

# 4TH CLIMATE CHANGE & POPULATION CONFERENCE ON AFRICA

## CC POP-GHANA 2015

### BOOK OF ABSTRACTS / SCIENTIFIC PROGRAMME

VENUE

**University of Ghana, Legon, Accra, Ghana**

**29th - 31st July 2015**

THEME

*"Climate Change, Sustainable  
Innovation and Partnerships"*



HOST & SPONSOR



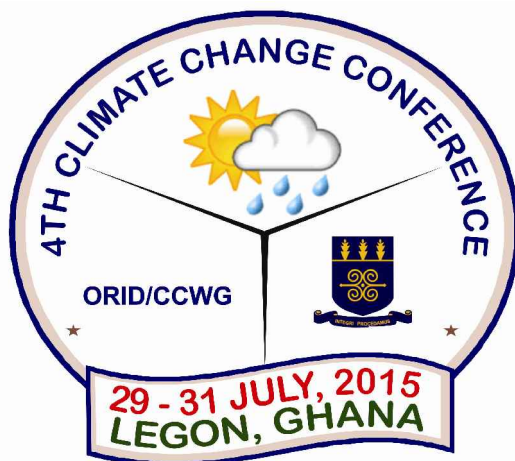
Climate Change

Working Group



# 4<sup>TH</sup> INTERNATIONAL CLIMATE CHANGE AND POPULATION CONFERENCE ON AFRICA

## CCPOP-GHANA2015



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## SCIENTIFIC PROGRAMME AND ABSTRACTS

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### Host

**Trans-disciplinary Climate Change Working Group  
University of Ghana**

### Sponsor

**University of Ghana / ORID, Legon**





# THE UNIVERSITY OF GHANA



## *Background*

The University of Ghana, the premier university and the largest university in Ghana was founded as the University College of the Gold Coast by Ordinance on August 11, 1948 for the purpose of providing and promoting university education, learning and research. As a University poised to distinguish itself in the area of research to make an impact at the national and international level, the University has launched a new Strategic Plan. This new strategic plan (2014-2024) is intended to consolidate the gains made from the review of the University's mission and practices and situate these within the context of a very dynamic environment of higher education in Ghana and beyond.

## *Our Vision*

To become a world class research-intensive University over the next decade.

## *Our Mission*

We will create an enabling environment that makes University of Ghana increasingly relevant to national and global development through cutting-edge research as well as high quality teaching and learning

As part of its vision to become a world class research intensive institution, University of Ghana has identified four priority areas where the university will focus and promote international collaboration in research initiatives to enhance the University's research output. These research areas are:

- Malaria Research
- Trans-disciplinary Research into Climate Change Adaptation
- Enhancing Food Production and Processing
- Development Policy and Poverty Monitoring and Evaluation



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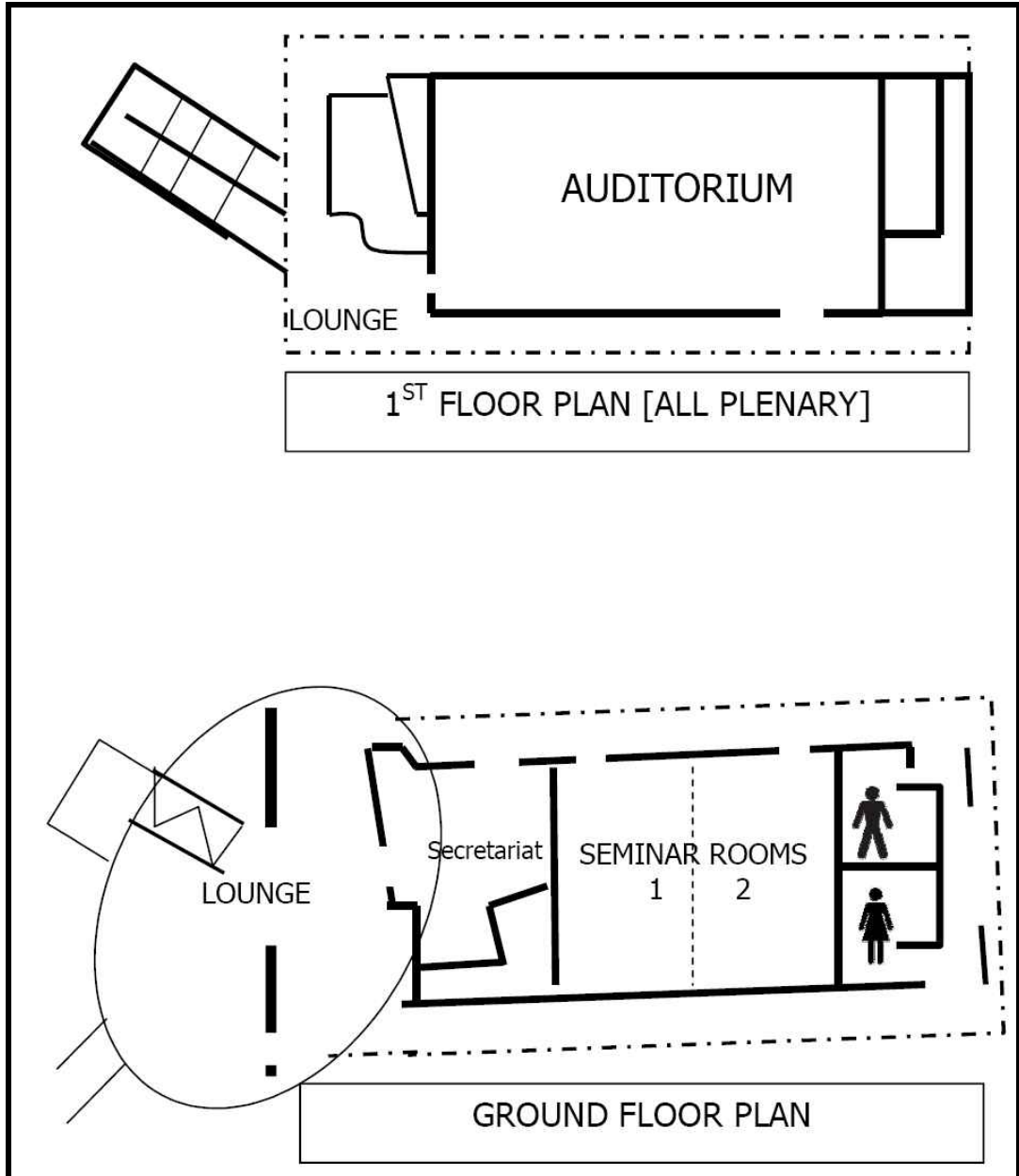
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## YOUR GUIDE TO THE MEETING VENUE

Noguchi Memorial Institute for Medical Research Conference Centre, Legon





## HOST INSTITUTION MESSAGES

### VICE CHANCELLOR'S CONFERENCE OPENING REMARKS

**Prof Ernest Aryeetey**

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Honourable Ministers of State, His Excellency Head of the European Union Delegation in Ghana, His Excellency the UN Secretary General's Envoy on Climate Change, Honourable Members of Parliament, The Diplomatic Corps, Invited Guests, Colleagues, Ladies and Gentlemen:

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The University of Ghana is indeed proud to be the host of this prestigious event, described as a Flagship Conference on Climate Change which is intended to bridge the gap between research and development in Africa. The conference is also significant because it was conceived in Africa, by Africans and hosted on the continent suggesting that our scientists and policymakers may not have to travel beyond the African Continent to learn about their own issues. It gives me a lot of hope that Africans now have a place to meet annually to deliberate on one of the significant challenges of development in our time, climate change. This conference which is also coming before the negotiations of the next commitment period of the United Nations Framework Convention on Climate Change (UNFCCC) and the launch of the Sustainable Development Goals, in Paris and New York, respectively is an African watershed for both events.

This conference fulfils one of the strategic goals of the University of Ghana to become a world class research university which recent university rankings are already suggesting, having the capacity to contribute to development in Ghana and beyond. The strategy is centred on four trans-disciplinary centres of excellence of which the organisers of this conference "the Climate Change Working Group" is one. May I seize this opportunity to congratulate the Working Group for this vision. I am also informed that several of our scientists have contributed to the Third UNFCCC National Communications on climate change and the preparation of Ghana's intended nationally determined contributions (INDCs) for the Paris Climate Conference in December. These symbolise our commitment as a University to National, Regional and Global integration on climate change deliberations as suggested by the theme of the conference "*Climate Change, Sustainable Innovation and Partnerships*".

Distinguished ladies and gentlemen, committing to become a global player as a public university in development requires significant resources for which the University of Ghana has been working towards. One of such was to seed each centre of excellence with financial resources to the tune of One Million Cedis (~\$300,000.00), out of which the Climate Change Working Group is organising this conference. We have thus taken the lead as the university further hosts several research projects and courses on climate change and sustainable development not only in science but also in business for the opportunities that climate change brings. I will therefore ask you and your institutions to consider joining us to support the subsequent conferences because the climate change conference has come to stay to benefit Africa and the world. This is depicted here by the gathering of participants representing over 25 countries across the world for which I am delighted to be part.

Distinguished ladies and gentlemen, on this note I gladly accept to chair this ceremony as I wish you well and welcome you to the University of Ghana.

I thank you.



## **THE CONVENER, CLIMATE CHANGE WORKING GROUP**

**Prof Samuel Adiku**

I am greatly honoured to be offered the opportunity to welcome you to the fourth Climate Change and Population Conference being organized by the Climate Change Working Group of the University of Ghana. The theme is Climate Change, Sustainable Innovation and Partnerships. The University of Ghana, in the year 2013, set up 4 main research themes as a major effort towards the realization of its Research University vision. Climate Change was one of these. The Climate Change Working Group has members drawn from a number of Departments and Institutes of the University of Ghana as well as organisations outside the University. The group has Professors SGK Adiku (Soil Science Department) and S.NA. Codjoe (Regional Institute for Population Studies: RIPS) as co-conveners.

Recent flooding events in Accra and other parts of the country are believed in some quarters as linked to Climate Change. Thus, as a Working Group, we do not in any way portray ourselves as the repository of knowledge or expertise in Climate Change. Rather, what we seek is to harness and also support Climate Change research work across the University and also reach out and collaborate with other institutions working on this topic outside the University. Aptly, as we all now live in a global village, it is helpful to compare notes with other colleagues from abroad on how to deal with Climate Change issues. This conference is the beginning of our efforts to engage the International and National Community in some discourse on Climate Change Research.

The terms of our working group are much more focused on research, education, and derivation of solutions to reduce the menace of Climate Change impact on the well-being of our society. Since its inception, the working group has held a number of meetings, seeking to sharpen its focus further, beyond the broad terms of reference provided initially by the University, put some structure to the group and map out a strategic path to be followed to achieve its set goals. Rather than inventing the wheel completely, we have leverage the previous Climate Change Research platforms of the Regional Institute for Population Studies (RIPS), one of the leading social-oriented Climate Change research groups of the University of Ghana. Climate change and Agriculture has been a major research focus in the Department of Soil and Crop Sciences and the working group also draws on expertise from these departments. The Departments of Geography and Resource Development, Botany, Public Health and the United Nations University are Institutions from which we draw our membership and expertise.

Mr. Chairman, a major weakness in Climate Change Research at the University of Ghana has been the lack of the Atmospheric Science components. What is the magnitude of global circulation on our weather, our river flows, wind patterns, etc.? What tools and models are there to help us quantify these effects? Mr. Chairman, an old adage goes: "Nothing Measured, Nothing Managed". So, we need to quantify to enable us manage. We are, happy to announce that the working group has successfully attracted and hosting two Post-Doctoral Fellows supported by the Climate Impact Research Capacity and Leadership Enhancement Programme (CIRCLE) of DFID, who are currently researching on various topics including Climate Change and Gender, and Climate Change Adaptation.

Mr. Chairman, what in concrete terms, has the Working Group set up to achieve in the short and medium terms? Our programme line up is detailed in our document entitled: "The Climate Change Working Group Plan (2014-2015)". But let me briefly highlight some few:



First, we intend to provide leadership in regional integration for climate change research through networking among scientists and also amongst institutions in Ghana and abroad, and to develop such climate change-policy initiatives that will support civil society, industry and business, researchers, policymakers and politicians in managing climate related challenges. This will involve the translation of key scientific results into policy, bridge the gap between science and policy and allow public interrogation of scientific results and outputs.

Second, it is our intention to operationalize our climate change research and solidify our education and outreach activities on the subject. Mr. Chairman, many misconceptions abound in the area of Climate Change discussions that are often not scientifically factual. For example, the common belief that climate change is a result of a “hole created in the ozone layer” of the atmosphere, which allows more of sun’s heat to reach the earth, is not scientifically correct. The common belief that sea level rise is due to melting sea ice at the poles is not scientifically correct. We have learnt from history that at some time in the past, it was believed that the earth was flat until science proved otherwise. Popular beliefs do not necessary equate to scientific facts, and as a working group with an educative focus, we must correct these erroneous believes if we are to make any meaningful progress toward arriving at solutions to the menace. We intend to achieve this by publishing a book on Climate Change in Ghana, periodic factsheets, flyers, brochures and other simple briefs that will bring the complex topic of Climate Change down to the level comprehensible to the layman.

Third, we intend to establish the University of Ghana Climate Change Museum, which will be a Field School for visitors (both from within and from without), High School students, Environmental NGOs, among others, on Climate change impacts on nature, our resources and livelihood. This Field School will be located in the Botanical Garden of the University of Ghana. We intend to showcase to visitors via, video clips, hands on activities in greenhouses, through tree planting exercises, simple climate data analysis, and carbon footprint accounting, how Climate Change affects us and what possibilities there are to mitigate the impacts. Mr. Chairman, Ghana and the entire African continent have witnessed many Climate Change workshops, meetings, seminars, conferences for decades. However, many of the continents people are still ignorant of what they can do within their sphere or zone of influence to minimize the effect. We think it is time to initiate something that brings the topic home to the masses.

Clearly, the outlined tasks cannot be achieved by a limited number of researchers in the Climate Change Working Group. Furthermore, the realization of these tasks will require financial support. We are grateful to the University of Ghana for providing the initial funds of Five Hundred Thousand Ghana Cedis (GH¢500,000.00) out of One Million Ghana Cedis (GH¢1,000,000.00) to start our programmes and part of these funds are supporting this very conference. But we will also be knocking on your doors to assist us to realize our aims, which we hope will serve a good course for humanity.

I wish you all the best in your deliberations and it is the hope of the Working Group that your findings will be documented in research articles that will further support climate change work not only in Ghana but also beyond.

Thank you and again our warm welcome to you.







