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## Influencing Curriculum Development and Knowledge of Climate Change Issues in Universities: The Case of University Of Nigeria Nsukka

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**Nicholas Ozor and Michael C. Madukwe**

Department of Agricultural Extension  
Faculty of Agriculture  
University of Nigeria, Nsukka  
Enugu State  
Nigeria

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### **Abstract**

*The current institutional structures and academic programmes in most universities preclude effective education and capacity building on issues of climate change. Besides, the pedagogies and curricula are centrally defined by university governance structures which are very hierarchical and rigid, and in most cases, discourage the culture of shared thinking and collaboration required for addressing complex system-related challenges such as climate change. The study aimed at influencing curriculum development and knowledge of climate change issues at the University of Nigeria, Nsukka (UNN) and its environs. To realize this, a multi stakeholder dialogue was conducted to sensitize the stakeholders on the need to include issues of climate change in their respective Faculty curricula. Over 320 participants drawn from the academia, policymakers, private sectors and the civil society organizations participated in the process that culminated in a one-day workshop at UNN in 2009. An outcome mapping approach was used to identify the most important reasons for climate-proofing the courses in the relevant Faculties of the University through curriculum review. Results show that there is need to provide a clearer understanding of climate change issues; build capacity at individual and institutional levels for climate change adaptation; provide opportunity to attract donor funds for teaching, learning, research and community service; provide conducive environment for transdisciplinarity and shared thinking on climate change issues; and transform the future leaders of tomorrow (youths) by promoting the culture of innovation for climate change adaptation. Recommendations ranged from revising existing course contents to emphasize issues of climate change (short-term approach), introduction of entirely new course modules on climate change (medium-term approach) to introduction of new degree programmes (long term approach) in the relevant Faculties of the University. Finally, a communiqué calling for urgent inclusion of climate change issues in the curriculum of the UNN was adopted by the University Administration.*

**Keywords:** Influencing, Curriculum development, Knowledge, Climate change, University of Nigeria Nsukka

## Introduction

The challenge of climate change adaptation is no longer a question of 'if', but that of 'how' countries should adapt. According to an assessment by the Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC), "we must adapt or die" (Ogallo, 2009). With the science of climate change now becoming increasingly clear, sustainability is turning more and more into an issue for education (Institute of Education [IOE], 2009). University education provides leadership in research, training and innovation responsible for sustainable development of any nation. According to Bloom *et al.* (2005), it has long been perceived throughout the world, that Higher Education plays a critical role in preparing and providing the leadership to meet these challenges and to stimulate sustainable development.

Effective adaptation to complex global challenges such as climate change requires well coordinated and collaborative efforts to galvanise ad hoc response activities at individual and institutional levels across Africa, to create new curricula, new teaching methods, new pedagogies and university governance structures suitable for building necessary capacities for climate change adaptation. At the same time, there is need for collaborative platforms for clusters of experts working on climate change adaptation at dispersed institutions on the continent to share multi-dimensional, multi-disciplinary, multi-cultural thinking and evidence-based experiences in order to anchor the African voice and fully embed the new curricular and pedagogies on climate change adaptation and mitigation on African realities, cultures and experiences. In this regard, the Africa Commission consultations noted that universities have a particular responsibility for generating and diffusing knowledge into the economy and creating opportunities for innovation. However, achieving such links require adjustments in the way universities function. One of such adjustments is the call for change in the curricula of African universities to accommodate issues of climate change so as to clearly understand the phenomenon and at the same time build the required capacity to adapt to the change.

Climate change has a disproportionate impact on the poorest countries, who have contributed the least to the problem (IPCC, 2007). Africa, for instance, accounts for less than 4 percent of global emissions, yet its 850 million inhabitants are the most vulnerable to climate change impacts. Africa is one of the most vulnerable continents to climate change and climate variability with the least intellectual, institutional and technological capability to address the climate challenge. Even in the midst of huge efforts by some development partners and some Non-Governmental Organisations, the prevailing political environment, institutional structures, pedagogies, rewards systems, research priorities, academic programs and teaching structures in African Universities precludes effective education and capacity building for climate change adaptation (Urama, 2009). Current pedagogies are centrally defined by University governance structures which are very hierarchical and rigid, and in most cases, discourage the culture of shared thinking and collaboration required for addressing complex system-related challenges such as global environmental change, including climate change

(Urama, 2009). Again, there has been an enormous loss through emigration of experts to other continents. It is estimated that 23,000 qualified academic professionals emigrate from Africa each year in search of better working conditions (BASIC, 2006). This situation exacerbates the already existing gap in capacity to deal with the current climate change challenges.

