, 1996). This global warming pattern is accompanied by observed decreases in snow and ice cover, with measured reductions in mountain glaciers, the retreat of Arctic sea ice and some melting of the Greenland and Antarctic ice sheets. This melting of glaciers, ice caps and sheets, and thermal expansion of the oceans, has led to an estimated rise in average global sea level of 17cm over the last century.

Changes in frequency and or intensity of some extreme weather events, such as heat waves and heavy precipitation events, have also been observed, and recent studies into the attribution of climate change have sought to identify the extent of the contribution of human activity to given events (Fien, 1993). For example, a study of the 2003 European heat wave showed that human influence had very likely at least doubled the probability of such an event. The extent of climate change in the future will depend upon the achievement of lower stabilization levels of GHGs through global mitigation efforts over the next 20–30 years.

Effective mitigation will require investment in and adoption of low-carbon energy generation, changes to lifestyle and behavioural patterns, and changes to industrial and agricultural practices (Dunkan, 2006). The implementations of national and international policies to regulate and incentivize mitigation, and

advances in technology, also have the potential to have a significant impact. However, even if GHGs in the atmosphere are stabilized, inertia in the climate system would mean that the world is 'locked in' to a level of further warming for many decades as the climate system is slow to respond. Sea levels will continue to rise for far longer. The earlier a peak and subsequent fall in emissions occurs, the more likely it is that global warming can be limited to less than 2°C37, leading to greater avoided dangerous and potentially irreversible impacts of climate change later in this century (Huckle, 2003).

Sustainability and Climate Change

Climate change is the most significant challenge to achieving sustainable development, and it threatens to drag millions of people into grinding poverty. At the same time, we have never had better know-how and solutions available to avert the crisis and create opportunities for a better life for people all over the world. Climate change is not just a long-term issue. It is happening today, and it entails uncertainties for policy makers trying to shape the future. Sustainability issues are having an increasingly dramatic impact on businesses, investors, consumers, the workforce and governments. Whilst the Covid-19 pandemic has caused widespread disruption, it has also provided momentum and opportunity to rethink and reconfigure for resilience (Hussein, 2017).

Furthermore, mitigating climate change, addressing waste and pollution, and ensuring environmental sustainability are among the world's most pressing issues. The Internet and other digital technologies can pose challenges to the environment (for instance through energy consumption for data production, storage, usage and transfer, and through the production of devices and disposal of e-waste), but they can also be leveraged to advance environmental sustainability (Huckle, 2003). Policies and actions are therefore needed to 'green' the Internet, reduce the environmental impact of new technologies (including artificial intelligence and big data) and facilitate their use to address environmental challenges. Examples include improving the circular economy for digital devices (e.g. enabling reuse and recycling), extending the lifespan of software and devices, reducing the energy use associated with the Internet, and promoting technologies that help reduce carbon emissions and energy consumption. Also important is to develop and put in practice adequate governance frameworks that enable the sharing and re-use of environmental data. At the same time, more focus needs to be placed on promoting environmental education and building awareness on environmental sustainability within Internet governance and digital policy spaces.

Contextualizing Community Education

The young adults generally agreed that the term "climate change" refers to an increase in temperature, resulting from the trapping of carbon dioxide and atmospheric pollution that poses a great danger to the continuation of life and the survival of planetary functions. Some of the young adults also referred to climate change as the consequence of humanity's care-free attitudes and lifestyle since the industrial revolution. Other responses pointed to strong connections between climate change and the melting ice at the North Pole and extreme weather scenarios, such as tsunamis, hurricanes, typhoons, cyclones and tornados that have become regular and yearly occurrences.

Nuccitelli (2013) cited a connection between climate change and human activities:

Essentially the main reasons the climate change is occurring is because we're putting

so much artificial carbon dioxide (Co_2) into the atmosphere right now through things such as the driving of cars, pollution due to factories' work; and deforestation. I think these are the most significant reasons as to why there are increased volumes of Co_2. On average I think it is supposed to rise by about 1.5 to 5.5 degrees, so it's going to completely disrupt the entire farming system, it's going to have a bigger impact on food and things like that, which obviously affects everyone in the world.

Nuccitelli (2013) establish a link between climate change and global increases in temperature, which have been found to be responsible for the decreasing sizes of glaciers and ice caps at the North Pole. Although they did not provide any scientific explanations for the rise in global temperature, they were able to connect climate change to the industrial revolution, which introduced large-scale use of fossil fuels for industrial activities and caused atmospheric pollution. The comments correspond to the 19th century scientist Svante Arrhenius' postulations on climate change, which established a linkage between temperature and human activities (Dunkan, 2006). Her position also tallies with the conclusions of the Intergovernmental Panel on Climate Change in early 2007 that the climatic changes seen around the world are very likely to be the result of the accumulation of carbon dioxide in the atmosphere rather than natural variations of warming the planet's surface (Nuccitelli, 2013). The Increases in the emission of carbon dioxide are the results of the changes in land use patterns, deforestation, land clearing, agriculture and other human activities, such the use of coal, oil and natural gas as fuel. Other participants describe the phenomenon of climate change from a generational perspective, in terms of intergenerational challenges regarding global climatic changes and sustainability.