## OFFICIAL OPENING ADDRESS BY MINISTER FOR ENVIRONMENT, SCIENCE, TECHNOLOGY & INNOVATION (MESTI), GHANA

**Honourable Mahama Ayariga, MP for Bawku Central**

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**Mr Chairman**, also the Vice Chancellor of the University of Ghana, the Organisers of this Conference (the Climate Change Working Group of the University of Ghana), the Head / Ambassador of the European Union delegation to Ghana, His Excellency the United Nations Special Envoy on Climate Change, Diplomatic Missions Represented, Climate Change Experts from Academia, Policy and Civil Society, the Media, Invited Dignitaries, Ladies and Gentlemen:

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Permit me **Mr Chairman** on a more personal note to first thank you for inviting me to be part of this august event. This is not another event that the Minister has to open but because a number of your scientists organising this conference I am told are also helping my Ministry to come up with the Ambitious Targets for the intended Nationally Determined Contributions (INDCs) for Ghana towards the next round of the UNFCCC negotiations at COP21 in Paris in December. I am further briefed that once again your scientists were seriously engaged in the completion of Ghana's Third National Communication to the UNFCCC. So therefore I am obliged to be here to say a big thank you to you and your colleagues for taking the lead on the African continent to seriously engage policymakers and politicians towards well informed development on the African continent.

I am indeed very honoured to be among diverse and relevant stakeholders who are committed in the fight against climate change through the sharing of lessons on opportunities that climate change brings rather grooming over the challenges only. Most African cities are now known to be at the highest risk from climate change through disasters such as flooding yet the majority of our population is concentrated in the cities. However, I also want to quickly remark that the failure of institutions and society to pursue responsible development and environmentally friendly activities has aggravated the impacts of climate change. Relevant institutions should no longer do things the way they used to some decades ago just as obsolete research and policy should give way to timely and relevant strategies and appropriate response from society including industry. That is why this conference and its theme "**Climate Change, Sustainable Innovation and Partnerships**", is significant in the timeline of climate change.

As experts, I would not like to talk about what climate change is but to quickly remind you that extreme weather events are expected to become more frequent and severe in Africa. We are informed by the 5<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) that impacts on agriculture and fisheries, forestry, tourism, coastal zones, water resources and energy expenditures would be aggravated such that loss of Gross Domestic Product (GDP) between 0 percent and 3 percent could be experienced. Africa alone would face a 2 - 9% decrease of GDP from agriculture as estimated by experts.

**Mr. Chairman**, the predictions of climate change impacts indeed are coming to pass and calling for attention especially in the area of disaster risk management and contingency planning. Urban dwellers are more exposed to the risks of floods, due to impermeable surfaces that limit infiltration and rather increase surface run-off of water which is the major cause of flooding in cities. This will be aggravated by limited parks and other green spaces to absorb storm water, and poor drainage networks choked by solid wastes that impede the flow of water. Thus the problem is multi-sectoral and trans-disciplinary and one of the reasons why I wish to also commend the Trans-disciplinary Climate Change Working Group for putting together this conference to reflect what they stand for. The IPCC



establishes that Africa is vulnerable to a number of climate sensitive diseases including malaria, tuberculosis and diarrhoea. Climate change, is changing the geographical distribution of disease vectors which are migrating to new areas and higher altitudes, for example, migration of the malaria mosquito to higher altitudes will expose large numbers of previously unexposed people to infection in the densely populated east African highlands. Future climate variability will also interact with other stresses and vulnerabilities such as HIV/AIDS, conflicts and war, towards increased susceptibility and risk to infectious diseases (e.g. cholera, diarrhoea and meningitis) and malnutrition among adults and children as suggested by the World Health Organisation.

Climate change is an added stress to the already threatened habitats, ecosystems and species in Africa, and is likely to trigger species migration and habitat reduction according to the IPCC. Up to 50 per cent of Africa's total biodiversity is at risk from reduced habitat and other human-induced pressures. Climate related disasters globally are now known to be displacing more people than even war and projected between 200 million - 1 billion by 2050. As a development challenge, agriculture and food security are expected to be highly impacted from increasing water stress that will severely compromise agricultural production due to loss of land, shorter growing seasons, increased uncertainty about planting times and what to plant. Worsening of food insecurity and the rise in populations at risk from hunger and malnutrition may increase to overburden our economies.

The need for strong and proactive policy frameworks has never before been crucial than in these times. Such frameworks should pave way to the development of strategies to include National Action Plans for Adaptation (NAPA), National Adaptation Strategies (NAS), Clean Development Mechanisms (CDM), and Adaptation Financing Mechanisms (AFM) including National Green Funds. However, all these will not materialise if most of you gathered here do not contribute your quota in ensuring that we move from science to policy. Your inputs into National Communications and International Negotiations for which I expect to see a number of you in Paris later this year cannot be overstated. Regionally, I wish to state that the AU and NEPAD call for the development and adoption of an environment initiative to address the region's environmental challenges including climate change while at the same time combating poverty and promoting socio-economic development. The action plan of the environment initiative is a response to such challenges and prepared through a consultative and participatory process under the leadership of the African Ministerial Conference on Environment (AMCEN). I'm happy to announce that the President of the republic of Ghana last year 2014 approved a National Climate Change Policy for which the accompanying Action Plan is in advanced stage again led by a University of Ghana Scientist. My Ministry has also secured over 8 million US Dollars from the Adaptation Fund to implement interventions in water resources, whilst the Ministry is already negotiating a Green Fund for Ghana to also contribute to climate change. Our iNDCs for Paris 2015 are progressing very well and would soon be outdoored.

**Mr. Chairman**, ladies and gentlemen, I wish to throw a challenge to you all to adopt, sponsor and sustain this conference into the future as truly African and serious about climate change issues on the continent.

I wish you fruitful deliberations as I declare this conference duly opened for commencement of business.

I thank you.





## **MEDIA BRIEF / PRESS RELEASE**

### **Background**

Developing countries need international assistance to support adaptation to climate change in the context of national planning for sustainable development, increased capacity-building and transfer of technology and funds. Systematic planning and capacity-building are also needed to reduce the risk of disasters from climate change and raise the resilience of communities to increasing extreme events such as droughts, floods and tropical cyclones. Funding for adaptation in developing countries must be sufficient and sustained. Least developed countries (LDCs) and Small Island developing States (SIDS) in particular need special consideration due to their extreme vulnerability. In all these, the role of knowledge institutions has been vital in negotiating with the best science towards mitigating, responding and adapting to climate change and yet there have been several gaps including lack of funding for climate change science and research in Africa.

Climate change presents challenges and even opportunities for the finance sector. Businesses will be affected by climate change and by policies to address it. Insurance measures can be beneficial for many developing countries by transferring risk from climate change. The international community could contribute to identifying actions aimed at:

- (a) Supporting public private partnership: by transferring (or arranging the transfer of) the risks of national or regional public private insurance systems.
- (b) Supporting relief and reconstruction by assisting governments to transfer their risks of public infrastructure damage.
- (c) Supporting micro insurers by playing a possible role in supporting and transferring the risks of micro-insurers.
- (d) Supporting data collection and analytical capacity-building.
- (e) Supporting new risk hedging instruments by creating national level market incentives.

Setting up financing mechanisms and tapping sources of finance at national, international and private-sector level would be crucial in mitigating and adapting to climate change. The early involvement of finance-sector actors is vital, such that if public funding is deployed, this should catalyse transformation of African economies towards a low-carbon development pathway that leverages Green Growth.

New technologies are essential to reduce the long-term cost of climate change and achieving green growth. Developing countries want to build their own capacity to innovate to (i) ensure energy security and increased energy access, (ii) promote climate change mitigation and adaptation and (iii) create competitive domestic industries in clean technology for job creation and economic benefits.

However, barriers to innovation in climate sectors are especially high and even more pronounced in developing countries of which Africa has been at most disadvantage. These barriers often include gaps in appropriate financing, lagging technical and business capabilities, entrepreneurial and human capacity constraints and uncertain regulatory environments. Moreover, many developing countries lack the public and private sector institutions that support innovation, and as a result support for locally appropriate climate innovation is often weak or absent. The University of Ghana has emerged as one of the centres of excellence in Africa in contributing to harnessing appropriate resources for promoting climate change science and harmonisation with policy and development planning through the establishment of the Climate Change Working Group. The group therefore has deemed it fitting to extend its goals through networking and fundraising towards raising the profile of climate change research and investment on the African



continent, for which this conference is geared towards in mobilising institutions and individuals at the highest level possible to promote innovation and partnership. The 2015 COP events in Paris is a likely watershed, when all countries will have to decide and publicly declare their commitments on climate and their visions for future development and growth. A collective political will is thus required for which CCPOP – Ghana 2015 would be crucial as part of the numerous preparations for Africa.

### **Conference Goals**

- (a) To promote regional and intercontinental networking amongst individual scientists and also amongst institutions in collaborating to pursue common agenda such as writing joint research grant proposals and publications on promoting climate change science in Africa.
- (b) To bring together the often forgotten stakeholders in development such as civil society, industry and business, to interact with researchers, policymakers and politicians on and how to move the challenges of climate finance and development forward.
- (c) To share lessons on rigorously pursuing a fundraising agenda that allows the participation of the scientific research community in the next COP meeting in Paris towards national determined commitments (NDCs) on the Kyoto Protocol.

### **In Attendance**

The conference is opened to all persons in all sectors and disciplines in Ghana, across Africa and rest of the World, including those in:

- Academia
- Non-governmental organisations
- Financial Institutions
- Industry and Business
- Civil Society Groups
- Private Sector Institutions
- State /Government Agencies
- Research Institutions
- Media and Communications
- International Missions
- Indigenous Society





## CONFERENCE ORGANISATION AND MANAGEMENT

The Trans-Disciplinary Climate Change Working Group, University of Ghana

Name	Affiliation
1. Prof. Samuel G. K. Adiku	Soil Science Department, School of Agriculture, College of Agriculture & Consumer Sciences
2. Prof. Samuel N. A. Codjoe	Regional Institute for Population Studies, College of Humanities
3. Prof. Julius N. Fobil	Department of Biological, Environmental and Occupational Health, School of Public Health, College of Health
4. Prof. Paul Yankson	Department of Geography & Resource Development, School of Social Sciences, College of Humanities
5. Dr. Elias T. Ayuk	United Nations University, Institute for Natural Resources in Africa
6. Dr. Christiana Amoatey	Department of Crop Science, School of Agriculture, College of Agriculture & Consumer Sciences
7. Dr. Kwadwo Owusu	Department of Geography & Resource Development, School of Social Sciences, College of Humanities
8. Ezekiel Acquaaah	Office of Research, Innovation & Development (ORID)
9. Prof. Alex Asase	Department of Botany, School of Physical & Biological Sciences, College of Basic & applied Sciences
10. Dr. Laurent Sedogo	West African Science Service Centre on Climate Change and Adapted Land Use
11. Dr. Delali B.K. Dovie	Department of Geography & Resource Development, School of Social Sciences, College of Humanities

### Conference Coordinator

Dr. Nancy Akwen Sah

### Conference Assistance

Michael Wiredu

Laura Dogbey

### Web Manager

Felix Larbi Aryeh



## GENERAL CONFERENCE INFORMATION & LOGISTICS

### Accommodation

The two main accommodations to be used by meeting participants are the University Guest House and the African Studies Chalets. They are easy to find once you get to the University Ghana Campus. You may also inquire from the security post at the main entrance of the university. Note that certain taxis / cars may not be allowed in so let them know that you are attending the Climate Change Conference at Noguchi organised by the University of Ghana. You may call the following number for attention: +233 (0)5029i1700

### Restaurants

There are several eating places on campus ranging from traditional restaurants "chop bars" to sophisticated settings. The campus accommodations have their own restaurants and bars from which both local and European dishes are available and reasonably priced. Amounts from \$3 - \$10 should give you an excellent meal around the meeting venue but you must be prepared to spend more for a buffet or extras. You will also find eating places in all the residences on campus, the closest to the meeting venue is the Night Market close to the International Students Hostel. You do not have to go outside the campus to find food. There is also a restaurant bordering the meeting venue.

### Transportation

Taxicabs are all over and plying between the University of Ghana Campus and the Legon Lorry Park / bus stop (although just a walking distance), from where you can connect to Accra CBD and other suburbs. In most of the cases, you do not have to hire a taxi. Mini and big buses are also available, again on the University of Ghana campus and the bus stops outside the main University entrance. When in central Accra, you can join any bus or taxi heading towards Madina, Adenta, Atomic, and Ashale Botwe, and get off at the Pentagon Residence, Legon Bus Stop or Police Station opposite the old university entrance, waling distance or short drive to meeting venue.

### Shops & Banks

There are various forms of shops in Accra, ranging from table top to kiosks, tuck shops and supermarkets and shopping malls. On campus, you will find smaller shops and tuck shops. There is a supermarket around the university basic schools, central cafeteria & the international students' hostel, easy to reach on foot, and

Banks. You may also visit the student halls for other services and the central cafeteria around the athletic oval (refer to map). The closest Accra shopping mall is the Accra Mall (about 3 km from the University Campus on your way to the CBD). Get off at the Tetteh-Quarshie interchange and cross left to the Spintex Road.

### Pharmacies, drug stores and clinic

These are also available on campus and within some of the halls (e.g. Legon Hall Annex B) where you can purchase simple medications. There is a campus clinic located within the Central Cafeteria. The university hospital is behind the Police Station, opposite the old University entrance which is ready to assist with all cases.

### Laundry

The two major laundries on campus are found in the Legon Hall (main) and opposite the Faculty of Arts building on your way to the University Guest Centre. The other is at the Akafo Hall car park and opposite Crops Science Department. Guest Centres, Lodges / Hotels also offer such service.

### Security

Although security is not a serious issue in Ghana, and only involving petty stealing, be alert and call for help. Keep all valuables with you (e.g. credit card, cameras, passports, money, laptop). Do not leave valuables in your hotel rooms. Beware of roaming taxicabs already having passengers.

### Telephone

The campus is full of telephone machines belonging to different telephone operators. Card telephones work on the Vodafone Network whilst MTN operates other forms of services. For international calls, dial 00 followed by the country code and the number. The various gsm / cell phone providers are Tigo, Vodafone, MTN, Expresso, Glo and Airtel, all that you need is a chip that costs around \$0.30, and registration and you are connected to the rest of the world. Vendors are easily located.

### Volunteers and other contacts

Please make use of the Volunteers / Protocol at the meeting venue, whose name tags are clearly marked. The language of the Ghanaian is courtesy and not always about rights so observe that and be polite even if you insist on something.