To effectively address the challenges posed by the adverse impacts of climate change and climate variability on the national development efforts of African Governments, there is increasing need for enhanced human, institutional and system-wide capacity-building initiatives, alongside the provision of adequate and predictable financial and technical assistance to assist countries in effectively implementing adaptation and mitigation projects consistent with national sustainable development priorities (UNEP, 2008). In this direction, the 12<sup>th</sup> Congress of the Association of African Universities (AAU) held in Abuja, April 2009, concluded that there is a need for urgent reforms in the current pedagogy, knowledge diffusion structures, mindsets of the actors, reward systems, governance structures and policy frameworks for African universities to effectively engage in higher education for sustainable development including adaptation to climate change (AAU, 2009).

It is against this background that numerous efforts have been launched globally and in Africa in particular to increase the level of awareness, understanding, teaching, research and learning on climate change adaptation and mitigation issues in universities which is believed to be the ideal centre of excellence in teaching, learning and research. This includes the research on influencing curriculum development and knowledge of climate change issues at the university of Nigeria, Nsukka and environs funded by the global change SysTEms for Analysis, Research and Training (START) in collaboration with International Development Research Centre (IDRC), African Academy of Sciences (AAS), Department for International Development (DFID), and Institute for Resource Assessment (IRA).

The pertinent questions to ask therefore are why do we need to mainstream climate change issues into the curriculum of universities? What are the processes to be followed in order to realize the inclusion of climate change issues in the curriculum of universities? The above questions formed the main focus of the paper.

### **Strategic objectives**

The strategic objective of the research was to influence curriculum development and knowledge of climate change issues at the University of Nigeria, Nsukka (UNN) and its environs. This was aimed at creating awareness and better understanding of the issues of climate change in the area and kick-start the process of curriculum development, improved teaching, learning and research in the area of climate change adaptation in the University and its environs.

Specifically, the research was aimed to:

1. Identify the need for curriculum development to include issues of climate change at the University of Nigeria, Nsukka;
2. Analyze processes for realizing curriculum review at the University of Nigeria, Nsukka; and
3. Engage stakeholders in the entire process of influencing curriculum development and knowledge of climate change issues at the University of Nigeria, Nsukka.

### **Methodology**

The research targeted University of Nigeria, Nsukka and its environs. The University of Nigeria, Nsukka is the first indigenous University in Nigeria and was founded in 1960, the same year that Nigeria gained her independence. The University is made up of 16 Faculties and about 106 Departments and has since inception strived to be in the forefront of manpower training as well as research and development in the country. The research was designed to benefit the academia- University of Nigeria authorities, the academic staff and students. However, the research also accommodated other universities, private sectors, policymakers, farmers and farmer organizations, the press and the civil society organizations within the environs in order to further create awareness, understanding and build their capacity to respond effectively to issues of climate change.

In the initial phase of the research, a Rapid Appraisal was conducted to sensitize the stakeholders on the current global challenges posed by climate change and the need to integrate issues of climate change into the curriculum of the University, make policies to effectively address the challenge and implement sustainable measures of adaptation and mitigation. This included several meetings and Round Tables with the Deputy Vice-Chancellor (DVC) Academics, the Deans of relevant Faculties, the Heads of Departments in these Faculties, other lecturers in the relevant Departments, Chairperson, Senate Committee on Curriculum at the UNN, and the student body from across the various Departments in the University; the Policy makers (Agricultural Development Agencies and Ministries of Agriculture and Environment); the Private Sectors (farmers and farmers' groups, agro-allied industries); and the civil society (relevant NGOs, media houses and journalists).

