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# CAPACITY FOR TEACHING CLIMATE CHANGE ADAPTATION IN THE UNIVERSITY FACULTIES OF AGRICULTURE IN SOUTH EAST NIGERIA

**Ozioko, R. I[1], Dimelu, M. U[2], Madukwe, M. C[3]**
Department of Agricultural Extension Faculty of Agriculture University of Nigeria Nsukka
[2]mabeldimelu@yahoo.com or mabel.dimelu@unn.edu.ng
[3]madukwemichael@yahoo.com
Correspondence Author: Dimelu, M. U., mabeldimelu@yahoo.com

## ABSTRACT
*The study examined teaching capacity for agricultural adaptation to climate change in the University Faculties of Agriculture in South east Nigeria. One hundred and thirty randomly selected academic staff in the University Faculties of Agriculture were used. Data were collected using questionnaire and analyzed by descriptive statistics and factor analysis. Majority (78.3%) of academic staff were males, married (85.8%) with an average of eight years of experience in teaching. A greater proportion (50.8%) had Ph.D and two years of research experience in climate change. Only 10% of the Universities indicated existence of postgraduate programme. Climate change content of courses taught were on issues such as vulnerability to climate change (27.7%), adaptation (25.5%), mitigation (23.2%), and indigenous strategies to climate change (22.5%). The teaching materials employed included textbooks (83.3%), journal (78.3%), conference proceedings (66.7%), articles on Climate Change and agricultural adaptation (80.8%) and lectures/teaching notes (44.2%). The major teaching methods used to communicate climate change concepts were lecture (63.3%) and field trip (12.6%). Teaching capability of the Universities were constrained by poor understanding of climate change concept, poor learning environment, weak infrastructure, and inadequate fund. The study therefore recommends universal review of curriculum and programmes to increase climate change content of courses, and provision of climate change teaching materials in the University Faculties of Agriculture. This however, requires adequate funding, availability of infrastructure, enabling environment through favourable policy and cooperation of all stakeholders in development process.*

**Key Words:** climate change, adaptation, capacity, teaching, agriculture

## INTRODUCTION

Climate change is a change in climate overtime, whether due to natural variability or as a result of human activity (Inter-governmental Panel on Climate Change, IPCC, 2001). It can also be seen as change in climate which is attributed directly or indirectly to human activities that alter the composition of the global atmosphere and in addition to natural variability observed over comparable time periods (IPCC, 2007). According to Ministry of Environment of the Federal Republic of Nigeria (2003), it has become a global issue manifesting in variation of different climate parameters including cloud cover, precipitation, temperature ranges, sea level and vapour pressure. The effects include among others, increase temperatures, decrease rainfall in the continental interiors, drought, desert encroachment, melting ice, extreme weather, floods, sea level rise, sinking of Islands, water scarcity, health and agricultural problems (Odjugo, 2007; 2009; Adefolalu, 2007; Nwafor, 2007). In Nigeria, climate change is seriously threatening rural communities and farmers. Its impacts in the southeast agro-ecological zone of the country include increased flooding, landslide and erosion of the zone which has led to loss of lives, houses, farmlands, properties and roads. (Agwu and Okhimamhe, 2009). Some states in the area such as Anambra and Enugu States are ravaged by sheet and gully erosion. Soil productivity in many parts of the region has been badly impacted with considerable reduction in food productivity (Adesina and Odekunle, 2012). Bello, et al. (2012) also observed that the area is currently confronted by irregularity in the rainfall pattern ( delay onset or early retreat of rains) leading to unsteady growing season and other soil –related problems.

It is predicted that in some African countries, yields from rain-fed agriculture will

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be reduced by up to 50% (IPCC, 2007). The FAO (2007) further reported that up to 11% of arable land could be highly affected by Climate Change in the developing world. Generally, IPCC (2007) predicted a decrease of up to 30% in world food production and between 75 and 250 million people will be exposed to water stress due to climate change in Africa and this will adversely affect livelihood in the region. Hence the global concern to educate the public, policy makers, development planners, organizations and agricultural producers/farmers for increased resilience and adaptation.