**Conference Secretariat Phone:** 05029i1700



**CONFERENCE DAY 1: Wednesday, 29<sup>th</sup> July 2015 (Official Opening)**

08:30 AM

Arrival of Participants / Invitees / Guests & Registration

09:30 AM

All Seated / Opening Prayer, **Rev. Daniel Yirenkyi-Larbi**, *Ghana Baptist Convention, Accra*

09:35 AM

Introductions: **Prof Samuel Codjoe**, *Ag. Convener, Climate Change Working Group, University of Ghana, Legon*

09:40 AM

Chairperson's Acceptance & Remarks

**Prof Ernest Aryeetey**, *Vice Chancellor, University of Ghana, Legon*

09:50 AM

Welcome Remark: **Prof. John Owusu-Gyapong**, *Pro-Vice Chancellor, Research, Innovation & Dev. University of Ghana, Legon*

09:55 AM

Host Remark: **Prof Samuel G.K. Adiku**, *Convener, Climate Change Working Group, University of Ghana, Legon*

10:00 AM

**Guests of Honour Speeches / Goodwill Messages**

- ◆ Head of EU Delegation to Ghana
- ◆ Special UN Secretary General Envoy on Climate Change
- ◆ Ghana Country Director, UNDP

10:15 AM

Keynote Address

**Dr. George Manful** *UNFCCC Focal Person & Climate Change Task Manager, United Nations Environment Programme, Nairobi, Kenya*

10:30 AM

Official Opening Address

**Hon. Mahama Ayariga**, *Minister for Environment, Science, Technology & Innovation, Ghana*

10:45 AM

Chairman's Response / Closing Remarks

10:50 AM

Vote of Thanks / Closing Prayer, **Rev. Daniel Yirenkyi-Larbi**, *Ghana Baptist Convention, Accra*

10:55 AM

Announcements & Updates

11:00 AM

Group Photograph / Reception / Close of Opening



## DAY 1: WEDNESDAY, 29<sup>TH</sup> JULY 2015

### PLENARY 01

11:30 – 12:30 Hrs

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<b>Speaker</b>	:	<b>Grace Akumu</b> Chairperson, <i>African Network for Peoples Empowerment</i>
<b>Title</b>	:	<b>Potential Pitfalls for a Paris 2015 (COP21) Agreement</b>
<b>Chair</b>	:	Dr. Christiana Amoatey, <i>Climate Change Working Group, Legon</i>
<b>Venue &amp; Time</b>	:	Auditorium (upstairs) / 11:30 – 12:30 Hrs

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#### Abstract

It's been like a game of musical chairs since the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992. This conference heralded the United Nations Framework Convention on Climate Change (UNFCCC), among other agreements (United Nations Convention on Biological Diversity, United Nations Convention on Drought and Desertification and the Rio Principles). Of all these, the UNFCCC has been the most politicised, the most controversial, and most discussed in international relations amongst all nations; and yet, the more the negotiations take place, the more the outcomes remain the same! Key principles of the UNFCCC (Art. 3) which remain the fulcrum of negotiations and which will play out and determine the outcome in COP21, Paris 2015 are:

- Common but differentiated responsibilities and respective capacities
- Equity
- Precautionary measures
- Right to sustainable development

Although they are only four principles, they remain the most arm-twisted in the climate change yearly negotiations, the most ignored, yet the most important to for an inclusive, universal, legally binding multilateral instrument for a global engagement in combating the adverse impacts of climate change. While global temperatures are on a steady and marked increase with current green house gas (GHG) emissions estimated in the region of 50 billion tons of carbon dioxide per year and threatens the deal for limiting global warming to the internationally agreed threshold of no more than 2 degrees Centigrade above pre-industrial levels, few or very little milestones can be put on the table ahead of Paris 2015! Developed countries which are historically responsible for most of the GHG emissions and yet the most endowed financially and technologically, continue to evade their responsibility in the Climate Change Convention, Kyoto Protocol, Copenhagen Accord and the Doha Amendment. Consequently, pre-COP21 negotiations in Paris have already started hardening with developing countries calling for:

- Parity between Mitigation and Adaptation
- Financing
- Technology development and transfer
- Capacity building
- Transparency of action and support in a comprehensive and balanced manner.

*Other concerns in the global climate change negotiations which pose threats are lack of political goodwill and lack of trust.*

All the above pitfalls present a serious threat to an ambitious and universally agreed, inclusive, legally binding multilateral instrument for a global engagement in combating the adverse impacts of climate change in December 2015 in Paris, France.





## DAY 1: WEDNESDAY 29<sup>TH</sup> JULY 2015 [ORAL SESSIONS]

12:30-13:30 LUNCH BREAK

### 13:45-15:00 GREEN ECONOMY SEMINAR

**SESSION 01:** Green Economy Principles, Assessments and Learning Experiences

**SPEAKER:** *Samuel Dotse*

UNIDO / Partnership for Action on Green Economy (PAGE), Ghana

**MODERATOR:** **Delali B.K. Dovie**, Climate Change Working Group, University of Ghana

**VENUE:** Auditorium

**TIME:** 13:45 – 15:00

15:00-15:30 SNACK / TEA / COFFEE BREAK

### PARALLEL SESSIONS

#### LATE AFTERNOON PRESENTATIONS [15:30 – 17:00]

**SESSION 02:** Green Economy and Green Growth  
**MODERATOR:** Samuel Dotse: UNIDO / Partnership for Action on Green Economy (PAGE), Ghana

**VENUE:** Auditorium

**TIME:** 15:30 – 17:00

15:30-15:50 **Successful community-company partnerships in climate change resilience forestry projects: the case of Eastern Cape, South Africa**  
*Trymore Chivinge*

Agricultural and Rural Development Research Institute, University of Fort Hare, Alice /Fort Cox College of Agriculture and Forestry, Department of Forestry, King William's Town 5600, South Africa

15:50-16:10 **A green economy approach to solid waste management: a case study of recycling in Nigerian urban centres**  
*Yekeen A. Sanusi, Sunday G. Owoyele, Samuel Medayese and Mohammed Ndana*

Department of Urban and Regional Planning, Federal University of Technology, Minna. Niger State, Nigeria

16:10-16:30 **Legislative Provision for Green Procurement in South African Metropolitan Municipalities**  
*AO Agyepong, G. Nhamo*

College of Agriculture and Environmental Science, University of South Africa, Institute for Corporate Citizenship University of South Africa

16:30-16:50 **Knowledge, attitudes and perceptions of stakeholders on biofuels as an enabler in South Africa's bio based economy**  
*Chipo Mukonza*

Institute for Corporate Citizenship, University of South Africa

16:50-17:00 **General Discussion & Conclusion**



- SESSION 03: Sustainable Energy and Industrialization**  
**MODERATOR:** Dr Kwadwo Owusu; Climate Change Working Group, University of Ghana, Legon  
**VENUE:** Seminar Room  
**TIME:** 15:30 – 17:00
- 15:30-15:50 **Power Sector's Challenges and Climate Variability: the Nigerian Experience**  
*Jacksolomon Delle and Joseph Mejabi*  
Department of Geography, Ahmadu Bello University, Zaria-Nigeria
- 15:50-16:10 **Potential Implications of Large Scale Wind Power Projects On Climate**  
*Cynthia W Kanyingi*  
Kenya Forestry Research Institute (KEFRI), Kenya
- 16:10-16:30 **Strategic Acceleration of Renewable Energy Industries for Climate Change Mitigation**  
Derkyi, N.S.A.<sup>1</sup> and Jiajitsawat, S.<sup>2</sup>  
<sup>1</sup>University of Energy and Natural Resources, Sunyani, Ghana  
<sup>2</sup>Naresuan University, Phitsanulok, Thailand
- 16:30-16:50 **Estimation of global solar irradiance from surface temperature measurements from Kumasi Airport and KNUST agromet station**  
*Leonard K. Amekudzi*  
Kwame Nkrumah University of Science and Technology (KNUST), Ghana
- 16:50-17:00 **General Discussion & Conclusion**

**CLOSE OF DAY 1**  
**WE THANK YOU FOR YOUR SUPPORT**

**CONFERENCE DINNER**  
**YOU ARE ALL WELCOME**  
**TIME: 6:30 PM**

**WATCH OUT FOR FURTHER INFORMATION**



## DAY 2: THURSDAY 30<sup>TH</sup> JULY 2015

### PLENARY 02

09:00 – 10:30 Hrs

<b>Speaker</b>	:	<b>Oladele Ogunseitan, PhD</b> Professor, <i>Department of Population Health and Disease Prevention, University of California, Irvine, USA</i>
<b>Title</b>	:	<b>Gaps in the Translational Science of Climate Change and the Disease Prevention</b>
<b>Chair</b>	:	Prof. Julius Fobil, <i>Climate Change Working Group, Legon</i>
<b>Venue &amp; Time</b>	:	Auditorium (upstairs) / 09:00 – 10:30 Hrs

### Abstract

The scientific underpinnings of causality in climate change research are increasingly secure; and so are the underpinnings of causality in the environmental burden of diseases. However, in both cases of climate change mitigation and disease prevention, there remain major gaps in translating knowledge to protective action. This situation is particularly relevant in many African countries where the reconciliation of national development plans with global priority to mitigate and adapt to climate change impacts remains an intractable scientific and policy controversy. This presentation will focus on the identity and characteristics of such knowledge gaps and discuss opportunity to fill the research and translational gaps.

10:30-11:00 SNACK / TEA / COFFEE BREAK

## PARALLEL SESSIONS

### LATE MORNING PRESENTATIONS [11:00 – 12:30]

- SESSION 04: Climate Change, Water and health**  
**MODERATOR:** Dr Mumuni Abu; Regional Institute for Population Studies, University of Ghana, Ghana  
**VENUE:** Auditorium  
**TIME:** 11:00-12:30
- 11:00-11:20 **Climate driven malaria transmission patterns in Ghana**  
*Leonard K. Amekudzi*  
Kwame Nkrumah University of Science and Technology (KNUST), Ghana
- 11:20-11:40 **The impact of climate change on seasonal floods in Southern Africa**  
*Yaw A. Twumasi<sup>1</sup>, Albert Osei<sup>2</sup>, Brilliant M. Petja<sup>3</sup>, Tomas Ayala-Silva<sup>4</sup>*  
<sup>1</sup>Department of Urban and Regional Planning, Jackson State University, U.S.A. Email: yaw.a.twumasi@jsums.edu  
<sup>2</sup>Department of Mathematics and Computer Sciences. Oakwood University, U.S.A. Email: osei@oakwood.edu  
<sup>3</sup>Water Research Commission (WRC), South Africa.  
<sup>4</sup>United States Department of Agriculture/ARS, Subtropical Horticulture Research Station



11:40-12:00 **Assessing potential climate change impact on extreme precipitation over Ouémé basin, Benin Republic**  
*Jean Hounkpe*  
Laboratory of Applied Hydrology, WASCAL-UAC, University of Abomey Calavi, Benin

12:00-12:20 **Development of high-resolution Rainfall Climatology for Ghana**  
*Aryee Jeffrey<sup>1</sup> and L.K. Amekudzi<sup>2</sup>*  
<sup>1</sup>Meteorology and Climate Science Unit, Department of Physics,  
<sup>2</sup>Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

12:20-12:30 **General Discussion & Conclusion**

**12:30-13:30 LUNCH BREAK**

**SESSION 05: Education and Capacity Building**  
**MODERATOR:** Dr Apraku Gyampoh; African Academy of Sciences, Kenya  
**VENUE:** Seminar Room (Downstairs)  
**TIME:** 11:00 – 12:30

11:00-11:20 **Transfer of Knowledge on Climate Change Adaptation from Pacific Islands to Africa**  
*Ajantha Wijesing Perera*  
Fiji National University, Fiji

11:20-11:40 **CIRCLE: developing human capital and increasing knowledge for management of Climate Impacts**  
*Apraku Gyampoh*  
African Academy of Sciences, Kenya

11:40-12:00 **Disseminating Climate Change Research Information through Theatre: Afram Plains, Ghana and Bagamoyo, Tanzania Experience**  
*Elias Kwaku Asiana*  
School of Performing Arts, University of Ghana, Legon, Ghana

12:00-12:20 **Indigenous Knowledge Systems (IKS) and the Teaching of Climate Change in Zimbabwean Secondary Schools**  
*Vincent Itai Tanyanyiwa*  
Zimbabwe Open University, Zimbabwe

12:20-12:30 **General Discussions & Conclusion**

**12:30-13:30 LUNCH BREAK**

## **PARALLEL SESSIONS**

### **EARLY AFTERNOON PRESENTATIONS [13:30 – 15:00]**

**SESSION 06: Climate Change and Food security**  
**MODERATOR:** Prof Samuel N.A. Codjoe; Climate Change Working Group, University of Ghana, Ghana  
**VENUE:** Auditorium  
**TIME:** 13:30-15:00



- 13:30-13:50 **Participatory mapping of multiple stressors contributing to vulnerability across scales in the Savannah zone of Ghana**  
*P. Antwi-Agyei<sup>ab</sup>, S.N.Codjoe<sup>b</sup>; S. Adiku<sup>c</sup>; B.D. Dovie<sup>b</sup>*  
<sup>a</sup> Department of Environmental Science, College of Science  
KNUST, Kumasi, Ghana  
<sup>b</sup> Regional Institute for Population Studies, University of Ghana, Accra.  
<sup>c</sup> Department of Soil Science, University of Ghana, Accra
- 13:50-14:10 **Impact of Climate Change on Gender Nutritional Vulnerability: Innovations for Adaptation by Smallholder farmers in Kenya**  
*Susan Muthoni Kamuru*  
Egerton University, Kenya
- 14:10-14:30 **Climate change and Food crisis epicenter in Eastern Tigray, Ethiopia**  
*Frangton Chiyemura*  
Institute of Climate and Society, Mekelle University, Tigray, Ethiopia
- 14:30-14:50 **Effects of climate variability on food security in Tanzania: The case Bagamoyo**  
*Paschal Arsein Mugabe*  
Institute for Environment and Sanitation Studies, University of Ghana, Legon, Ghana
- 14:50-15:00 **General Discussions & Conclusion**
- 15:00-15:30 SNACK / TEA / COFFEE BREAK**
- SESSION 07: Climate Smart Agriculture and Indigenous Knowledge Systems (Part I)**
- MODERATOR:** Dr. Christiana Amoatey; Climate Change Working Group, University of Ghana, Ghana
- VENUE:** Seminar Room (Downstairs)
- TIME:** 13:30 – 15:00
- 13:30-13:50 **Use of biophysical simulations to evaluate farmer agricultural adaptation strategies to climate change in northern Benin, West-Africa.**  
*Mathias A. Tidjani, P.B. Irénikatché Akponikpe*  
Soil Physics and Environmental Hydraulics Unit (PSHE), Faculté d'Agronomie (FA), Université de Parakou (UP); Bénin
- 13:50-14:10 **Bridging Planned and Autonomous Climate Change Adaptation Strategies for Food Security: Evidence from the Ecosystem-Based Adaptation In The Talensi District By Smallholder Farmers**  
*Benjamin B. Jabik, Simon Bawakyillenuo*  
ISSER, University of Ghana, Ghana