The Rapid Appraisal was followed by a Training Workshop for all the identified stakeholders. This took place on 3 December 2009 at the Centre for Entrepreneurship Development and Research (CEDR) Auditorium, UNN. The Workshop brought together 320 participants from the academia, the private sectors, the civil society organizations and the policy makers to brainstorm on the need for inclusion of new and or revised courses and programmes into the existing curriculum of relevant Faculties at the UNN. The workshop shed more light on climate change science including the causes, effects, adaptation and mitigation measures and the current politics of climate change. The Workshop took the form of paper presentations from the principal researcher and other invited guest

lecturers. The invited speakers included; the Chairperson Senate Committee on Curriculum, University of Nigeria, Nsukka (representing the Vice Chancellor); the Deans of Faculties of Agriculture, Social Sciences, Environmental Sciences, Education, and Biological Sciences; and the Executive Director of Green Economics, Abuja, Nigeria.

There was an extended participatory dialogue session at the end of the paper presentations where participants made immense contributions and charted the way forward on how to realize the inclusion of climate change issues into the University curriculum, the types of new and revised courses/programmes that could be introduced in relevant faculties and how to improve the teaching, learning and research on climate change issues in the University. This session culminated with the adoption of a communiqué (Box 1) by the Vice Chancellor, UNN.

Research results obtained through an outcome mapping approach were presented using descriptive and narrative analysis of key events during the project period. This mainly came from the series of dialogue with stakeholders within the University and its environs.

## **Results**

One key outcome from the research was the contextualization of the subject matter for the targeted stakeholders. This is presented below:

### ***The Context of Climate Change***

Climate change has been defined by the Intergovernmental Panel on Climate Change, IPCC (2001) as statistically significant variations in climate that persist for an extended period, typically decades or longer. It includes shifts in the frequency and magnitude of sporadic weather events as well as the slow continuous rise in global mean surface temperature. According to Ozor (2009), climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity and is widely recognized as the most serious environmental threat facing our planet today. Climate change describes changes in the variability or average state of the atmosphere overtime scales ranging from decades to millions of years (FAO, 2007). Climate, water resources, biophysical and socio-economic systems are interconnected in complex ways, so a change in any one of these induces a change in another. Anthropogenic climate change adds even more pressure to nations that are already confronting the issue of sustainable resource use such as Africa.

Countries in sub-Saharan Africa are likely to suffer the most devastating impacts of climate change because of their geographical location, low incomes, low technological and institutional capacity, as well as their greater reliance on climate-sensitive renewable natural resources sectors such as water and agriculture (Eboh, 2009). According to Anyadike (2009), Africa is particularly susceptible to climate change due to the desertification process, declining run-off from water catchments, declining soil fertility, dependency on subsistence agriculture, the prevalence of AIDS and vector-borne diseases, inadequate government

mechanisms and rapid population growth. More than 70% of those living in African, Caribbean, and Pacific (ACP) countries work in the agricultural sectors and climate change for these people are not a theoretic discussion; it is the difference between life and death (Spore, 2008).

Research has shown that gases termed Greenhouse Gases (GHGs) are responsible for the warming that lead to the changes in climatic conditions. These gases are notably carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ), Ozone ( $\text{O}_3$ ), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride ( $\text{SF}_6$ ) and water vapor ( $\text{H}_2\text{O}$ ). They trap the sun's radiation causing global warming. A quick explanation of how weather patterns work will lead to easier understanding of the concept of climate change. According to Spore (2008) each day, the sun emits rays of light onto the earth's surface. The earth absorbs part of the heat, reflects another share into the atmosphere and sends out a third share in the form of infra-red rays. These rays are cushioned by the clouds and water vapour, which stabilizes the earth's temperature under normal circumstances. The problem we are facing today is that the concentration of GHGs produced by human activity has increased significantly. The gases absorb the terrestrial radiations from the earth and re-radiate the heat back to earth, thereby leading to a general increase in temperature known as global warming (Fig. 1). This is the infamous greenhouse effect, a phenomenon first explained in 1824 (Spore, 2008).