Adaptation refers to adjustments in practices, processes or structures in response to projected or actual changes in climate (Ifeanyi-Obi, Etuk and Jike-Wai, 2012), with the goal of maintaining the capacity to deal with current and future changes. With respect to agriculture, Climate Change adaptation aims at reducing and developing appropriate coping measures to address the negative impacts of Climate Change on crop production, soil management/conservation and animal husbandry. Adaptation to climate change requires high climate science literacy and engagement of stakeholders: research and education institutions, policy makers, and governmental agencies, productive sectors, and the public in general. However, studies have shown that the level of awareness of climate change phenomenon is still low among stakeholders in developing countries like Nigeria (Nzeadibe, et al. 2010; Nzeh and Eboh 2010). A research carried out by International Food Policy Research Institute (IFPRI, 2007) shows farmers' lack of information and knowledge of appropriate adaptation measures as barriers to adaptation to climate change. Empirical studies carried out in many parts of the country also showed that farmers have low knowledge of climate change related issues (Obiora and Onwubuya 2011; Igbonazobi 2011) and lack investment capability in terms of equipment and human resources to enable them tackle the negative effects of climate change. (Obiora, 2012). Moreover, report suggests that a large segments of the society still remain unconvinced that climate change is real (Kohut et al., 2009). Consequently, as Hassol (2008) pointed out there is an acute and demonstrable need to educate and inform decision-makers and citizens in general( producers in particular) on the most basic facts of climate change and adaptation responses and options.

Universities in Nigeria exist with the aim of advancing the frontiers of knowledge. According to Lemons (2011), institutions of higher education must recognize their responsibility in responding to the urgent need of global climate change. Faculties of agriculture in particular, need to adequately educate and communicate basic facts on climate change to actors in the agricultural sector. This calls for full commitment and provision of leadership in research, training and innovation requisite for effective adaptation to climate change in the country. The question is; what teaching capacities exist in the universities for executing the climate science education needs of the society and the farmers in particular. In other words, what abilities, skills, understandings, attitudes, values, relationships, behaviours, motivations, resources and conditions that enable individuals, organizations, networks/sectors and broader social systems to carry out functions and achieve their development objectives over time, exist in the University Faculties of Agriculture in Southeast, Nigeria. The study therefore, sought to;

1. ascertain the human capital available in the Universities;
2. examine capacities for teaching climate change adaptation in the Universities and
3. determine the factors that constrained capacities of University Faculties of Agriculture for teaching climate change adaptation.

## MATERIALS AND METHOD

The survey was conducted in southeast agro-ecological zone of Nigeria. Southeast is located between latitudes 04$^{o}$ 17'N and 07$^{o}$ 06'N and longitudes 05$^{o}$ 23'E and 09$^{o}$28'E (Macmillan, 2009). The area comprises the geographical location of the following states: Abia , Anambra, Ebonyi , Enugu, and Imo state. The climate of the southeast can generally be described as tropical with two clear identifiable seasons, the wet and dry seasons, average highest annual rainfall at 1952 mm and temperature pattern-mean daily and annual temperatures at 28$^{o}$ C and 27$^{o}$ C respectively (Igbokwe, *et al.* 2008). Southeast Nigeria is primarily an agricultural zone with sandy, mostly loose and porous soil, hence its vulnerability to climate change. Three states namely Abia, Anambra and Enugu out of five states were purposively selected because of the presence of federal and state universities/faculties of agriculture. All academic staff in faculties of agriculture of the Universities in the states constituted the population for the study. In each state, two universities (state and federal) were purposively selected for the study. For Abia State, Michael Okpara University of Agriculture (MOUA), Umudike, and Abia State University (ABSU) Uturu; for Anambra State, Nnamdi Azikiwe University (UNIZIK) Awka and Anambra State

University (ANSU) Uli; and for Enugu State , University of Nigeria, Nsukka (UNN) and Enugu State University of Science and Technology (ESUT). Simple random sampling technique was used to select five (5) staff across he departments in the faculty/college of agriculture of each university. An exception was made at the Nnamdi Azikiwe University Awka, where the faculty was still new, five staff of the faculty were selected. The total sample size of the study was one hundred and thirty (130) respondents. Questionnaire was used for data collection. To elicit information on the human capital the respondents were asked to indicate their age (years), marital status, experience in teaching (years), highest qualification and rank,