14:10-14:30 **Traditional knowledge and adaptation to climate change in West Africa: lessons from the experiences of people in the Senegalese groundnut basin**  
*Galiné YANON*  
Laboratory of Climatology and Environmental Studies / Department of Geography, Cheikh Anta Diop University, Senegal

14:30-14:50 **Embracing local ecological knowledge in climate change adaptation in Mukwichi communal land, Zimbabwe**  
*Olga Laiza*  
University of South Africa, South Africa

14:50-15:00 **General Discussions & Conclusion**

**15:00-15:30 SNACK / TEA / COFFEE BREAK**

**LATE AFTERNOON PRESENTATIONS [15:30 – 17:00]**

**SESSION 08: Gender Mainstreaming**  
**MODERATOR:** Grace Akumu; African Network for Peoples Empowerment, Kenya  
**VENUE:** Auditorium  
**TIME:** 15:30 – 17:00

15:30-15:50 **Gender and Vulnerability to Climate Change in Indigenous Communities: The Case of the Bakas of Djoum**  
*Nguegang Tayou Sariette and Waffo Uilrich Inespere*  
Department of Sociology University of Yaoundé 1  
Institute of Demographic Training and Researches (IFORD) Yaoundé and Department of Geography University of Yaoundé, Cameroon

15:50-16:10 **A Gender Approach to Understanding the differentiated impacts of barriers to adaptation: responses to climate change in rural Ethiopia**  
*Mersha Azeb Assefa*  
Utrecht University, Netherlands

16:10-16:30 **Exploring Gender, Climate Change Vulnerability and Adaptive Capacity through an Intersectionality Lens**  
Derkyi, M<sup>1,2</sup>, Adiku, S<sup>3</sup>, Akwen, N<sup>4</sup>, Dovie, D.B.<sup>4</sup>, Codjoe, S<sup>4</sup>, Nelson, V<sup>5</sup> and E. Awuah<sup>6</sup>  
<sup>1</sup> Department of Forest Science, University of Energy and Natural Resources  
<sup>2</sup> CIRCLE Post –Doctoral Fellow, Regional Institute of Population Studies, University of Ghana  
<sup>3</sup> Department of Soil Science, University of Ghana  
<sup>4</sup> Regional Institute of Population Studies, University of Ghana  
<sup>5</sup> Natural Resources Institute, University of Greenwich  
<sup>6</sup> University of Energy and Natural Resources

16:30-16:50 **Does Gender Influence the Uptake of Climate-Smart Agriculture? Experiences from Nyando, Kenya**  
*Catherine Mungai and Mary Nyasimi*  
CCAFS, Nairobi, Kenya



16:50-17:00 **General Discussion & Conclusion**

**SESSION 09: Climate Smart Agriculture and Indigenous Knowledge Systems (Part II)**

**MODERATOR:** Prof Alex Asase; Climate Change Working Group, University of Ghana, Ghana

**VENUE:** Seminar Room

**TIME:** 15:30 – 17:00

15:30-15:50 **Comparative Analysis of Climate-Smart Agricultural Practices (CSA) Adoption by Crop Farmers in Semi-Arid Regions of West and East Africa: Evidence from Nigeria And Ethiopia**

*Anthony. O. Ojinimi*

Department of Agricultural Economics and Extension, University of Port Harcourt, Nigeria

15:50-16:10 **Social Capital and Adoption of Climate Change Adaptation Strategies in Burkina Faso**

*Thomas Bindayaoba, YAMEOGO*

WASCAL, Burkina Faso

16:10-16:30 **Smallholder Farmers' On-Farm Adaptation to Climate Variability in the Bosomtwe District of Ghana**

*Divine Odame Appiah and Sampson Yamba*

Department of Geography and Rural Development, KNUST, Ghana

16:30-16:50 **Traditional Knowledge Systems and Innovations towards Small holders' resilience to Climate change**

*Roxventa A. Othim*

16:50-17:00 **General Discussion & Conclusion**

**CLOSE OF DAY 2**  
**WE THANK YOU FOR YOUR SUPPORT**



## DAY 3: FRIDAY, 31<sup>ST</sup> JULY 2015

### PLENARY 03

09:00 – 10:30 Hrs

<b>Speaker</b>	:	<b>Samuel N.A. Codjoe, PhD</b> Associate Professor, <i>Regional Institute for Population Studies / Climate Change Working Group University of Ghana, Ghana</i>
		<b>Kwasi Appeaning-Addo, PhD</b> Lecturer, <i>Department of Marine Science, University of Ghana, Ghana</i>
<b>Title</b>	:	<b>Environmental hazard and livelihood options in a coastal area in Ghana: A case of sea flooding</b>
<b>Chair</b>	:	Prof. Paul W.K. Yankson, <i>Climate Change Working Group, Legon</i>
<b>Venue &amp; Time</b>	:	Auditorium (upstairs) / 09:00 – 10:30 Hrs

#### Abstract

Evidence, albeit scanty, from research conducted mainly in island states indicates that many low-lying coastal communities threatened by an environmental hazard choose not to consider migration as a response option for a variety of cultural and economic reasons. The scientific community has not methodically assessed the willingness or otherwise of communities exposed to this phenomenon to migrate in other geographic settings. Even in highly vulnerable coastal regions, very few empirical studies have simultaneously described the livelihood options of those who decide not to migrate and the kinds of migration pursued by those who use migration as an adaptation strategy. This presentation seeks to help fill this knowledge lacuna with an assessment of response strategies to an environmental hazard, i.e., sea flooding in coastal Ghana. Revealing these livelihood options may provide policymakers of other countries with alternatives to mass relocation and resettlement associated with environmental hazards, since these schemes may be too expensive to undertake in developing nations. In this presentation, we will first, present the coastal zone of Ghana, and what is happening within it, second, we will show the economic potential of the coastal zone, but also indicate that it is under threat, third, we will show erosion hot spots on the coast of Ghana, and what is causing the erosion, fourth, we will present evidence of sea level rise in Ghana, and show mitigation efforts undertaken by Government. Fifth, we will use a case study of the Dangbe East District to provide evidence of the major coping and adaptation strategies being used.

### PARALLEL SESSIONS

#### LATE MORNING PRESENTATIONS [11:00 – 12:30]

##### **SESSION 10: Climate Vulnerability Assessments and Development (Part I)**

**MODERATOR:** Prof P.A.O. Odjugo; University of Benin, Nigeria

**VENUE:** Auditorium

**TIME:** 11:00 – 12:30

11:00-11:20

##### **Climate change impacts, vulnerability and adaptation strategies in the Niger Delta Region of Nigeria**

*Odjugo, P. A. O. and Emeritus Onokerorhaye A. G.*

Department of Geography and Regional Planning, University of Benin,





Nigeria

11:20-11:40 **The Socio-economic Impact of Climate Change Adaptation on Smallholder Farmers in Lawra District, Upper West Region, Ghana**  
*Nana Yamoah Asafu-Adjaye and Joseph Amikuzuno*  
Department of Climate Change and Food Security, University for Development Studies, Ghana

11:40-12:00 **Vulnerability Assessments of Climate Change Impacts on the Cameroon Coastal Communities: Mitigation and Adaptation**  
*Charlotte Enjoh Fonocho*  
CIME Services, Yaounde, Cameroon

12:00-12:20 **Location is not the Least Common Denominator: Different Vulnerabilities to Climate Change in Ghana's Volta Delta**  
*Kwame Ntiri Owusu-Daaku*  
Humanitarian Response and Development Lab-Department of Geography, University of South Carolina

12:20-12:30 **General Discussions & Conclusion**

12:30-13:30 **LUNCH BREAK**

**SESSION 11: Climate Vulnerability Assessments and Development (Part II)**  
**MODERATOR:** *Leonard K. Amekudzi*; Kwame Nkrumah University of Science and Technology (KNUST), Ghana

**VENUE:** Seminar Room (Downstairs)

**TIME:** 11:00 – 12:30

11:00-11:20 **Climate Change-Induced Migration and Adaptation to Climate Change in Oyo State, Nigeria: Is the Cup Half Empty or Half Full?**  
*Ayodeji O.Ojo<sup>1</sup> and Isaac B. Oluwatayo<sup>2</sup>*  
<sup>1</sup>Department of Agricultural Economics, University of Ibadan, Nigeria  
<sup>2</sup>Department of Agricultural Economics and Animal Production, University of Limpopo, Sovenga 0727, South Africa.

11:20-11:40 **Impact of Sea Surface Temperature on West African Rainfall: Case Study of Coastal Zone Of Ghana**  
*Michael Baidu*  
Kwame Nkrumah University of Science and Technology, Ghana

11:40-12:00 **Climate Change Impacts on *Faidherbia albida* (Del.) A. Chev. Distribution and Implications for the Species Conservation in Dry Lands in East Africa**  
*Florent Anguilles Noulekoun*  
Centre for Development Research (ZEF), Benin

12:00-12:20 **Climate Change Perception and Utilization of Risk Mitigating Forecasts among Farming Households in East and West Africa**  
*Abayomi Samuel Oyekale,*  
Department of Agricultural Economics and Extension, North-West University Mafikeng Campus, Mmabatho, South Africa.



12:20-12:30 **General Discussions & Conclusion**

**12:00-13:30 LUNCH BREAK**

## **PARALLEL SESSIONS**

### **EARLY AFTERNOON PRESENTATIONS [13:30 – 15:00]**

**SESSION 12: Climate Smart Agriculture and Indigenous Knowledge Systems (Part II)**

**MODERATOR:** Dr. Bartholomew Ituma Aleke; Institute for Corporate Citizenship, University of South Africa, South Africa

**VENUE:** Auditorium

**TIME:** 13:30-15:00

13:30-13:50 **Livestock Keepers' Experiences of Climate Hazards and their Adaption Responses in Diverse Agro-ecosystems of Kenya**

*Bockline Omedo Bebe*

Department of animal Sciences, Egerton University, Kenya

13:50-14:10 **Farmers Perceptions of Climate Change and Coping Strategies in Selected Sites in Kenya**

*Wanjiku Chiuri<sup>1</sup>, Francis Lelo<sup>2</sup>, Margaret Ngigi<sup>3</sup>, Nancy Munga<sup>4</sup>, Samuel Kabuitu<sup>5</sup> and O. Bebe<sup>6</sup>, Susan Kamuru<sup>7</sup>*

<sup>2</sup>Laikipia University, <sup>3-7</sup>Egerton University, Kenya

14:10-14:30 **ICT adoption in the wildlife sector: Implications for climate change adaptation and disaster risk reduction in Africa**

*Bartholomew Ituma Aleke, CVF Kupika Olga L., Godwell Nhamo*

Institute for Corporate Citizenship, South Africa

14:30-14:40 **General Discussions & Conclusion**

14:40-15:20 **CLOSING CEREMONY AT THE AUDITORIUM**

**15:20-17:00 COCKTAIL RECEPTION**

**SESSION 13: Climate Finance, Fundraising and Investment**

**MODERATOR:** Winfred Nelson, National Development Planning Commission, Ghana

**VENUE:** Seminar Room (Downstairs)

**TIME:** 13:30 – 15:00

13:30-13:50 **Analysis of Sectoral Vulnerability and Trends of National Budget Allocation and disbursement to Climate Change Risk Management in Ghana**

*Assaah Muhammed*

University of Development Studies, Ghana

13:50-14:10 **Environmental Perception and Willingness to Accept Carbon Trade on Agro forestry Land: A Case of Zongi Community, Tigray, Ethiopia.**

*Stella Nwawulu Chiemela*

University of Nigeria, Nsukka, Nigeria



- 14:10-14:30 **Climate finance in Ghana: trends and progress in climate-related investments**  
*Ama Pokua Fenny*  
ISSER, University of Ghana, Ghana
- 14:30-14:40 **General Discussions & Conclusion**
- 14:40-15:20 **CLOSING CEREMONY AT THE AUDITORIUM**
- 15:20-17:00 COCKTAIL RECEPTION**

**CLOSE OF DAY 3**  
**WE THANK YOU FOR YOUR SUPPORT**

Followed by

The Official Closing Ceremony

**SEE YOU AGAIN IN 2016**



## ORAL PRESENTATION ABSTRACTS

<b>DAY</b> <b>1</b>	<b>SESSION 01: Green Economy Seminar</b> <b>Green Economy Principles, Assessments and Learning Experiences</b> <i>Samuel Dotse and Delali B.K. Dovie</i>  <p>In the last decades the majority of investments have gone into physical capital (e.g. infrastructure) human capital (e.g. employment) and financial capital (e.g. shares) with the aim to increase economic growth. On the other hand, relatively small amounts were invested in natural capital (e.g. investments in renewable energy, energy efficiency, sustainable agriculture, ecosystem and biodiversity protection, and land and water conservation). The rapid accumulation of physical, financial and human capital at the expense of natural capital has contributed to the manifestation of several concurrent crises: climate, biodiversity, energy, food, water, poverty and more recently, the global financial and economic crisis. The green economy proposes an alternative model for economic and social development. It aims to eradicate poverty, increase social equity and decent jobs, strengthen livelihoods and environmental stewardship, and sustain growth, by integrating environmental and social considerations in macro-economic planning and policy making. The approach is based on sound economic analysis of current trends, risks and opportunities, as well as on taking stock of national experiences in applying relevant policy tools effectively. In the context of Ghana, no official definition of Green Economy exists yet . However, most of the country's development priorities and strategies (such as Ghana-Vision 2020 and the National Climate Change Strategy) are in harmony with the key objectives of the Green Economy concept. The green economy approach creates a range of opportunities, but also challenges for learning. Topics such as green economy modelling and assessments, valuing natural capital and ecosystem services, advancing resource efficiency, etc. are often unfamiliar for national and local decision-makers.</p>
<b>DAY</b> <b>1</b>	<b>SESSION 02: Green Economy and Green Growth</b> <b>Successful community-company partnerships in climate change resilience forestry projects: the case of Eastern Cape, South Africa</b> <i>Trymore Chivinge</i>  <p>Diversification of income streams for climate-vulnerable rural communities is an important climate change adaptation priority. As part of national food security strategies targeted at sustaining poor rural community livelihoods, plantation forestry partnership projects (PFPPs) involving rural communities and commercial forestry companies attract the interest of many African governments. Anxiety is high on identifying context-specific fact-based solutions for PFPP failure so as to secure a firm role of PFPPs in climate change adaptation pathways. Perceptions of rural farmers on approaches in the implementation of plantation forestry partnership projects (PFPPs), were evaluated in order to inform provincial capacity building strategies for rural climate change adaptation programmes using participatory rural appraisal techniques. Communities felt that government needed to resolve major land ownership issues to expedite widespread community participation in tree plantation projects. While tree plantation benefits were appreciated by communities, livelihood security concerns were raised at the loss of traditional farmland to plantations, particularly given an unclear beneficiation framework. A paradigm shift from a product buy-in approach to participatory</p>



project identification is the major recommendation made in setting-up future PFPPs.