Community Education in Climate Change Adaptation

Community education has been recognized as a critical tool for climate change adaptation in sub-Saharan Africa. It involves the provision of knowledge, skills, and resources to individuals and communities to enable them to understand and respond to the impacts of climate change. The goal of community education is to empower individuals and communities to take proactive measures to reduce their vulnerability to climate change.

Community education can take many forms, including awareness-raising campaigns, capacity building workshops, and the provision of resources such as drought-resistant seeds and water harvesting systems. It is essential that community education is designed and delivered in a culturally sensitive and context-specific manner to ensure its effectiveness. This means taking into account the unique socio-economic, cultural, and political contexts of each community.

Community education is a critical tool for climate change adaptation among rural residents in sub-Saharan Africa. It can raise awareness, build skills, empower communities, facilitate collaboration, and promote policy change. However, community education must be delivered in a culturally sensitive and context-specific manner to ensure its effectiveness. By empowering rural residents to take proactive measures to adapt to the impacts of climate change, we can build more resilient communities and ensure a sustainable future (Dunkan, 2006).

The Roles of Community Education in Climate Change Adaptation among Rural Residents in Sub-Saharan Africa

Community education has several roles to play in climate change adaptation among rural residents in sub-Saharan Africa. These roles include:

- Raising Awareness: Community education can raise awareness about climate change, its causes, and its impacts. This can help to build a sense of urgency around the issue and encourage individuals and communities to take action.
- Building Skills: Community education can provide individuals with the skills and knowledge necessary to adapt to the impacts of climate change. These skills may include water harvesting techniques, drought-resistant farming methods, and sustainable forest management practices.
- Empowering Communities: Community education can empower communities to take ownership of their adaptation efforts. By providing communities with the knowledge and resources they need to adapt, they become more self-reliant and better equipped to cope with the impacts of climate change.
- Facilitating Collaboration: Community education can facilitate collaboration between different stakeholders, including government agencies, NGOs, and community-based organizations. By bringing these stakeholders together, community education can help to build more resilient communities.
- Promoting Policy Change: Community education can promote policy change at the local, national, and international levels. By raising awareness of the impacts of climate change and the need for action, community education can influence decision-makers to take action on climate change (UNESCO, 2016).

Suggested foci of community education on climate change

The relationship between education, the climate crisis and preserving life on land and below water happens at various levels. While education is needed to enhance people's awareness of the damaging impacts of human actions against natural ecosystems, at the same time ecosystem unbalance and climate change-related emergencies are one of the critical barriers for people to enjoy their right to education (UNESCO, 2016). Indeed, climate change-related emergencies leave millions of learners out of school. Disasters like landslides, wildfires, droughts, floods, cyclones or typhoons cause famines, death, force people to move or destroy school facilities and universities, and communities might take years to recover from search events. Target 4.7 specifically mentions the roles of education in promoting sustainability" Ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development" (UNESCO, 2016).

1. Creating knowledge

Education plays a vital role in combating climate change and is key to understanding how the human-made climate crisis is affecting the planet. Our knowledge of the climate crisis is based on solid science, research, data that scientists across the world rigorously dissect and analyse. They are the

basis of the policy recommendations made in the IPCC, 2018 report. Researchers, academics and higher education develop the research to understand the causes, consequences and magnitude of the climate crisis and global warming related emergencies. Scientists have unveiled both the important role oceans or forests play in regulating the climate, along with revealing the immediate impacts the climate crisis is having on these fragile ecosystems.

2. Understanding ecosystems to build more resilient societies

Studying our ecosystems, their systemic nature and their connections to human and non-human life are important to care, preserve, restore and reverse damages human development is causing on Earth. Education, or ecological literacy, is pivotal to our understanding of how the actions of all individuals are negatively impacting the balance on Earth, in particular, the natural forests, the cycle of water and the preservation of wildlife (Huckle, 2003). Constant transformative learning to truly understand the fundamentals of natural life is needed as diversity increases resilience. Local and indigenous knowledge have contributed to ecosystem functioning, disaster early warning systems, and climate change adaptation and resilience. Traditional knowledge in such areas as agriculture, food production and conservation has played an important role in environmental sustainability for centuries. Numerous examples of indigenous communities' traditional land management practices, particularly those led by women, are becoming recognized globally as excellent approaches for conserving biodiversity and maintaining ecosystem processes.