The teaching capacities of the universities for climate change adaptation were assessed in the following areas : existing academic programme on climate change, courses and topics taught on climate change, available teaching materials, practical/learning experience and methods. The respondents identified the constraints to teaching capacities of the Universities for agricultural adaptation to climate change on a four point Likert- type scale of no extent, little extent, large extent, very large extent with weighted values of 1,2,3 and 4, respectively. Constraint variables such as poor funding of climate change research, lack of effective policies on climate change adaptation, poor teaching environment, poor learning environment among others were provided to the respondents. Only variables with factor loadings of 0.40 and above at 10% overlapping variance were used in naming the factors and variables that loaded in more than one factor were also discarded (Madukwe, 2004). Data were analyzed using descriptive statistics and factor analysis

## RESULTS AND DISCUSSION

**Sex**

The majority (78.3%) of the respondents were males (Table 1). The result shows a male dominated workforce. The proportion of women in agricultural science is still on the low side compared to level of their visibility and participation in other sectors like farming, agribusiness etc. This may be as a result of earlier domination of lecturing work by male in the universities. This agrees with the report that the literacy level of women in Nigeria is low (This Day Newspaper, 2010). It may likely hamper generation of gender sensitive adaptation technologies, learning strategies, information and wide communication of the same to the society.

**Age**

Greater proportion (38.5%) of the respondents were within the age range of 30-39 years. About 31.5.% were between 40-49 years, 19.7% were between the age range of 50 years and above, while only 3.3% were in the range of 20-29 years (Table1). The mean age was 43 years. The respondents were still within the productive and academically active years. According to Obiora, (2012) they are likely to respond positively to initiatives or programmes designed to enhance capability for agricultural adaptation to climate change agricultural adaptation. Besides, majority of the staff are still within age limit that are often eligible for external academic assistance/opportunities tailored on capacity building for both research and training in priority areas like Climate Change. Relatively such crops of academic staff are great assets for building teaching capacity in the universities.

**Marital status**

A greater proportion (85.8%) of the respondents was married, and about 14% were single. The presence of single and perhaps younger generation of academic staff in the universities agricultural faculties and departments has promise for sustained benefit from investment in staff development and training. Besides, they are more likely to enjoy undistracted and focused academic goals and plan, which boost performance on job. The married in the university system also makes for lesser staff mobility and greater organizational confidence in staff development.

**Educational qualification**

Table 1 shows that majority (50.8%) of the respondents had Ph.D, 37.5% obtained M.Sc. while 11.7% had B.Sc/B.Agric. In other words, about 89% of the academic staff in the universities had postgraduate qualifications. The greater proportion with doctorate degree is in accordance with the current National University Commission (NUC) approved minimum qualification for lecturing in the Nigerian universities. The degree holders suggest the presence of graduate assistant in the system. Overall, this means greater teaching and research capacities for climate change adaptation, given the degree of exposure to possibly courses with varying climate change content while undergoing their programmes.. According to Ernst, *et.al* (1994) increase in general education could help develop technological capability in the workforce especially for Climate Change.

**Academic rank**

Greater proportion (39.2%) of the respondents were senior lecturers; and lesser number (25.0%, 12.5%, 8.3%, 8.3% and 6.7%) were assistant lecturers, graduate assistants, professors, lecturer II and lecturer I, respectively. The mix and composition of academic staff in the universities reveal a rich availability of knowledge and a critical mass of research and teaching capabilities which could enhance generation of knowledge and/or skill, innovation for agricultural adaptation to Climate change. It is also an asset for communicating information and increasing awareness and in turn, promotes climate change literate society.

**Years of experience in teaching**

Greater proportion (45.8%) of the respondents had between 1 and 5 years of teaching experience in the universities, while a lesser proportion (26.8%, and 15.8% ) had 6-10 years and 11-15 years of experience in teaching, respectively. Only 6.7% and 4.3% of the respondents had spent between 16-20 years and 21 years and above, respectively. The mean year of teaching experience of the respondents in the university was eight years. Quite a good number of the respondents have more than six years of teaching experience which is considerably sufficient to acquire teaching capacity requisite for addressing the climate change education needs of producers and the public in general.