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**A green economy approach to solid waste management: a case study of recycling in Nigerian urban centres**

*Yekeen A. Sanusi, Sunday G. Owoyele, Samuel Medayese and Mohammed Ndana*

Increase in population, urbanisation, and consumption greatly contribute to solid waste generation. Within the context of green economy, solid waste should be seen as an environmental problem that should be managed and as a resource with the potentials to generate more consumable products and to create livelihood opportunities. In general terms, recycling of solid waste takes place at different scales. This study is based on solid waste recycling activities in Minna, Nigeria. The activities consist of informal, micro and small scale, recyclers who make use of a wide range of waste materials. The objectives of the study are to examine solid waste management problem in Minna and its implications for climate change impact, to take inventory of recycling outlets, to determine the recycling input and output, to investigate the livelihood opportunities that recycling generates and to determine ways to enhance pro-green recycling business activities. The study is based on direct observations and application of questionnaire to the recycling outlets. The results suggest that the recycling sector consists of scavenging, collection, transportation, conversion, processing/ manufacturing, marketing and apprenticeship as sub-sectors. These are part of multiple green economic opportunities offered by solid waste recycling. However, to achieve mass recycling process capable of contributing to zero waste agenda, attention should be devoted to seeing recycling first as a productive business, provide policy actions on scavenging, waste sorting, and economic incentives to recyclers, and support to different scales of recycling and provide improved physical planning environment that accommodates recycling outlets.

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**Legislative Provision for Green Procurement in South African Metropolitan Municipalities**

*AO Agyepong, G. Nhamo*

The objective of this paper is set to investigate and document legislative provisions for green procurement in the eight South African metropolitan municipalities. This was done given the global tide compelling municipalities to procure green so as to address, particularly issues of climate change. Given that the entry level of compliance in green procurement in many instances pertain to the policy environment, it became imperative that the research focuses on reviewing the available legislature to establish the extent to which green procurement is embedded in metropolitan municipality policies and regulations. The main method used to generate data was document analysis. It emerged that three main policies were common to all the metropolitans and these included: integrated development policy, environmental policy and the supply chain management (SCM) policy. From the study, all the older metropolitans (those in existence for five years and more from the date of study that was 2013) have environmental policies whereas the younger metropolitans (those that in existence for three years and less from the date of study that was 2013) only had



environmental statements. Although all the metropolitan municipalities have procurement policies, only the City of Cape Town and eThekweni metropolitan have incorporated green procurement strategies into their 2013 amended SCM policies. These incorporated green procurement strategies include the promotion of environmental best practices as well as the inclusion of green procurement practices as an integral part of procuring goods, services and construction works used in the metropolitan municipalities in their bid to addressing climate change. The City of Cape Town and Nelson Mandela Bay metropolitans also emerged as the only ones with stand-alone green procurement strategies. Hence, legislative provisions mandating green procurement is not entirely lacking in these metropolitan municipalities.

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**Knowledge, attitudes and perceptions of stakeholders on biofuels as an enabler in South Africa's bio based economy**

*Chipo Mukonza*

This study investigates stakeholder knowledge, attitudes, practice and public perception with regard to biofuels as an enabler towards a bio based economy. Biofuels have been touted as a clean fuels with an ability to reduce greenhouse emission, while simultaneously creating employment and growing the economy. South Africa like other countries in the world is transitioning towards a bio based economy. In this regard policies and institutions have been developed to promote biofuels production and distribution. The study also aimed at unravelling the emotions as far as biofuels in a bio based economy are concerned. In innovation and adoption studies perceptions play a critical role in acceptance of a technology. Knowledge, Attitude and Practices (KAP) surveys were carried out to deepen one's knowledge and understanding of the stakeholder's knowledge attitudes, perceptions and practices. Emails, telephonic interviews, group interviews based on open questions and social media were used to gather data. Convenient and Purposive random sampling was used to select the participants. Descriptive statistics, thematic analysis and content analysis was used to analyze the stakeholder perceptions, knowledge, attitudes and practice. The study found out that the introduction of biofuels presents so many are opportunities and benefits for the economy and in particular unlocking potentials for the rural entrepreneurs. However, stakeholders have concerns and issues regarding the use of biofuels on their engines. The study recommends that, rigorous communication and education been done on the benefits of biofuels in a bio- based economy. Biofuels are being developed in a very complex, dynamic and diverse context. There is no doubt, if properly exploited biofuels can make a significant contribution to the energy mix and become a major enabler in a bio based economy. Key words: Biofuels, bio-based economy, perceptions, and stakeholder.

**DAY 1 SESSION 03: Sustainable Energy and Industrialization**

**1 Power Sector's Challenges and Climate Variability: the Nigerian Experience**

*Jacksolomon Delle and Joseph Mejabi*

Electricity as a vital tool in national development is receiving increasing attention from various regimes of Government in Nigeria. Obviously, there is a great deal of potentials for investors in the country; this is the idea behind the recent reforms in the industry. However, there lie a number of critical issues that must be addressed to ensure a high and efficient electricity power supply and distribution across the



national grid. The electricity market in Nigeria is facing multi-variant challenges ranging from distribution equipment vandalism, climate variability and change and corruption. This paper focuses on the challenges facing electricity generation in Nigeria and possible ways by which the nation can build a sustainable electricity market. Climatic data from the Nigerian Meteorological Agency, Lagos and that of electricity from the Power Holding Company of Nigeria (PHCN) were used for the study and analyzed by different cartographic and statistical techniques. The findings revealed that Nigeria has large technically exploitable hydropower potentials but only 19% is currently being tapped. Since over 90% of electricity generation in Nigeria is based on hydro (rivers), seasonal climatic variability greatly affects the volume generated with the lowest volume in the dry season and this will be worsened with intensifying climate change impacts. Solar, wind, biomass, etc are also in abundance all year round in Nigeria but are largely untapped leading to acute electricity shortage. Sustainable power supply in Nigeria will be dependent on proper government policy, financial and technical capability, mitigation on climate change and public acceptance for their installation.

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### **Potential Implications of Large Scale Wind Power Projects On Climate**

*Cynthia W Kanyingi*

A 'climate resilience' economy is the most popular strategy by developing countries in addressing climate change adaptation and sustainable development. This has led to the need to upscale sustainable (wind and solar) energy sources. For the last five years large scale wind projects have been launched in several African countries such as Egypt Morocco and Ethiopia respectively with Ethiopia being the largest in Africa. The Turkana wind project in Kenya proposes to generate over 5000 megawatts and occupy over 40000 acres; it would be the biggest in Africa upon its completion. If the developing countries actually tap onto their full potential, how much wind energy potential does the whole of Africa have? Shouldn't there be some form of policy to govern the standards of the turbine technology and the size per unit geographic area of the parks? The paper put forwards these challenge associated with wind parks and their effects on the environment and weather conditions of the surrounding area. There is need for policies which anticipate and regulate standard turbine sizes and technologies as well as geographic locations of mega wind parks. Governing the how, when and where of wind parks is vital so as to avoid compromising the livelihoods of surrounding communities.

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### **Strategic Acceleration of Renewable Energy Industries for Climate Change Mitigation**

*Derkyi, N.S.A.<sup>1</sup> and Jiajitsawat, S.<sup>2</sup>*

Developing and emerging economies face a two-fold energy challenge: meeting the needs of its citizens who still lack access to basic, modern energy services while at the same time participating in a global transition to clean, low-carbon energy systems. Renewable energy is envisaged to be an important tool in climate change mitigation technologies. In most developing countries, various policies and interventions have been formulated and implemented for developing a renewable energy industry. However, most of these interventions have not seen significant



achievement in renewable energy industries and climate change mitigation. This paper aims to address key knowledge with regard to two questions: (1) “To what extent is the linkage between renewable energy and climate change fostered?” and (2) “How can renewable energy industries be sustained through strategic business alliances and value addition for the development of economically viable and ecologically sound enterprises for climate change mitigation?” Data for this paper was drawn from our research experiences in renewable energy studies undertaken, as well as secondary sources as case studies for addressing these issues. The paper highlights some smart applications, like the smart grid, climate-smart agriculture and smart buildings. We conclude that policy coherence at the national level is an important enabling factor for the success of renewable energy industries as well as strengthening capacity for research and development at the socio-economic, environment and technology nexus. It is recommended that collaboration among policymakers, academia and business be enhanced, which could go a long way towards the strategic acceleration of renewable energy industries for climate change mitigation.

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**Estimation of global solar irradiance from surface temperature measurements from Kumasi Airport and KNUST agromet station**

*Leonard K. Amekudzi*

Scarcity of global solar radiation data is a major drawback in most related studies and research application in solar technology. This study assesses the performance of the Hargreaves-Samani model in estimating solar radiation using the maximum and minimum temperature measured at Kumasi Airport and KNUST Agromet station. The simulated model output were compared & with global solar radiation measured at Owabi station. These comparisons revealed that the RMSE, MBE and MPE are 8.4%, 2.9% and -3.24% respectively at the Kumasi Airport and 9.81%, -4.71% and 4.01% respectively at KNUST Agromet station. Furthermore, a correlation analysis showed a good agreement between the measured and simulated GSR values with clearness index of 70.2% and 66.8% for the Kumasi Airport and KNUST Agromet respectively.

**DAY 2 SESSION 04: Climate Change, Water and health**

**2 Climate driven malaria transmission patterns in Ghana**

*Leonard K. Amekudzi*

The regional-scale dynamical malaria model VECTRI is used to assess the spatio-temporal variability in malaria transmission over the various ecological zones in Ghana. The model is run simply under the same conditions with the exception of the driving temperature and rainfall datasets obtained from GMET synoptic stations between 1980 and 2010. In addition, VECTRI driven by KNUST Agromet station dataset simulated malaria incidence are compared to morbidity data obtained from Emena and Atonsu hospitals between 2010 and 2013. The model results reveal that the simulated malaria transmission follows rainfall with a one month time lag. Furthermore, malaria transmission is all year round, with minimum transmission occurring between February and April. Interestingly, despite the limitation of the model and the morbidity data not being a true representation over KNUST, the model produces a reasonable simulation of seasonal variability in malaria transmission.





### **The impact of climate change on seasonal floods in Southern Africa**

*Yaw A. Twumasi<sup>1</sup>, Albert Osei<sup>2</sup>, Brilliant M. Petja<sup>3</sup>, Tomas Ayala-Silva<sup>4</sup>*

Flooding is a major problem facing Southern Africa region. In December 2007 and 2008, a global weather pattern known as La Niña resulted in increased rainfall over Southern Africa causing floods and extensive socio-economic damage. Some of the most serious floods which occurred in 2009, 2010, 2011, 2013 and 2015 may have been enhanced by La Niña, which cools ocean waters in the equatorial Pacific and changes rainfall patterns across the world. According to United Nations Office for the Coordination of Humanitarian Affairs, each year millions of dollars are spent to rebuild flood-related damages in the region. Although considerable studies on floods have been conducted in Southern Africa region, yet merely a handful of studies have been done on climate influence on extreme events. The primary objective of this study was to investigate the impact of climate change on seasonal floods in Southern Africa. This research paper used both primary and secondary sources for data analysis. Historical data from the Meteorological weather stations in the study area were integrated with satellite data to assist in the investigation of the impact of climate change on seasonal floods in the Southern Africa region. The results of the study revealed notable environmental damage include, among others, degradation of the ecosystem, erosion of major roads, submerged farmlands and sediment loading of the major watercourses. The output of this research can be used as a benchmark of climate resilient flood management plan for Southern Africa region which has been experiencing flood damage in recent years.

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### **Assessing potential climate change impact on extreme precipitation over Ouémé basin, Benin Republic**

*Jean Hounkpe*

Changing climate and weather patterns will have severe negative impacts on natural resources and consequently on food production and food security in developing countries. Likely accentuated by climate change, flooding is one of the disasters which affects people and destroy agricultural land and products. At different governance levels and scales, appropriate responses are needed. A methodology for testing for change was applied to heavy daily rainfall of 34 stations across the Ouémé basin in order to assess the environmental change impact on extreme rainfall. For the analysis, rainfall data up to 92 years period (1921-2012) were used. For all studied return periods, 82% of the stations show statistically significant change in daily precipitation among which 57% exhibit a positive change and 43% negative change. A positive change is associated to an increase in heavy rainfall over the area of concerned. An analysis of change in a 10 year return period of heavy rainfall reveals an east-west gradient from negative to positive along the lower Ouémé basin. From the middle to the upper Ouémé, a decreasing tendency of return periods of heavy rainfall is dominant. This result of mixed pattern of change is of great interest since it can help the decision makers to anticipate the negative aspect this fact could produce and develop consequently adaptation measures.

### **Development of high-resolution Rainfall Climatology for Ghana**

*Aryee Jeffrey<sup>1</sup> and L.K. Amekudzi<sup>2</sup>*



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Various sectors of the country's economy (health, energy, agriculture, planning, energy) depend on climate, and as such availability of quality climate datasets becomes essential for climate impact studies in these sectors. In this paper, rainfall climatological database for Ghana has been developed using 113 Ghana Meteorological Agency (GMet) point station datasets distributed over the four agro-ecological zones and spanning a 33-year period (1980 - 2012). Seasonal rainfall for the four agro-ecological zones has been derived based on 0.25 degree x 0.25 degree grids covering the entire country. This allowed a clear evidence of the Inter-Tropical Discontinuity (ITD) migration from the South of the country to the North and back. This study provides a firsthand data for climate impact study, in the aforementioned sectors, across the country. Data gaps within the rainfall time-series were filled by Regularized Expectation Maximization and homogenization of the time-series was performed by Quantile Matching Adjustments. Seasonal rainfall for the four agro-ecological zones have been derived from the gridded datasets over the entire country and this allowed a clear evidence of the migration of Inter-Tropical Discontinuity (ITD) from the South of the country to the North and back; thus, establishing a uni-modal rainfall regime over the Northern part of the country and a bi-modal rainfall regime over the Southern part of the country. At present, country-wide rainfall climatology has been developed from GMet rainfall time-series which now serves as precursor for further climate impact study, in the aforementioned sectors, across the country.

**DAY**  
**2**

**SESSION 05: Education and Capacity Building**

**Transfer of Knowledge on Climate Change Adaptation from Pacific Islands to Africa**

*Ajantha Wijesing Perera*

Fiji, comprise of 332 islands of which only 110 are permanently inhabited. The total land area is approximately 18,300 sq. km. For most people in Fiji climate change is an everyday word that is well connected to their lives. The sea level rise measured in most islands between 6 to 15mm per year and in Fiji it is approximately 6mm per year. The cyclones are less frequent but are more intense. There is a very high confidence level that the ocean acidification will continue. All these predictions amounts to the fact that Fiji needs to adapt to the reality of climate change. Even though prolonged drought seasons, intense cyclones, sea level rise are to be seen, their life goes on without making much of an effort to adapt to the environmental changes around them. Therefore it has become a priority of the academic institutions to provide adequate knowledge to their students such that they could carry out the necessary awareness, technical know-how and adaptation methods to the villages and the community. The conference paper highlights on the environmental changes happening in Fiji Islands due to climate change, as well as due to negligence by the communities. The strategies used to transfer knowledge more effectively to the students to empower them and equip them as messengers will also be discussed. The paper will also highlight on the effective work carried out by the student population among the communities and villages to create awareness on mitigating measures and adaption to climate change.