The effects/impacts of climate change are numerous, but have more devastating

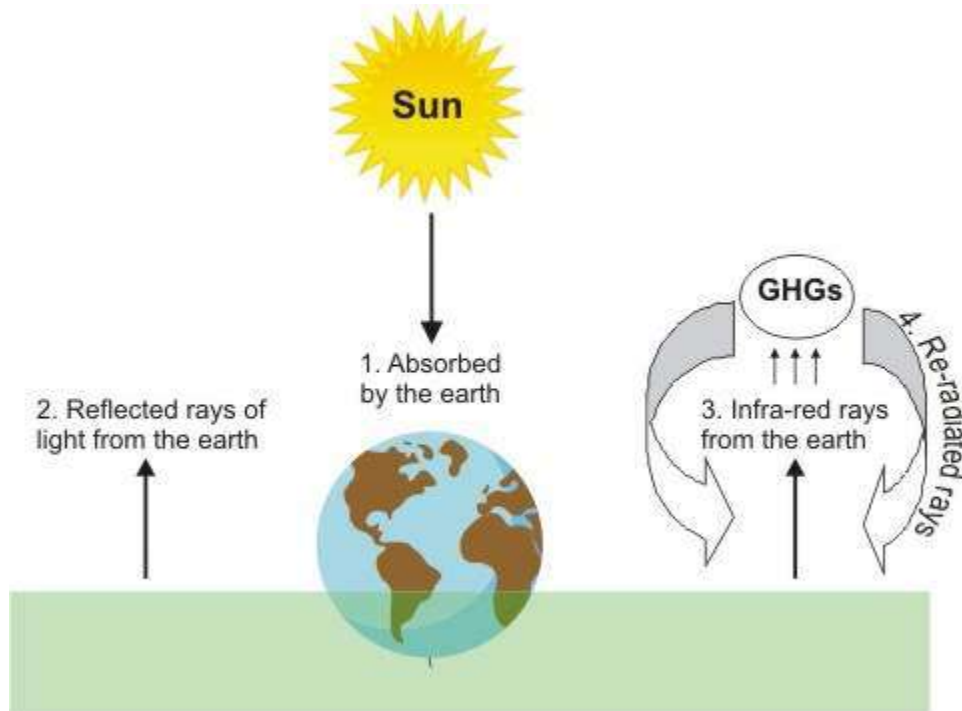


Fig. 1: Radiation process that lead to climate change

consequences on African Agriculture and hence food security. These effects/impacts range from drought events to flooding events, sea level rise, drying of rivers and streams, decrease in water quality, melting of glaciers, loss of biodiversity, changes in rainfall pattern and amounts, increases in temperature, among others. These effects have negative impacts on the economy, food security, agricultural production, health, and social statuses (conflicts and migration) of many nations especially the developing countries. This calls for integrated approaches for adaptation and mitigation and one sustainable way to achieve this is through education and capacity building. To realize this, the curriculum of educational institutions has to be modified to accommodate the current issues of climate change. This was the focus of the project as it aims to influence the development of new and or revised curriculum and programmes at UNN and create better understanding and knowledge of the issues of climate change within the University environs.

### ***The need for curriculum development to include issues of climate change***

Through a series of interactive participatory dialogue, stakeholders observed that the need for curriculum development to include issues of climate change in universities is topical. Climate change issues should be infused into the curricula of universities as a matter of urgency (Chakeredza, Temu, Yaye, Mukingwa et al., 2009). There is need for evidence based scientific data on African experiences to be infused into the curricula to serve the African specific problems. The suggested areas of emphasis with respect to agriculture are presented in Table 1.

The curricula can be handled as a separate subject or infused and integrated into the various agricultural and natural resources management subjects. The methodology for teaching and learning should be lectures (including guest lectures), seminars, group discussions, visits to sites demonstrating the impact of climate change and or adaptation and mitigation work in progress, on-farm discussions and surveys. E-Learning enhanced with research repositories can also be pursued where possible. Disciplines could also be selected with the greatest potential to deliver on mainstreaming climate change into the university education. The objective will be to ensure that graduating students fully understand and grasp the implications of climate change on the whole global economy. The thrust should be towards building a cadre of academics and researchers with appropriate knowledge and skills on the key issues affecting society and be in a position to advise policy makers, educational establishments and practitioners.