**Experience in climate change research**

Majority (80.2%) of the respondents had been in Climate Change research for a period of 1- 2 years (Table 1). About 12% had 3-4 years, while 7.6% had spent 5 years and above in climate change research. The average years of experience in climate change research in the universities was two years. The respondents were relatively new in Climate Change related research and may not have been adequately exposed to capacity building programmes or trainings for greater participation in training and research targeted on agricultural adaptation to threat of climate change. This is not surprising because the issue of climate change is gradually becoming popular lately. Nevertheless, personal interview revealed increasing changes in the area of curriculum, course content and programmes. For example in some universities, there are indications of increased interest and application for grants on climate change research, increase in students projects on climate-related topics, increased participation in conferences and workshops, and presentation of papers in the area.

**Training in Climate Change**

Table 1 shows that only 26.7% of the respondents from UNN had received training on climate change issues. Personal interview revealed that the trainings received were in trans-disciplinary research on climate change, Climate Change policies, Concepts and causes of climate change. Academic staff from other universities had not attended any special training on Climate Change issues. Generally, the result suggests poor commitment and responsiveness to climate change challenges in the education system. Training is fundamental for building climate change teaching capacities in the universities. According to Open Society foundation (2012) climate Change research, education and outreach involves developing new curricula to enhance learning about climate change, providing training that develops instructional approaches for teaching on climate change issues, and promoting inter-disciplinary research on climate change. Teachers learn more and discover new areas of research in training/workshops. Also, conferences and workshops provide excellent opportunities for teachers to share ideas, needs and challenges on such national issues.

**Capacities for teaching agricultural adaptation to climate change in universities**

Teaching capacities for climate change adaptation in the Universities are discussed under the following headings; existing degree programme on climate change, climate change content of courses taught, availability of teaching material on climate change, methods used in teaching climate change, changes in department/faculty in the past 3 years, availability/extent of library stocking, and training on climate change. Discussion was presented as follows:

**Degree programmes on climate change by universities**

The respondents indicated that the universities had no Dip/OND/HND and B.Sc programmes in Climate Change. Ten percent of the respondents indicated the existence of M.Sc and Ph.D programmes in climate change, respectively (figure 1). This could be attributed to the recent approval by the National Universities Commission for some universities like University of Nigeria Nsukka to run postgraduate programmes in climate change. Many universities are yet to evolve any meaningful academic activities or programmes in response to the global challenge of agricultural adaptation to Climate