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**CIRCLE: developing human capital and increasing knowledge for**



### **management of Climate Impacts**

*Apraku Gyampoh*

The Climate Impacts Research and Leadership Enhancement (CIRCLE) programme is a 5-year research fellowship which identifies the need to develop research capacity of African researchers to do cutting-edge research and develop relevant local solutions capable of uptake and use in local, national and regional policy and implementation. CIRCLE recognizes human capital as the most cost-effective and viable entry point for sustaining organizational and institutional research capacity in Africa – in terms of the risks and potential contribution to the overall objective of strengthening research capacity in impacts of climate change. CIRCLE is designed to provide support to early career African researchers already employed by research institutions and universities and enhance output of African researchers in internationally recognized peer-reviewed publications. CIRCLE also emphasizes providing critical support for institutions participating in the programme to capitalize on the skills and knowledge gained by their returning researchers and build partnerships with reputable advanced research institutions in Africa which offers training to the researchers. The programme in its first year of implementation has offered one year fellowships to 34 early career researchers from twenty-nine institutions participating as home and/or host institutions covering nine African countries. By concurrently strengthening the capacity of institutions to manage, organize and support the career development of ‘next generation’ researchers, it is intended that CIRCLE Fellows will return to a more enabling and sustainable environment for further research. This focus acknowledges the importance of nurturing early career academics to the long-term future development of university research, while also offsetting some of the common disadvantages they face in obtaining funding and time for scientific enquiry. CIRCLE will deliver a gender balanced increase in the number of high quality African researchers on Climate Change successfully designing, delivering and communicating peer reviewed research.

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### **Disseminating Climate Change Research Information through Theatre: Afram Plains, Ghana and Bagamoyo, Tanzania Experience**

*Elias Kwaku Asiamah*

For many decades, humanity has felt and experienced changes in climate. Scientists, social scientists and scholars in the humanities have all become apprehensive about what climate change is and why it must be schematized, discussed and communicated. Various Agencies, including social groups, organizations and educational institutions have engaged themselves with issues on climate change and are committed to proactively intervene academically, financially, and politically with good will support. The Pennsylvania University, USA, for instance, donated a substantial amount of money for researchers to tap into, for any research involving educating, promoting and creating the awareness of climate change. Participants involved in this project between 2010 and 2013. include some scholars from Penn State University, University of Ghana, Legon and some from Dar- el- Salam University, Tanzania. This Paper seeks to present research conducted in these two African countries, namely, Ghana and Tanzania, based on an assessment and evaluation of the use of theatre as an extensive communicative and artistic medium. It also examines its potential form as an innovative approach, by which participants to conferences, seminars and



workshops, such as the current forum, could possibly forge out a more pragmatic policy framework as a model, based on cutting-edge information about climate change. This, the Paper hopes to achieve by exhibiting this Theatrical approach, as a necessary model adopted to impact creatively on the living conditions of the indigenous populations, thereby reflecting the changes in environmental policy, as a result of an improved projects and programs that underlie the national development plan.

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### **Indigenous Knowledge Systems (IKS) and the Teaching of Climate Change in Zimbabwean Secondary Schools**

*Vincent Itai Tanyanyiwa*

Indigenous African education grew out of the immediate environment, real or imaginary where pupils had to have knowledge of the environment. Indigenous education inculcated a religious attitude that imbued courtesy, generosity and honesty. At colonization Zimbabweans were thought of as primitive although they had their own systems, contents and methods of education. Few attempts were made to integrate IKS into formal education despite its potential in solving contemporary socio-economic and ecological problems. Using qualitative research, this study focuses on the following questions: can IKS be used in the teaching of climate change in schools and is there a convergence of IKS and western science in the teaching / learning process? Content analysis will be used to analyze data. The western assault on IKS applied to the use of weather conditions which determines the rhythm of life especially in the eve of climate change whose manifestation has been exacerbated by limited use of indigenous knowledge systems which are unique to a given society. By shifting focus in the core curriculum from teaching / learning based on western science to teaching / learning through IKS as a foundation for all education, it is anticipated that all forms of knowledge, ways of knowing and world views be acknowledged as equally valid, adaptable and complementary to one another in equally valuable ways . The education ministry is currently pursuing curriculum reviews in Zimbabwean schools but the issue of IKS has not been clearly spelt out in the current deliberations. Indigenous knowledge is very important for community based adaptation and mitigation actions in the agricultural sector for maintenance of resilience of social-ecological systems at a local level and this has to start at school level. Collectively held knowledge in a community offers critical insights which can complement western science.

#### **DAY 2 SESSION 06: Climate Change and Food security**

**2**

#### **Participatory mapping of multiple stressors contributing to vulnerability across scales in the Savannah zone of Ghana**

*P. Antwi-Agyei<sup>ab</sup>, S.N.Codjoe<sup>b</sup>; S. Adiku<sup>c</sup>; B.D. Dovie<sup>b</sup>*

Smallholder farmers in sub-Saharan Africa are confronted with climatic and non-climatic stressors. However, research attention has focused on climatic stressors with little empirical studies exploring non-climatic stressors and how these interact with climatic stressors to affect food security and related livelihoods at multiple scales. A focus on climatic factors alone restricts understanding of the combinations of stressors that exacerbate the vulnerability of farming households. This study adopts a multi-scale approach in understanding how climatic and non-climatic stressors interact at household, community and district scales to influence



the vulnerability of smallholder farming households to food insecurity. This study utilises a series of participatory tools including household surveys, key informant interviews and focus group discussions in three selected farming communities in the Savannah zone of Ghana. The results show that smallholder farmers in different communities perceived climatic and non-climatic stressors differently; yet, there were a number of common stressors including lack of credit facilities, high cost of farm inputs, erratic rainfall, cattle destruction of crops, and lack of agricultural equipment that cross all scales. Results indicate that other socioeconomic factors including gender and age also influenced the perception and severity assessment of stressors on food security at the household and community levels. The interactions of the various stressors and how these interactions affect food security at household and community levels are also highlighted. The implications of the findings are discussed in the light of climate change policy development in sub-Saharan African countries.

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### **Impact of Climate Change on Gender Nutritional Vulnerability: Innovations for Adaptation by Smallholder farmers in Kenya**

*Susan Muthoni Kamuru*

This study investigated smallholders' perception of climate change, impact on food security, gender vulnerability to food insecurity and innovations for adaptation and effectiveness of institutional support, with a view of identifying those that are appropriate to the smallholder farmers' circumstances. These, would then be up-scaled and replicated. Participatory research design was used which involved workshops and focus group discussions of key stakeholders in food security, comprising of the farming community, Government, Non-Governmental and Faith-based community workers. Five sites in Kenya's major agro-pastoral ecosystems, representing varying degrees of vulnerability to impacts of climate change and variability were selected purposively. These regions included: Arid and semi arid pastoral areas of Kajiado County in Southern Kenya; Semi arid areas (in transition) of Mbeere Sub-county in South Eastern Kenya; High potential food crop of Bungoma County in Western Kenya; Medium potential food crop/livestock areas of Nakuru County in Central Rift Valley and Coastal lowland areas of Kilifi County. Check lists containing various themes of climate change and food security were used to guide the discussions. Frequent droughts, shift in the rainfall seasons and unpredictable rainfall patterns and poor spatial rainfall distribution were climate change indicators common to all sites. Children under five years were perceived to be malnourished in all sites except Nakuru during adverse seasons, while men and boys were better nourished. Climate change innovations should therefore have a gender focus, and partnership between institutions supporting climate change innovations will enhance their effectiveness.

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### **Climate change and Food crisis epicenter in Eastern Tigray, Ethiopia**

*Frangton Chiyemura*

The discourse on the effects of climate change has been an area of vast research, but the largest part of this research has deliberately or fortuitously focused on factors that do not give sufficient look as they tend to concentrate on the 'projected' impacts which in most cases by-pass reality on ground. As it stands, climate change adaptation, mitigation and resilience construction sentiments are



built from a top-bottom approach that does not factor in micro-level issues of the affected communities and people. The study investigates the micro-level impacts of climate change on food security in Eastern zones of Tigray region, Ethiopia. A systematic random sampling technique was used to select 7 kushets (villages) in eastern zone of Tigray, from which a structured survey questionnaire was administered to collect primary data over a sample size of 100 respondents. Additional primary data was gathered with the aid of focused group discussions, interview sessions and key informants. Secondary data was gathered from literature. The data retrieved was analyzed using STATA and an integrated framework approach in which a combination of both socio-economic and biophysical aspects were used in order to establish the extent of climate change vulnerability and how that ultimately leads to food security or insecurity status. The study found that 71 per cent of the respondents were food insecure as a result of climate change. Women and children were more food insecure than man, and 73 per cent of the smallholder farmers spent more than 5000 ETB (250 USD) annually, on food products in order to address food insecurity caused by climate change. In order to redress the situation, the study recommends that a hybrid adaptation strategy should be put in place, inclusive of both indigenous and external adaptation measures.

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**Effects of climate variability on food security in Tanzania: The case Bagamoyo**

*Paschal Arsein Mugabe*

The oil crises in the 1970s contributed to the crisis of agriculture internationally and severely hampered food security in the Third World countries (TWCs) that faced decreasing returns from traditional cash crops (Bryceson 1993; Friedmann 1993; Iliffe 2007). Demographic trends have an important connection to both the challenges and solutions to the problem of climate change. Rapid population growth exacerbates vulnerability to the negative consequences of climate change, and exposes growing numbers of people to climate risk (Population Action, 2011). Climate variability/change poses great threat to agricultural livelihood in Africa due to the reason that farming activity in Africa is a natural resource dependent. In Tanzania, the sector faces underperformance due reasons related to environmental changes. In western Bagamoyo, a total of three hundred people were individually interviewed face to face (household survey), twenty eight Focus Group Discussions (FGD) and fourteen Participatory Rural Appraisal (PRA) were conducted; and fifty four key informants interviews subject to statistical and qualitative analysis. Secondary data was collected through review of past literatures related to the topic in Tanzania and the study area. Community information reveals that rainfall patterns change with the change of seasons that affects agriculture. Temperature change has significant effects on water borne disease, pests and post-harvest effects. Furthermore, it was revealed that population increase has added pressure on natural resources in the study area.

**DAY  
2**

**SESSION 07: Climate Smart Agriculture and Indigenous Knowledge Systems (Part I)**

**Use of biophysical simulations to evaluate farmer agricultural adaptation strategies to climate change in northern Benin, West-Africa.**

*Mathias A. Tidjani, P.B. Irénikatché Akponikpe*



In response to pronounced climate variations and changes since the 1970s in West-Africa and particularly in Benin, adaptation strategies have emerged as the only alternative to reduce the vulnerability of rural populations. Yet these strategies commonly adopted by or recommended to farmers often lack of initial assessment. Using an integration of qualitative (social survey) and quantitative (biophysical modelling) approaches focused particularly on the study of climatic constraints and their impacts on local maize production in Matéri, Tanguiéta, Kérou, Banikoara and Kandi districts in northern Benin, this study aims to determine farmers adaptation strategies to climate variability and climate change and seek the most effective and efficient strategies for maize production in northern Benin. The Agricultural Production Systems Simulator (APSIM) was first calibrated and validated on historical yield of maize (landrace and improved varieties) in the Tanguiéta district and then used to determine the agricultural impacts and response of adaptation strategies to different climate scenarios. We found that the scenarios presenting risk of poor maize yields or crop failure in Tanguiéta are those of rising temperatures and declining rainfall. The evaluation of the adaptation strategies permit to recommend the adoption of improved maize varieties with short cycle as it guarantees sustainable present and future maize yields in the context of climate change scenarios. The following farmer strategies, although commonly recommended or practiced should be avoided as they do not offset present climate impacts nor guarantee better yields in the future: (1) late planting and (2) reduction of planting densities.

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**Bridging Planned and Autonomous Climate Change Adaptation Strategies for Food Security: Evidence from the Ecosystem-Based Adaptation In The Talensi District By Smallholder Farmers**

*Benjamin B. Jabik, Simon Bawakyillenuo*

The effects of climate change in Ghana pose a threat to food security. Phenomena including drought, prolong dry season, flooding, storms and increased temperatures have become prevalent in the country, with several implication for food production. Particularly, the small-scale farmers in the country who account for about 80% of domestic agricultural production have limited resources to invest in appropriate technologies in order to adapt to the changing climate variability. In the Talensi district several staple crops are affected by the shortening of the growing season. Small-holder farmers have considerably relied on traditional knowledge for the production of food in the mist of this variability. World Vision Ghana started the implementation of a climate change project in the district in 2009 with the aim of improving the adaptive capacity of small-holder farmers. This paper seeks to understand the synergistic relationship between the autonomous and the planned adaptation measures in shoring up food security. Focus group discussion, individual and group interviews were adopted to collect data from respondents in three purposively sampled beneficiary communities. Findings revealed that bridging indigenous knowledge with the planned approaches strengthens the adaptive capacities of beneficiaries. These findings imply that planned adaptation programmes need to identify and incorporate indigenous knowledge and practices in order to achieve greater success.

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**Traditional knowledge and adaptation to climate change in West Africa: lessons from the experiences of people in the Senegalese groundnut basin**



*Galiné YANON*

Rural populations in the Senegalese groundnut basin have accumulated, over the time, knowledge on climate evolution, especially the rainfall. However, this knowledge (empirical or traditional) appears essential in the definition of adaptation strategies for the community. That way, the analysis of local perceptions on climate variability and change appears for the scientific knowledge as essential, especially for the definition of appropriate adaptation measures at the local level. Thus, the challenge is the validation of these «empirical» observations. A study on a sample of 106 households allows us to see that the peasant population, despite their low level of education, has a good perception on climate change, and in some cases to predict the season (bad or good season). Thus, and in the case that concerns us specifically, local's perceptions reflect a decadent evolution of rainfall with an increasing of temperatures. These observations are also confirmed by analysis on ground data (temperature and rainfall from the Met service) and which also reflect a downward trend (less than 32% on the rainfall over the time series (1947-2010), temperature increasing (0.24 ° C over the period 1947-2010) and the rainy seasons are becoming shorter and disturbed.