More specifically, stakeholders in the research process identified the following as the main reasons for the inclusion of climate change issues in the curricula of universities:

1. **Capacity building (human and institutional) for mitigation, adaptation, and resilience to climate change:** There is increasing need for young people especially students and researchers to gain knowledge and understanding about climate change. Such knowledge and understanding enable them to respond effectively to the global challenges posed by climate

change on graduation. Educating those currently at school about climate change will help to shape and sustain future policy-making. More so, the academics who are involved in research, teaching, and community service can achieve more in this direction if the curriculum is developed to support their activities. In the same vein, institutions can separately or jointly engage in research and development that will provide better adaptation options for climate change. Institutions should be able to contribute to the development of the body of knowledge as regards climate change adaptation and mitigation. Students and lecturers should be aware of the various International Conventions and Protocols surrounding climate change such as the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto protocol, Cop 15, Cancun 16, Durban 17, and a range of other informal partnerships and dialogues that provide a framework that supports co-operation, and a foundation from which to build further collective action. The challenges therefore are to develop good curricula, produce relevant learning resources and capacitate educators (Chakeredza, Temu, Yaye, Mukingwa et al., 2009).

2. **Opportunity to attract donor funds:** Currently, there are millions of dollars available to be harnessed globally for climate change research and development. Universities can key into this opportunity to attract several funds for teaching, learning, and research in climate change issues through evidence-based actions to support their applications. Such actions can be through curriculum development and capacity building initiatives on climate change teaching, learning and research. Such funds are available under the UN adaptation fund, the Clean Development Mechanisms (CDM), the carbon markets, and alternative energy initiatives among others. Several United Nations Arms and Multi Nationals are already funding initiatives on climate change ranging from awareness creation to building individual, community, and institutional capacities, tapping the indigenous knowledge systems for adaptation and building national and regional frameworks and collaborations among institutions for adaptation to climate change. This is therefore an area of future intense funding and universities should tap into the opportunity.
3. **Universities are centres of excellence, transdisciplinarity, shared thinking, and intellectual domain:** Universities are custodians of knowledge and provide platforms for transdisciplinarity, multidisciplinary and shared thinking that is capable of sustaining the socioeconomic and environmental growth and development of any nation. Climate change is an issue that requires knowledge and capacity across many disciplines in order to provide effective strategies for mitigation and adaptation. This scenario can only be harvested in a multi-talented and multi-cultural environment like the university. Gone are the days when research development occurs in tunnels of silos because impacts generated from such endeavours are limited. Currently, transdisciplinary research has taken over as it engages peoples of different research backgrounds in solving common problems thereby providing a better and sustainable solution. Transdisciplinarity espouses collaboration amongst different knowledge communities and utilizes extra



scientific experiences and tacit knowledge in its approaches. It therefore provides a useful model for addressing current global challenges such as climate change, poverty and global financial crisis which are mutually exacerbating (Urama, 2009).

4. **Building future leaders of tomorrow (Youths):** University education offers the best opportunity for young people who are future leaders of tomorrow to be empowered so as to sustain their livelihoods and that of the future generations. The youths are the future policy makers, administrators, leaders, etc, and when not properly empowered, can become the future destroyers of the society and environment. Such empowerment comes through good education and especially university education. Empowering the youths to acquire skills and knowledge on climate change issues will not only lead to the development of mechanisms for adaptation and mitigation but will also make them become environmentally responsible. The requisite skills acquired in university education will enable them innovate and devise modern strategies for climate change adaptation and mitigation. When placed in decision making institutions, the knowledge and skills obtained through university education will enable them make policies that reduce the anthropogenic causes of climate change and encourage best practices for adaptation.

### **The Process**

Stakeholders noted that the process of curriculum change in universities is not usually an easy and quick task. This is because of the necessary bureaucracies involved at the departmental, faculty, university and at the national university's levels. However, in order to achieve quick results, it was recommended that the process takes either of three forms or methods. One method is by adjusting and revising already existing course contents within relevant departments and faculties to include issues of climate change (short term measure). The other method is to entirely develop new courses and modules that address issues of climate change (medium term measure). The last measure is to develop programmes that award degree certificates on climate change (long term measure). The first method is easier and quicker but masks the contents that address the issues of climate change while the second method is more rigorous and time consuming but brings out the issue of climate change being addressed to the fore. The third measure is most sustainable as it will equip graduates with all the necessary skills and knowledge to tackle the climate change menace. The third approach also has the capability of attracting a lot of student intake from far and near as it aims to address a topical issue of global dimension. Staff and students involved in the third approach also stand the chance of getting Donor funds in the course of the programme

Achieving all the three methods listed above will involve stakeholder dialogues. Realizing the first method may just involve only the staff in a department or faculty and during a departmental meeting or faculty board meeting. In this case, revising

the content of a particular course to include issues of climate change can be realized when the rationale is presented and approval obtained.