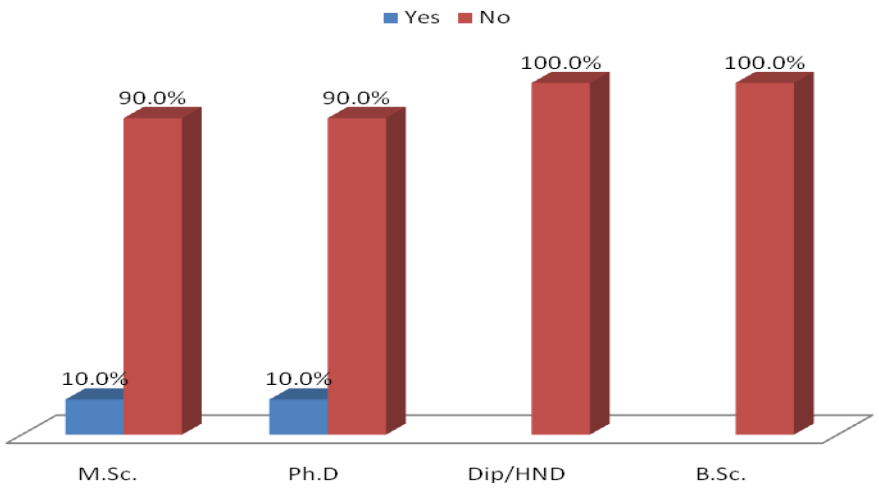


**Fig.1 Percentage distribution of respondents based on degree programme on CC**

## Table 1. Percentage distribution of respondents based on personal characteristics

| | Percentage (%) N= 120 | Mean |
|---|---|---|
| **Sex** | | |
| Male | 78.3 | |
| Female | 21.7 | |
| **Age (years)** | | |
| 20-29 | 3.3 | |
| 30-39 | 38.5 | 43.1 |
| 40-49 | 31.5 | |
| 50 and above | 19.7 | |
| **Marital Status** | | |
| Married | 85.8 | |
| Single | 14.2 | |
| **Educational Qualification** | | |
| B.Sc/B.Agric | 11.7 | |
| MS.c | 37.5 | |
| Ph.D | 50.8 | |
| **Academic Rank** | | |
| Graduate Assistant | 12.5 | |
| Assistant Lecturer | 25.0 | |
| Lecturer II | 8.3 | |
| Lecturer I | 6.7 | |
| Senior Lecturer | 39.2 | |
| Professor | 8.3 | |
| **Years of working Experience** | | |
| 1-5year | 45.8 | |
| 6-10years | 26.8 | |
| 11-15years | 15.8 | 8.0 |
| 16-20years | 6.7 | |
| 21years and above | 4.3 | |
| **Experience in Climate Change research** | | |
| 1-2years | 80.2 | |
| 3-4years | 12.2 | 2.2 2.2 |
| 5years and above | 7.6 | |
| **Training in climate change** | | |
| University of Nigeria Nsukka | 26.7% | |
| Abia State University Uturu | Nil | |
| Nnamdi Azikiwe University | Nil | |
| Michael Okpara University of Agriculture | Nil | |
| Anambra State Unuversity | Nil | |
| Enugu State University of Science & Tech | Nil | |

Change However, there has been much emphasis and promotion of curricula review to increase climate change content of courses offered in universities. This is in accordance with general recommendation that Climate change issues should be infused into the curricula of universities as a matter of urgency (Chakeredza et al., 2009). The inclusion of climate change issues in curriculum of universities is a solid approach towards generating and inculcating into staff and students the right mix of knowledge, ideas and innovation for combating challenges of climate change. According to Ozor (2010) 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 on climate change. Besides, it is in line with the assertion that if education is going to make a contribution to the current challenge of climate change, there should be institutional innovations and changes to ensure that graduates produced from the tertiary agricultural institutions are abreast with the climate change issues including mitigation and adaptation strategies (Akimifesi, et al; 2008.

**Climate Change content of Courses taught in the universities**

Table 2 shows that the climate change issues covered in courses taught in the universities were vulnerability to climate (27.7%), adaptation (25.5%), mitigation (23.2%), indigenous strategies to agricultural adaptation to climate change (22.5%), climate change and rural development (5.8%), gender issues in climate change and others. The issue on climate change policy formulation was not covered in the courses taught. However, there is evidence of responsiveness of universities' curriculum to the challenge of climate change, though the low perception of respondents suggests minimal inclusion of climate change subjects in the courses taught. As Rowe (2002) reiterated, though some universities have successfully implemented different education models to integrate environmental education into existing courses, inclusion of climate change is an area in need of great improvement. Since it may not be presently feasible for some universities to run full programme on climate change at any level, given the poor economic, institutional and infrastructural environment of tertiary institutions in the country, it is apt that universities increase their course content on climate change issues. This points to the need to revisit the course curriculum in universities. They can either be handled as a separate core or ancillary courses or integrated into the various agricultural and natural resources management courses. On the contrary, Galindo-Gonzalez et al., (2011) opined that the sustainability of our society within an ever changing climate, regardless of the source of change, requires that we place climate science education, including education about climate change, on a level of education similar to that of the basic sciences, such as biology, chemistry, and physics.

**Table 2: Percentage distribution of respondents based on climate change content of courses taught**

| Climate Change contents in courses | % (n=120) |
|---|---|
| Agricultural adaptation to Climate Change | 25.5 |
| Climate Change mitigation in agricultural practices | 23.2 |
| Gender issues in Climate Change | 4.3 |
| Climate Change and youth in agriculture | 3.3 |
| Climate Change and rural development | 5.8 |
| Indigenous strategies to agricultural adaptation to Climate Change | 22.5 |
| Economics of Climate Change | 0.8 |
| Vulnerability to climate change | 27.7 |
| Climate Change policy formulation | |
| Response/contribution of animals to Climate Change | 4.2 |
| Systems of innovation in Climate Change | 2.8 |