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**Embracing local ecological knowledge in climate change adaptation in Mukwichi communal land, Zimbabwe**

*Olga Laiza*

Over the past few decades, local ecological knowledge (LEK) that is both traditional ecological knowledge (TEK) and indigenous knowledge systems (IKS) has gradually become fundamental to natural resource management. Because LEK is closely linked with environmental sustainability and the empowerment of local communities, indigenous people's perspectives have been incorporated into a myriad of environmental decision making processes worldwide. This study explored ways in which the use of LEK by farmers in Mukwichi communal land, located in the transitional zone of Middle Zambezi Biosphere Reserve, Zimbabwe contribute towards climate change adaptation and mitigation in light of existing contemporary scientific value systems, policy and institutional frameworks. Data was collected through participant observation, interviews with traditional leaders and elders, focus group discussions and literature review techniques within a case study framework. Results from the study revealed that LEK is significant in climate change adaptation and mitigation particularly in the prediction and monitoring of extreme weather events and farming practices. We conclude that LEK plays a critical role in climate change adaptation and mitigation; hence it should be recognized, customized, respected, preserved, protected as well as integrated into mainstream climate policy.

**DAY 2 SESSION 08: Gender Mainstreaming**

**2**

**Gender and Vulnerability to Climate Change in Indigenous Communities: The Case of the Bakas of Djoum**

*Nguegang Tayou Sariette and Waffo Uilrich Inespere*

Climate change is becoming a human development problem in Africa. According to that, targeted actions to address it have to be population-centered. However, these populations are composed of men and women, marked by structural





differences that are expressed by differentiated socio-cultural constraints. Therefore, for greater efficiency, responses to climate change, both in terms of adaptation and mitigation need to be gender-specific. This suggests the need to address climate change by considering gender. Also, the adoption of appropriate measures to face climate change assumes that the most vulnerable and most sensitive populations are to be at the heart of concerns. Hence there is need to study gender, indigenous people and climate change in a systemic approach. Thus, this research through evidences from the Bakas forest people of the locality of Djoum in southern Cameroon is intended to be a contribution to the consideration of gender and indigenous people in the planning and implementation of climate change adaptation and mitigation policies or projects. Analysis revealed that social roles and unequal access to resources are the main factors of gender differentiated vulnerability to climate change in the Baka indigenous communities. Hence the need for the inclusion of gender in policies and projects related to adaptation and mitigation in these communities. In addition, these indigenous people in relation to their traditional knowledge of the environment and its functioning should not only be considered as beneficiaries of actions but also as key solutions providers in the adaptation process. Moreover, indigenous women, as citizens, need to be held in high esteem given their intervention abilities, skills and experiences they can bring for an appropriate respond to climate change.

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### **A Gender Approach to Understanding the differentiated impacts of barriers to adaptation: responses to climate change in rural Ethiopia**

*Mersha Azeb Assefa*

While adaptation to climate change has received a fair amount of attention in the climate change debate, barriers to adaptation are the focus of a more specific, recent discussion. In this discussion, such barriers are generally treated as having an overall negative impact on all actors. However, we argue that the precise nature and impact of such barriers on different actors has so far been largely overlooked. Our study of two drought-prone communities in rural Ethiopia sets out to examine how female and male-headed households adapt to climate change, particularly focusing on how a variety of barriers influence the choice and impact of adaptation measures to varying extents. To this purpose we built a conceptual framework based on the Sustainable Livelihood Approach. Data was collected using semi-structured interviews and focus group discussions with male- and female-headed households, community leaders and local extension workers. Our findings suggest that gender-based differences in the choice and impact of adaptation measures at the household level are driven by cultural, social, financial and institutional barriers. Barriers to adaptation – particularly when interacting– have a differentiated impact upon different actors. This outcome hints at the need for donors and policy-makers to develop intervention strategies that are sensitive to this fact.

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### **Exploring Gender, Climate Change Vulnerability and Adaptive Capacity through an Intersectionality Lens**

Derkyi, M<sup>1, 2</sup>, Adiku, S<sup>3</sup>, Akwen, N<sup>4</sup>, Dovie, D.B.<sup>4</sup>, Codjoe, S<sup>4</sup>, Nelson, V<sup>5</sup> and E. Awuah<sup>6</sup>



Climate change and variability have significant implication for food security and sustainable forest management especially in developing countries'. In most rural settings, the roles and responsibilities of gender are socially and culturally ascribed and these determine how each category experiences and responds to climate change/variability. However, disaggregated data by gender and more specifically its intersection with other social groups like class, age and wealth in Ghana are scarce. Most studies tend to focus on single variable such as gender thus projecting it as binary. Such focus obscures the fact that gender takes meaning from its intersections with other identities. It is against this gap in knowledge that this paper explores how intersectionality framework had been used to interrogate and understand human differences in a social problem like climate change and variability. Results indicate that from intersectionality lens people's lives are multi-dimensional and complex thus shaped by different factors and social dynamics operating together. Secondly, it is observed that comparisons of men vs. women are not adequate for understanding who is impacted by climate change and how, instead gender, age, ethnicity, marital status and life stage affect levels of vulnerability and adaptive capacity. Furthermore, it is observed that intersectionality leads to multi-level analysis of intersecting factors, processes and structures impacting climate but its principles lead to questions regarding how climate change problems are framed and understood. The paper concludes that the synergy between gender and climate change could be explicitly understood for informed policy intervention through intersectionality lens.

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### **Does Gender Influence the Uptake of Climate-Smart Agriculture? Experiences from Nyando, Kenya**

*Catherine Mungai and Mary Nyasimi*

Adoption of climate-smart agricultural technologies and practices, supported by enabling frameworks and institutions is crucial to transforming African agriculture into a long-term and sustainable system. Studies have shown that gender relations determine the ways in which the changing climate is experienced by small holder farmers. Notably, not all women (nor all men) are the same in that they do not all have the same roles, levels of access to, and control over, resources or power in decision-making, since gender norms are also related to race, class, ethnicity, religion, and age. Participatory gender studies undertaken in Nyando reveal that there are differences in the uptake of climate-smart agricultural technologies and practices between different categories of men and women farmers. For instance, 64% of men and 57% of women reported to have made changes in their agricultural, livestock or livelihood practices in response to climate risks. Without the power to decide on family resources, married women's ability to manage risks for example, by diversifying crops and livestock, altering planting dates is limited. In terms of accessing weather forecasts and agro-advisory services 80% of men and 40% of women report having access to information on seasonal weather forecasts, inputs supplies and extension services. In order to enhance gender equity and climate change adaption efficiency in agriculture, policies, strategies and investment responses at local and national levels must meet the specific needs of different categories of women and men.



### **Comparative Analysis of Climate-Smart Agricultural Practices (CSA) Adoption by Crop Farmers in Semi-Arid Regions of West and East Africa: Evidence from Nigeria And Ethiopia**

*Anthony. O. Ojinimi*

The study identified two analogous African sites in semi-arid regions experiencing climate change so as to share their common experiences and document CSA practices adopted in these regions. It ascertained the perception of crop farmers on climate change risks in the areas and then described the CSAs adopted in both sites. GIS tool (CCAFs) was used in site selection. 120 crop farmers each were randomly selected from the two countries (i.e. total size of 240 farmers) in a stratified manner. Focus Group Discussion method, a set of structured questionnaire and interview schedule were used to collect the data. Data collected were analyzed using descriptive statistics and ranking techniques; analysis of variance and t test. While the most severe climate risks perceived by farmers were drought, market shocks/loss of revenue/poor price, late onset of rains crop and animal and erosion/leaching for Ethiopia, in Nigeria, they included drought increased temperature, late onset of rains reduced yield of crop and market shocks/loss of revenue/poor price. The two countries had similarities in the adoption of CSAs with the most common CSAs being crop rotation, agro-forestry, and adoption of water management techniques, terracing/bunding and contour cropping. In Nigerian farms, while changing of planting dates (76%), diversification of crops (71%) and planting of high resistant varieties (82%) were common CSAs adopted by the farmers, Ethiopian farmers did not adopt these on a high scale. It was recommended that farmers should be assisted to build capacities in applying more reliable CSAs such as use of drought tolerant seeds, improved water management techniques, and to have better access to early warning information on climate; irrigation facilities and finance by relevant institutions.

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### **Social Capital and Adoption of Climate Change Adaptation Strategies in Burkina Faso**

*Thomas Bindayaoba, YAMEOGO*

This study incorporated recently introduced behavioural economics concepts to examine factors that influence rural households' decisions to deal with climate change and climate variability in Burkina Faso, with a particular emphasis on the role of farmers' social capital in their decision. The study is based on a household survey conducted among randomly selected 450 households from three locations, sampled out through a multi-stage sampling procedure. Two approaches were used to identify factors influencing farmers' choice of adaptation alternatives, the number of adaptation practices used by farmers and the extent to which they are applied. In the first approach, we applied a Generalized Poisson Regression (GPR) to determine the effect of the different forms of social capital on the extent and intensity of adaptation measures taken by farmers to cope with climate change. In the second, we investigated the effect of social capital on farmers' choice of adaptation measures using a multivariate probit model. The analysis revealed that farmers already exposed to more weather variabilities were more likely to use extra adaptation strategies and to take action in a relatively big portion of the total farm size. Further, the effect of social capital depends on the type of indicator used and on the type of adaptation strategies necessary. Farmers' cognitive social capital were found to significantly and positively impact their



choice of Soil and water conservation techniques (SWCT), and techniques such as agroforestry, and irrigation. Structural social capital were positively associated with the adoption of new varieties and conservation tillage strategies and negatively associated with the use crop diversification strategy. The results also highlighted that socio-economic, institutional and agro-ecological variables determine the farmers' decisions to adapt to climate change.

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**Smallholder Farmers' On-Farm Adaptation to Climate Variability in the Bosomtwe District of Ghana**

*Divine Odame Appiah and Sampson Yamba*

In the Bosomtwe District of the Ashanti region, incomes from subsistent agriculture constitute a significant proportion of the overall household income. In the midst of climate variability and climate change, this livelihood option is threatened. This study assessed the various adaptation strategies employed by smallholder farmers, to obviate the effect of climate variability in the District. Using a triangulation of quantitative and qualitative approaches, 152 farmer respondents were purposively sampled using the snow-balling method selected from 12 communities. The quantitative data gathered were subjected to the tools of regression analysis, contingency tables, frequencies and tests of association, embedded in the Statistical Package for Social Sciences (SPSS) v.17. A multiple regression analysis performed on the factors influencing farmers' on-farm adaptations indicated that age, crop type, income, observed changes in rainfall intensity and positive and significant at  $p < 0.05$ . The results further revealed, farmers in the district have been practicing on-farm adaptation strategies such as intensification of land use. Other appropriate adaptation strategies are needed to make smallholder farming sustainable in the district. This study concludes that specific government policies and programs need to be initiated by the Ministry of Food and Agriculture in order to enhance the capacity of smallholder farmers to respond to climate change.

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**Traditional Knowledge Systems and Innovations towards Small holders' resilience to Climate change**

*Roxventa A. Othim*

Traditional knowledge, innovations, and practices (often referred together as 'traditional knowledge') are developed and nurtured over many generations. They are underpinned by spiritual beliefs and customary laws that reinforce communities' identities, cultures, and ways of life. They enable communities to live within the natural limits of specific territories, areas, or resources upon which they depend for livelihoods and wellbeing. They are also integral to Indigenous languages, spiritual beliefs, and culturally appropriate education, health, and nutrition. Traditional knowledge is vital for sustainability of natural resources including forests, water, and agro ecosystems across landscape continuum spanning from households through farms, village, commons and wilderness. Indigenous knowledge, particularly in the African context, has long been ignored and maligned by outsiders. Today, however, a growing number of African governments and international development agencies are recognizing that local-level knowledge and organizations provide the foundation for participatory approaches to development that are both cost-effective and sustainable. The aim



of the study was to identify and disseminate traditional knowledge based practices and innovations that enhance food productivity, including traditional crop varieties with important traits such as drought and pest resistance, traditional farming practices and climate change response strategies and understanding the conditions and processes fostering vibrant and resilient innovation systems. The survey covered Giriama, Chonyi, Rabai and Digo sub-tribes which form part of the wider Mijikenda community. Literature review, Focus group discussions (FGDs), and key informant interviews were used to collect data. Preliminary results show that, the main effects of climate change highlighted included reduced food production due to reduced rainfall, high incidences of pests and diseases for crops and livestock, reduced soil fertility, extreme weather and reduction of sea level which has resulted in a decline in fish population and even loss of some fish species. However, the communities have come up with several adaptations and innovations in response to these climate change effects.

**DAY 3** **SESSION 10: Climate Vulnerability Assessments and Development (Part I)**

**Climate change impacts, vulnerability and adaptation strategies in the Niger Delta Region of Nigeria**

*Odjugo, P. A. O. and Emeritus Onokerorhaye A. G.*

The Niger Delta Region of Nigeria is a complex, low lying and fragile ecosystem which is vulnerable to the impacts of climate change. Available literature in the Niger Delta region show that the understanding of vulnerability to climate change and the strategies and pathways for adaptation are currently enveloped in high uncertainties because of inadequate information and data. It is on this premise that this study investigated climate change impacts, vulnerability and adaptation strategies in the Niger Delta Region of Nigeria with emphasis on Delta State. Climatic data (rainfall and temperature) for 64 years (1951-2014) were collected from the Nigerian Meteorological Agency, Lagos, Nigeria. 7000 copies of a questionnaire were administered in seven Local Government Areas in the three ecological zones. Cartographic methods, percentages and Analysis of Variance (ANOVA) were some statistical techniques employed in analysing the data. The results show that coastal erosion, increasing temperature, flooding due to increasing rainfall amount, intensity and sea level rise, inundation of farmland, fish ponds, other coastal investments, settlements and migration are some key impacts of climate change in the Niger Delta region. The mangrove and fresh water swamp forest ecosystems, the poor, women, young and the aged are the most vulnerable to climate change impacts. Only autonomous adaptation measures were noticed and some include; raising the Down Protection Centre (DPC) of buildings, sand filling, use of sandbags as barriers to prevent flooding, netting of fish ponds, planting on mound and ridges, dry season farming and agricultural diversification. For sustainable development, planned adaptation strategies like construction of shoreline barriers, availability of climate information, credit and loan facilities and relocation among others are recommended, while the Nigerian climate change policy should be signed into law and implemented.