In the second and third methods, a more detailed and systematic approach is required. In this case, an initial rapid appraisal should be conducted to sensitize the relevant stakeholders in the university on the current global challenges posed by climate change and the need to integrate issues of climate change into the curriculum of the university, make policies to effectively address the challenge and implement sustainable measures of adaptation and mitigation. The relevant stakeholders include university Vice chancellors, Deans of relevant Faculties (agriculture, biological sciences, education, engineering, environmental sciences, social sciences, health sciences, arts, veterinary sciences, etc), Heads of Departments in these Faculties, academic and non academic staff, university committee on curriculum, and the student union. After initial deliberations at this stage, potential courses and programmes are developed and approved by the particular university and then forwarded for approval by the national body in-charge of curriculum development at the ministry of education. This body can be a separate agency within the ministry of education such as the national universities commission as is obtained in some countries like Nigeria.

It was also recommended that an interactive session/workshop between the university (science experts) and other stakeholders including policy makers (development agencies, ministries of agriculture, education, environment, science and technology, etc); the private Sectors (farmers, pastoralists, farmers' groups, agro-allied industries); and the civil society (relevant NGOs, media houses and journalists) be convened during the stakeholder dialogue at the university level so as to obtain contributions, experiences, and views from other members of the quadruple helix in a bottom-up approach. In this way, universities will be advancing a graduate research based knowledge that is relevant to the needs of the industries and to the development of agriculture and entrepreneurship. This is because the voices from the demand-side would have been accommodated.

### **Sample Curriculum**

Through series of dialogue that characterized the research process, samples of curricula were developed by the stakeholders in the various areas of endeavours (disciplines) that participated in the research project. These included the Faculties of Agriculture, Social Sciences, Environmental Sciences, Education, and Biological Sciences. A case example is provided in Table 1 for the agricultural sciences.

**TABLE 1**  
**Sample curriculum reforms on climate change for the agricultural sciences**

<b>S/N</b>	<b>Course/Module</b>	<b>Areas to be covered</b>
1.	Introduction to climate change	The content and context of climate change; implication of climate change to people's livelihoods and the world economy; the science of climate change; historical and present day climates and predicted future outcomes given a range of emissions scenarios; different interactions between climate change, environment, food security, policy and sustainable agricultural production; etc.
2.	Global warming	The causes of global warming and the projections under different scenarios; green house gases responsible for global warming; etc.
3.	Agrobiodiversity	The need to maintain agrobiodiversity under climate change threat; impact of land use change on agrobiodiversity at ecosystems, species and within-species levels; Adaptation to climate change: agrobiodiversity options; Approaches for putting adaptation strategies into practice in research, extension and policy implementation; etc.
4.	Pastoralism Biodiversity	Sustainable pastoral production systems; conservation; Pastoral livelihood systems; Land use management; Ecosystem services; Animal nutrition and breeding; Dynamism in community co-habitation; veterinary and extension services; Traditional knowledge systems; etc.
5.	Biofuels	The need for reduced carbon emissions; Alternative fuel production with special focus on biofuels; Socio-economic implications of alternative energy sources including food crisis scenarios; etc.
6.	Adaptation Strategies	Indigenous and modern Innovations for adaptation to climate change by different groups of people; economics of climate change adaptation; skills and tools for analysis and management of environmental problems; etc.
7.	Mitigation Strategies	Current thinking on climate change mitigation strategies; Reduction of carbon emissions; Geo-engineering concepts and practices; the REDD+ initiative; etc.

8.	Global policy issues on climate change	Global policy framework; UNFCCC; Kyoto protocol; CDM; National Adaptation Plan of Action (NAPA): the politics and policies of climate change; etc.
9.	Climate Change Extension	Methodologies for disseminating and communicating climate change science to rural farmers and pastoralists and their feedback mechanisms; documentation of science, technology and innovations on climate change; mapping of climate change scenarios- causes, impacts, mitigation and adaptation; etc.
10.	Impacts of climate change on crops	Identify the major impacts of climate change on crops and plants; process of developing drought and flood tolerant crops through genetics, breeding and engineering; etc.
11.	Impacts of climate change on livestock	Major impacts of climate change on livestock, contributions of livestock to climate change; genetics and breeding for resilience in animals; etc.
12.	Impacts of climate change on soils	Impacts on soil infertility and the relationship with agricultural productivity; soil surveying for mitigation and adaptation; etc.
13.	Climate change and food technology	Impacts of climate change on value chain; changes in tastes of crops and livestock due to climate change; post harvest losses; etc.