*** Multiple responses**

**Table 3: Percentage distribution of respondents based on availability of teaching material on climate change**

| Teaching Materials | % | (n=120) |
|---|---|---|
| Text books on Climate Change | 83.3 | |
| Journals on Climate Change and agricultural adaptation | 78.3 | |
| Conference proceedings on Climate Change and agricultural adaptation | 66.7 | |
| Articles on Climate Change and agricultural adaptation | 80.8 | |
| Magazines on Climate Change | 22.5 | |
| Training manuals on Climate Change | 7.5 | |
| Teaching/Lecture notes on Climate Change | 44.2 | |
| Internet facilities for teaching Climate Change | 18.3 | |
| Pictures/pictorials for teaching Climate Change | 10.0 | |
| Teaching modules on Climate Change | 3.3 | |
| Newsletters on Climate Change | 6.7 | |
| Film shows on climate change | 7.6 | |
| Excursions to climate change impact areas | 6.7 | |
| Field trips/exhibition | 9.2 | |
| Pictorial slide shows on climate change | 15.8 | |

*** Multiple responses**

**Table 4: Percentage distribution of respondents based on teaching methods used for teaching climate change and agricultural adaptation**

| Teaching Methods | % ( n=120) |
|---|---|
| Audio visual | 9.0 |
| Field trips | 12.6 |
| Lectures | 63.3 |

*** Multiple responses**

**Availability of teaching materials on climate change**

The respondents indicated the availability of textbooks (83.3%), journal (78.3%), conference proceedings (66.7%), teaching/ lecture notes on climate change (44.2%), magazines (22.5%) and internet facilities (18.3%) for teaching climate change (Table 3). The finding depicts a limited availability of teaching materials and invariably poor library stocking for climate change education, a situation which hampers teaching and learning process. Provision of functional library with current and relevant materials is fundamental in responding to the education challenge of climate change. Library materials are valuable resources for teaching staff, students and the public. It facilitate better access to bibliographic resource, efficient sharing of knowledge and information among stakeholders on climate change. This is in response to the need to produce relevant learning resources and capacitate educators (Chakeredza, et. al., 2008). Worse still, learning materials are often not adequately contextualized in the local African environment (Chakeredza *et al.,* 2008). This is true for many agricultural subjects and for climate change.

**Teaching methods used in teaching climate change in the Universities**

The respondents used field trips (87.4%) , lectures (63.3% ) and audio visual (9.0%) for teaching climate change in the universities (Table 4). This agrees with the suggestion by Ozor, (2010), that the methodology for teaching and learning climate change issues should be 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/internet enhanced with research repositories can also be pursued where possible. The curricular content, teaching materials, methods and delivery approaches should be designed in such a way as to equip students with necessary skills and knowledge to tackle climate change global challenges and their interpretation in specific local situations (Chakeredza *et al.*, 2008).

**Table 5: Factors that constraint capacities for teaching Climate change adaptation in Universities**

| Constraint factors | Factor 1 Poor Understanding | Factor 2 Poor Learning Environment | Factor 3 Weak Infrastructure | Factor 4 Poor Funding |
|---|---|---|---|---|
| Poor or absence of teaching materials | 0.079 | -0.053 | **0.566** | 0.241 |
| Poor knowledge of Climate Change | **0.493** | 0.059 | 0.298 | 0.173 |
| Lack of ICT, E-learning in climate change | 0.070 | 0.305 | **0.401** | 0.183 |
| Poor learning environment | 0.216 | **0.794** | -0.055 | -0.018 |
| Lack of reliable weather forecasts/climate information | 0.272 | 0.350 | **0.567** | -0.109 |
| Limited availability of grants and scholarship on climate change issues | -0.380 | 0.035 | 0.318 | **0.404** |
| Lack of collaborations with other agencies | 0.324 | **0.485** | 0.217 | 0.205 |
| Lack of weather observatories in universities | -0.008 | 0.096 | **0.667** | -0.094 |
| Inadequate funds for research | -0.373 | 0.115 | 0.257 | **0.576** |
| Poor research capabilities | 0.248 | 0.298 | 0.222 | 0.223 |
| Poor interest in climate change research | **0.728** | 0.160 | 0.135 | -0.029 |
| Poor outreach capacities in terms of human resources | 0.242 | **0.454** | .0 029 | 0.123 |
| Lack of technical and communication facilities | 0.126 | 0.038 | **0.551** | 0.067 |
| Limited availability of media network | -0.153 | **0.492** | 0.246 | 0.048 |
| High Cost of TV, radio and newspaper adverts | -0.159 | 0.170 | 0.116 | **0.743** |
| Poor knowledge/skill for communicating climate change science | 0.166 | 0.046 | **0.522** | 0.001 |
| Lack of climate change issues integrated in rural development | 0.122 | **0.481** | -0.113 | 0.297 |
| Corruption/bad governance in university system | **0.571** | 0.079 | 0.054 | 0.208 |
| Lack of mandate on specific climate change research area | 0.272 | 0.217 | 0.330 | 0.359 |
| Poor remuneration for staff researchers | 0.048 | **0.527** | 0.206 | 0.095 |
| Lack of policies/policy implementation on Climate Change | 0.041 | **0.700** | -0.085 | 0.116 |
| Poor funding for teaching climate change | -0.065 | 0.186 | -0.133 | **0.530** |
| Poor understanding of the climate change concept | **0.782** | 0.069 | -0.026 | 0-.092 |