3. Raising awareness

Today's children are the citizens and consumers of tomorrow. Their behaviours and decisions will inevitably affect the environment. Children are also important agents of social change in society, because apart from adopting responsible environmental behaviours themselves, they also have the potential to bring about change by influencing the environmental knowledge, attitudes and behaviours of peers, family and of the wider community. Educating youth and adults on issues related to the climate crisis, pollution of water and land will encourage individuals and communities to change attitudes and behaviour towards it. Initiatives to prevent and mitigate the impact of climate change through education may allow children, young people and adults to get a better understanding of the impact of global warming on their possibilities to enjoy their fundamental human rights.

4. Finding solutions

Even if strong commitments for action are taken this week and the rise of global temperature is kept below 1, 5 C, this rise will have serious impact worldwide. As the climate crisis is unfolding, education, skills and innovative ideas based on sound science are needed to find solutions and mitigate damages. As United Nation Educational Scientific and Cultural Organization (UNESCO, 2016) suggests, education can advance our knowledge and skills to prevent and to adapt to climate change-related emergencies.

Engineers, activists and youth make constant progress in improving devices to produce cleaner energy, devise ingenious process to clean oceans of plastic pollution and design practical mechanisms to allow wildlife and human to live peacefully together. At the same time, universities are at the

forefront of research to develop more recyclable materials, improve efficiency of man-made tools and increase the reuse of precious resources. Education can amplify these initiatives and reverse the toxic trends towards more extractivism and non-sustainable consumption models.

5. Holding leaders accountable

Finally, educated citizens and youth are more equipped to hold their leaders accountable and to put pressure on their governments to take decisive actions against the climate crisis. This was demonstrated by the millions of people who walked out of their schools and workplaces to demand urgent action on climate change and the end of fossil fuels.

Summary

Education is a vital element to resolve the climate change issues. It helps people to make understand the impact of global warming, increase climate awareness among people, encourages changing in their attitudes and behavior and adopt to climate change related trends. Education also encourages them in decision making, problem solving, resolving conflicts and building peace culture. It plays a vital role in adaptation and mitigation in climate change of communities, and empower human being for sustainable life. The cause of global warming is natural as well as human activities. The development of material life leads to erosion of values, increasing of unconsciousness, disorder in family, society, and nation as well as in globe. Awakening of consciousness is barely needed to protect the beautiful lovable Earth from its all miss-happenings.

Climate change might be combated through adaptation and mitigation. Innovative ideas, best practices, and utilization of technology may lead the Earth for building peace and sustainable development. Education will prepare all of societies to combat the challenges of climate change and make people and growth of economies with the knowledge and competencies as conscious citizens in shaping green environment, low GHGs emission and climate-resilient societies. United Nations Educational, Scientific and Cultural Organizations (UNESCO), World Bank, United Nations Development Programmes (UNDP), United Nations Framework Convention on Climate Change (UNFCCC), World Commission on Protected Areas (WCPA) and other leading organizations are taking extensive measures with long-standing climate action expertise, combined with our global, regional and country's cooperation. Quality education can provide a holistic and humanistic vision of worldwide, social and economic development, poverty eradication, peace building and sustainable life. Education for Sustainable Development and Global Citizenship emphasises on the transformation and development – transformation of knowledge, values, attitudes and behaviours and development of a range of skills. Hope the best will happen near and future.

Conclusion

Some experts have given following suggestions for better growth and better climate. Those are as following:

1) First, governments should put a price on carbon and move toward mandatory climate risk disclosure for major investors and companies.

2) Second, all economies should place much greater emphasis on investing in sustainable infrastructure as a central driver of the new growth approach.

3) Third, the full power of the private sector and innovation needs to be harnessed.

4) Fourth, a people-centre approach is needed to ensure lasting, equitable growth and a just transition.

- Technology can produce new material to use instead of plastic or other polluting materials. Along with getting carbon pricing right, it is needed to take other policies which are protecting the old inefficient, polluting economy.
- Today's progress on renewable energy, energy storage and low-carbon mobility is not an accident. It is part of the outcome of decades of investment by governments, universities, foundations and the private sector's research in mission-driven innovation.
- Advance in the radical transparency and accountability is necessary to achieve deforestation-free supply chains.
- It should be encouraged the private-public partnerships in each major sector to pilot, scale and share learning around the deployment of new low-carbon and climate-resilient technologies.

All governments should establish clear Energy Transition Plans to reach net-zero energy systems, and work with energy companies, trade unions, and civil society to ensure a just transition for workers and communities. Successfully diversifying local economies as we shift away from coal and eventually other fossil fuels will require multi-stakeholder dialogue, strategic assistance, re-training, and targeted social protection.

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