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*With contributions from Chakeredza et al (2009) and Ozor (2010)*

**Box 1: Communiqué of the Workshop on Influencing Curriculum Development and Knowledge of Climate Change at the University of Nigeria, Nsukka and Environs**

**Background:**

1. The workshop “UNN TALKS CLIMATE CHANGE” was held on 3 December 2009 at the CEDR under the auspices of the global change SysTems for Analysis, Research and Training (**START**) and supported by the Development Partnerships in Higher Education (**DeIPHE**), the African Institute for Applied Economics (**AIAE**) and the University of Nigeria, Nsukka (**UNN**). The workshop was attended by the academia- students, lecturers, University authority; private sectors; policy makers; and the civil society organizations.

**Appreciation:**

2. The African Climate Change Teaching Fellow, Dr Nicholas Ozor on behalf of the START appreciates the numerous other institutions and stakeholders that supported the initiative.
3. We especially thank the Chief Host Prof B. Okolo, Vice chancellor UNN and the Deans of Faculties represented, for their supportiveness to the project.

**Concerns:**

4. We are concerned on influencing curriculum development and knowledge of climate change at the UNN as a way to build the capacity of staff and students to effectively and strategically respond to the global environmental challenge.
5. We understand that there is an urgent need for multi-disciplinarity, trans-disciplinarity, and multi-cultural thinking in the teaching, learning and research on climate change issues at the UNN.
6. We recognize that the UNN can provide requisite leadership on influencing the curriculum change across over 190 universities in Nigeria to include issues of climate change in their programmes.

**Way Forward/ Actionable points:**

7. There should be an immediate audit of staff engaged in climate change research at the UNN and staff with the capacity for teaching the various areas of climate change
8. The UNN should organize workshops to further sensitize the academia on issues of climate change and proactively involve them in the development of new and or revised curriculum that address issues of climate change.
9. A Centre for Climate Change Research and Development should be set up by the University authority to address all issues relating to climate change in the University. This will include curriculum development in relevant Faculties such as Agriculture, Arts, Social Sciences, Education, Biological Sciences, Environmental Sciences, Health and Medical Sciences, Engineering, Veterinary Sciences, and Physical Sciences; transdisciplinary teaching and learning; and in outsourcing for funding opportunities for climate change research and development from the national, regional and international governmental and non-governmental organizations.
10. The UNN should promote scholarships in climate change teaching and research by supporting postgraduate scholarships for MSc and PhD programmes, supporting postdoctoral programmes, and supporting academic staff for short trainings on issues of climate change in centres of excellence on climate change across the globe.
11. The UNN should commission new research initiatives on climate change among academic staff and postgraduate students through the Universities Senate Grants.
12. The UNN should reach out for partnerships and collaborations with other institutions and organizations involved in climate change research and development so as to build effective networks that will enhance their capacity to address issues of climate change teaching, learning, research and curriculum development.
13. All actions identified must start now.

## **Conclusion and Recommendations**

The research sought ways to influence curriculum development and knowledge of climate change issues at the University of Nigeria, Nsukka and its environs. Curriculum development in universities is one of the most sustainable and emerging strategies to develop capacity for mitigation and adaptation to climate change impacts on livelihoods and ecosystems. After a series of meetings, stakeholder dialogue, and sensitization processes, a workshop was organized to address part of the strategic objective of the project. Participants ranged from the academia – students, lecturers, University authority to policy makers, the private sectors and the civil society organizations. The ACCFP Teaching Fellow and other guest lecturers from relevant Faculties at the University of Nigeria presented papers that reflect the need to include issues of climate change in their respective Faculties.

In all, the participants made up of about 320 people accepted the need for the inclusion of new and or revised courses and programmes into the curricula of the University of Nigeria, Nsukka. An adopted communiqué (Box 1) by the Vice Chancellor of the University, Prof. Bato Okolo represented by the Chairperson Senate Committee on Curriculum and Dean Faculty of Education, Prof. Grace Offorma attests to the resolutions passed by the participants.

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