**Constraints to teaching capacities in University Faculties of Agriculture**

Table 5 represents factor analysis of perceived constraints to teaching capacities for adaptation to climate change in the universities. The constraint variables were loaded under four major factors namely understanding, learning environment, facilities/infrastructure, and funding.

Factors that loaded high under poor understanding were; poor knowledge of climate change (0.49), poor interest in climate change (0.68), corruption/bad governance in the university system (0.57) and poor understanding of climate change concepts (0.78). Poor knowledge/understanding of the concept of climate change could be a big impediment towards building requisite capacity in the universities. Poor understanding of the concept of global climate change could lead to poor adaptation (Ozor, *et al*., 2010). It affects both commitment, interest, altitude, and hinders the promotion and advancement of climate science in the institutions.

Poor learning environment also constrained teaching capacities in the Universities as poor learning environment (0.79), lack of reliable weather forecast/climate information (0.56), limited availability of media network (0.49), lack of climate change issues integrated on rural development (0.48), poor remuneration for staff (0.52), lack of policy implementation on climate change (0.70) and poor outreach capacities in terms of human resources (0.40). A favourable learning environment provides motivation and high morale for effective learning process. In addition to other personal factors, it determines input and output of both the learner and instructor. Government and policy makers have formidable role to play in positively influencing the learning environment of the universities. This may include setting priorities, participating and enacting laws that could enhance capacity and development needed in climate change adaptation.

Weak infrastructure as a constraint was defined by poor ICT facilities, (0.40), lack of weather observatories (0.66), lack of technical and communication facilities (0.55). Poor or absence of teaching materials (0.56), and poor knowledge of media communication on climate change (0.52). It has been reported that Nigeria's university system is bedevilled with the challenges of poor infrastructure; inadequate classrooms and teaching aids (projectors, computers, libraries, laboratories etc); paucity of quality teachers/ poor or polluted learning environment (Aiyamenkhue, 2012). This could be a strong threat to any effort and initiative for combating the challenges of climate change adaptation.

Poor funding as a constraint factor manifested in the form of limited availability of grants and scholarship on climate change issues (0.40), lack of funds for research (0.57), cost of television, radio and newspaper adverts (0.74), and poor funding for teaching (0.53). The problem of poor funding of universities has remained unabated and an issue of great concern

in the country. According to Obiora, (2012), lack of funds for teaching and research incapacitate universities in carrying0 out basic functions of generating, educating, informing and disseminating information/technologies or innovations needed for climate change adaptation. According to Nigeria Universities Commission, (2000), Nigerian universities have been underfunded especially in the area of capital development and research grant. Hence researchers rely mostly on external funding for a qualitative research in their field which is not always available.

## CONCLUSION

The results showed huge human capital both in terms of quality, composition and experience on climate change adaptation in the University Faculties of Agriculture. Presently, there is no degree programme on climate change adaptation at any level going on in the universities faculties of agriculture. However, the climate change content of courses taught in the universities have relatively increased in the last three years. Facilities for accessing, teaching or communicating climate change information were mostly print materials like text books, journals, proceedings, magazine, lecture note and others. The most common method of teaching and communicating climate change facts were use of lectures, and field trip. Majority of the academic staff of the universities had no training on climate change. Factors such as poor understanding, learning environment, infrastructure and funding constrained teaching capacity for climate change agricultural adaptation in the universities. The study recommends universal review of curriculum and programmes, provision of teaching materials in the University Faculties of Agriculture to evolve academic programmes/activities, and education that are climate science responsive; and capable of producing informed/ literate society

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