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**The Socio-economic Impact of Climate Change Adaptation on Smallholder Farmers in Lawra District, Upper West Region, Ghana**

*Nana Yamoah Asafu-Adjaye and Joseph Amikuzuno*



Climate change is severe in sub-Saharan Africa where the agriculture is an important source of livelihood for a majority of rural populations. This implies that, as smallholder farmers strive to overcome poverty, climate change threatens to deepen their vulnerability and undermine their prospects for development. In this, the empirical evidence of the economic impacts of climate change in semi-arid Ghana, specifically in the Lawra District of the Upper West Region is presented. We use the trade-off analysis minimum data model to estimate the economic impacts of climate change on smallholder farmers. The focus is on three staple crops namely maize, groundnut and cowpea and the aim is to determine the impacts of climate change on poverty rates among smallholder farmers; examine the proportions of farms that would gain or lose from climate change with and without adaptation; and analyze the associated income effects for adopters and non-adopters of possible adaptation strategies under climate change using five key climate model scenarios. The findings reveal negative impacts of climate change on farmer's net revenue, per capita income and poverty rates without adaptation and with adaptation for mid-century. However, adaptation (irrigation) results shows that farms will have an increase in net revenue gains by as much as 10% to 17%, per capita income increases between 1% and 7% within upland farms but shows a decrease between 2% and 9% for lowland farms. Accordingly, poverty rates are shown to decline from 16% to 8% in the Lawra district across all farms households.

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### **Vulnerability Assessments of Climate Change Impacts on the Cameroon Coastal Communities: Mitigation and Adaptation**

*Charlotte Enjoh Fonocho*

Climate change impacts are felt in many regions across the world. Economic, social and political concerns as well as environmental factors inform perceptions and decision making to reduce climate risk and ensure livelihood security. This study was intended to determine the impacts of climate change, mitigation and adaptation on communities within the Cameroon coastal environment. The Cameroon coastal environment was divided into three zones, the Rio del Rey, Douala-Edea coastal environment and the Kribi-Campo coastline. Communities as well as individuals were interviewed and their responses were based on changes observed as well as from history. As per the discussions with individuals and focus groups, climate change impacts such as heavy rainfall led to increase water levels within estuaries, rivers, and creeks leading to increase overtopping stress at Suelaba, Youme, Bekumu, Meme village, Bakassi area and Campo beach resulting in inundation in 2010 and 2011. This coupled with poor sanitary conditions enhanced the proliferation of water diseases such as cholera, malaria, and typhoid. Coastal erosion has lead to the disappearance of areas such as the Bota, the sahara island, and Kwekele village. Some of the communities surveyed are inundated yearly during the period of heavy rainfall (June – November). During the rainy season and during high tides, strong waves invade Youme II. Local adaptation measures include population displacement, the building of suspended houses, non felling of mangrove trees, planting of mangrove trees, the building of improved smoke houses, elevation of houses. Envisaged adaptation projects include facilitating the use of green stoves, diversifying youth activities (explore climate change opportunities) to reduce dependence on natural resources.

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**Location is not the Least Common Denominator: Different Vulnerabilities to Climate Change in Ghana's Volta Delta**

*Kwame Ntiri Owusu-Daaku*

River deltas often support large populations and have been identified as one of the "hotspots" of climate change. The challenge of attributing phenomenon such as flooding, sea-level rise (SLR), and out-migration to climate change is compounded when analysed in a complex environment such as the Volta River Delta (VRD) of Ghana. Often in such environments, a common belief is that physical location or geographical boundaries make up a large proportion of the explanatory power of the types of climate change impacts on people living in the area. However, an identification of the different vulnerabilities of people to climate variability and change reveals vulnerabilities that are distinct (exposure of the same population to different impacts) versus those that are differentiated (exposure of a population to the same impact but with different responses). This study compares the framings of climate change vulnerability (CCV) of the residents of two communities in the Ada Foah area of the VRD. The identification of different vulnerabilities revealed differences in vulnerability which were exposure-led (distinct) versus those that had to do with differences in sensitivity and adaptive capacity (differentiated). These distinct and differentiated vulnerabilities varied based on the community and/or livelihood system under focus demonstrating that vulnerability had more to do with location and/or exposure. Areas for further research include a re-assessment of the different vulnerabilities to reveal other factors beyond location and/or exposure that influence climate change vulnerability. The identification of different vulnerabilities is one of the many ways through which we can begin to gain an intimate understanding of the impacts of climate change on livelihoods. Such understandings will better inform future adaptation options to climate and global changes more broadly.

**DAY  
3**

**SESSION 11: Climate Vulnerability Assessments and Development (Part II)**

**Climate Change-Induced Migration and Adaptation to Climate Change in Oyo State, Nigeria: Is the Cup Half Empty or Half Full?**

*Ayodeji O.Ojo<sup>1</sup> and Isaac B. Oluwatayo<sup>2</sup>*

The study investigated the effects of climate change-induced migration on adaptation choices of yam-based farmers in Oyo state. In addition the socioeconomic characteristics influencing the choice of adaptation strategy of the respondents were analyzed. Descriptive statistics, Multinomial Logistic Regression (MNL) and likert scale were used to analyze relevant data. The result of the analysis shows that 34.4 percent of the surveyed households have members who migrated due to climate change effects. This has made the farmers to consider diversifying their income, intensify search for labourers, and adopt use of agrochemicals among others. Moreover, the results of the MNL analysis reveals that age, marital status, education, farm experience, household size, primary occupation, mode of farm acquisition, access to credit and access to extension services were the factors influencing adaptation choices of the respondents. The adaptation methods adopted by the farmers include mulching, change in planting dates, and use of agrochemicals among others. It is recommended that provision of improved inputs and infrastructure necessary for agricultural development by Government and international donor agencies should be prioritized and participation of farmers in cooperatives to ease access to credit need to be



encouraged.

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### **Impact of Sea Surface Temperature on West African Rainfall: Case Study of Coastal Zone Of Ghana**

*Michael Baidu*

The impact of Sea Surface Temperature (SST) on Rainfall at the selected coastal areas in Ghana was analyzed using regression and wavelet analysis. Monthly Rainfall and Sea Surface Temperature (SST) data between the periods of 1990 to 2010 was used for this study. A linear regression analysis was first performed to determine the existence of a linear relationship between the two data sets. Different lag correlation analysis was then performed on the data to determine the lag period that gives the best correlation between SST and Rainfall. It was realized that a lag period of one month gives the best correlation coefficient. A wavelet analysis was also done on the data to determine the variability in the dataset. The results from the linear regression analysis and the wavelet analysis indicate that SST is significant in predicting the Rainfall of the selected coastal zones.

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### **Climate Change Impacts on *Faidherbia albida* (Del.) A. Chev. Distribution and Implications for the Species Conservation in Dry Lands in East Africa**

*Florent Anguilles Noulekoun*

Best climate change adaptation and mitigation strategies to lessen the impact of climate change on species distribution have been recently achieved through the use of species distribution modelling approach. However, the extent to which climate change can alter species ecological habitat and its implication for species conservation have not been well unravelled for useful, drought-avoiding species like *Faidherbia albida*. This study assessed climate change impact on *F. albida* distribution in Northern Ethiopia. Species records were collected all across potential habitats where the species occurs. Current climate data alongside two future emission scenarios (Representative Concentration Pathways 2.6 and 8.5) for two time slices (2050 and 2070) were used to model current and future distributions of the species using Maximum Entropy (Maxent) algorithm. Temperature was the major abiotic factor that determines the potential distribution of the species. Its most suitable temperature conditions ranged from 17°C to 27°C. Suitable habitat for *F. albida* under the current climatic conditions was mid-highland. Future projections revealed that temperature increase will result in the diminution of the species suitable habitats. New potential suitable habitats for future occurrence of *F. albida* depicted much greater size for all scenarios, pointing out the possible promotion of the species to build resilience for the agroecosystem and adapt to climate change. It is therefore recommended that better conservation strategies for the species encompassing both in-situ and ex-situ options are developed and directed towards the new potential and low impact sites to ensure the long term survival of the species under changing climate.

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### **Climate Change Perception and Utilization of Risk Mitigating Forecasts among Farming Households in East and West Africa**

*Abayomi Samuel Oyekale,*





Provision of timely climatic forecasts is now an essential adaptation initiative in many African countries. This study analyzed perception on climatic changes and access/utilization of farm related forecasts. Data were collected from 1338 farmers and analyzed using descriptive statistics and Probit regression. The results showed that climatic changes in the form of droughts and rainfall instability were perceived by farmers across African countries with 35.19% in East Africa and 29.47% in West Africa reporting late commencement of rainfall. Farmers also had access to climate forecasts on pest and diseases (PD) in East Africa (48.35%) and West Africa (29.18%). However, accesses to forecast on start of rainfall (SR) were 62.66% and 56.37% in East and West Africa, respectively. Probabilities of having access to forecasts on PD significantly decreased ( $p < 0.05$ ) among farmers that perceived less overall rainfall, while it increased with rented degraded land, climatic shock exposure, receipt of assistance for climate shocks, access to business income, perception of more overall rainfall, low ground water and access to radio. Also, probabilities of having access to forecasts on SR significantly decreased ( $p < 0.05$ ) with household size, but increased with climatic shocks exposure (0.1552), access to climatic shock assistance, primary education, secondary education, tertiary education, farm employment income, wage income, business income, remittance income, income from projects/government, perception of more erratic rainfall, low ground water and access to radio. It was recommended that promotion of informal education among illiterate farmers would assist in access and utilization of climate forecasts, among others.

**DAY  
3**

## **SESSION 12: Climate Smart Agriculture and Indigenous Knowledge Systems (Part II)**

### **Livestock Keepers' Experiences of Climate Hazards and their Adaption Responses in Diverse Agro-ecosystems of Kenya** *Bockline Omedo Bebe*

Focus Group Discussions (FGD) were conducted with livestock farmers to analyze their experiences about exposure to climate hazards and corresponding adaption responses in five sites representing diverse agro-ecosystems with varying severity of climate hazards in Kenya. From farmers' experiences, the most felt climate hazards that had impacted on livestock were drought and disease outbreaks, but the impact had been lower on the indigenous cattle, ducks, turkeys and donkeys. Drought occurrence was considered to impact on bees but disease outbreaks had not had a noticeable impact on bees. Frequent response to climate hazards were purchase of feeds and water, selling off some animals to reduce pressure on scarce feed and water, and using both preventive and curative veterinary intervention against disease outbreaks. In addition to own efforts, farmers received external support from public institutions providing feeds, water, and vaccination and purchasing animals while support from the NGOs were directed to capacity building and provision of breeding stock. The private sector provided credit facility to entrepreneurs to purchase animals during droughts. These farmers' experiences reflect differences in localized impacts of climate change, for which adaptation responses are already occurring, using both low regret and no regret adaptation options advanced by communities' own efforts and external support providers. This has policy pointers that enabling farming community adapts to the risks of drought and disease outbreaks will require strengthening delivery of seasonal weather forecasts and increased investment in water harvesting and veterinary surveillance and diagnostic capacities to increase preparedness.



### **Farmers Perceptions of Climate Change and Coping Strategies in Selected Sites in Kenya**

*Wanjiku Chiuri<sup>1</sup>, Francis Lelo<sup>2</sup>, Margaret Ngigi<sup>3</sup>, Nancy Munga<sup>4</sup>, Samuel Kabuitu<sup>5</sup> and O. Bebe<sup>6</sup>, Susan Kamuru<sup>7</sup>*

Information on climate change is often from the scientists. The people most affected do not often have voice or agency on climate change, and how they are coping with or adapting to these changes. Are government institutions and development agencies involved in climate change issues ready and/or willing to start with what the farmers' know? This paper summarises results of a three year project entitled Building Adaptation Capacities for Climate Change in Kenya through Participatory Research, Training and Outreach Actions (CAPro). The project used participant observation, focus group interviews and household surveys to establish farmers' and pastoralists' perception on climate change and the coping and adaption strategies they were applying to identify the most successful strategies depending on the ecosystem and the technologies that are most appropriate and easily adoptable. Researchers found that in Kenya, farmers have developed coping and adapting strategies such as Zai pits at the Coast, planting early in Rift Valley and reverting back to traditional crops in other areas. These adaptation and coping strategies are grounded in experience, local knowledge, skills and resources. From five selected sites in Kenya, this paper depicts farmers' and pastoralists' awareness and perceptions of climate variability change and the types of adjustments they have made in response to these change. Being a participatory project, the team explored improvement on what farmers had already, and through exchange visits, introduced other technologies that were working elsewhere. Farming as a business was stressed throughout the project.

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### **ICT adoption in the wildlife sector: Implications for climate change adaptation and disaster risk reduction in Africa**

*Bartholomew Ituma Aleke, CVF Kupika Olga L., Godwell Nhamo*

This paper acknowledges the rich biodiversity in Africa and present socio-economic and technical sets of values surrounding ICT innovation adoption with special emphasis on smart communication technologies in the African wildlife sector. Climate change and extreme weather events such as flood, drought, cyclones and wildfire is orchestrating disasters and also devastating biodiversity. Deforestation on the other hand is equally impacting negatively on carbon sink thereby increasing CO<sub>2</sub> and greenhouse gas (GHG) emission. The focus is on identifying the implications of adopting ICT innovation towards climate change adaptation and disaster risk reduction in the wildlife sector. A reflection on the success and failure of indigenous knowledge systems, managerial practices and communication patterns (face-to-face and radio messages-reactive approach) among the stakeholders is presented. This is compare matched with the opportunities derivable from adopting any of the ICT innovation components. Finally, future scenarios are presented where socio-technical principles of adopting ICT innovation might enable building of environmental database for carbon disclosure, efficacy of communication and community engagement, thereby triggering rapid responses to climate change impacts and disaster risk reduction in the African wildlife sector.



**DAY**  
**3**

**SESSION 13: Climate Finance, Fundraising and Investment**

**Analysis of Sectoral Vulnerability and Trends of National Budget Allocation and disbursement to Climate Change Risk Management in Ghana**

*Assaah Muhammed*

The reality of Climate change is in no doubt affecting various sectors of global, regional and national development. To this effect, individual member countries of the United Nations Convention on climate Change (UNFCCC) are taking various climate change initiatives in compliance with commitments under the convention. Ghana has therefore put in place a National Climate Change Policy and a National Climate Change Adaptation Strategy to address the risks associated with climate change. However, policies and strategies in themselves do not guarantee implementation unless there are supported by annual national budgets. This paper has therefore conducted a comparative analysis of the 2013, 2014 and 2015 national budget statements from climate change perspective with a view of demonstrating the progressiveness and sensitivity of the budget statements to climate change risks management. The analysis was limited to budget allocations to the Ministries of Agriculture, Environment, Finance, Water, Lands and Natural Resources, Health, Roads and Highways, Gender, Children and Social Protection. This paper is purely a desktop review of available literature, policies and 2013, 2014, 2015 national budget statements. Key findings are as follows: Generally, budgetary allocation for climate change and related activities is inadequate over the years. The Ministries, Departments and Agencies (MDAs) do not generally provide clear and deliberate climate change related activities and associated costs. The tendency to rebrand projects and measures as climate responsive but which otherwise were unintended is therefore high. Nominal figures and percentage share of estimates on climate change activities as revealed in the appropriations to the MDAs, is in a declining trend, except for the Ministry of interior. The paper concludes that having policies and programmes in place do not mean much until such policies are implemented through annual budgetary allocation, disbursement and implementation.

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**Environmental Perception and Willingness to Accept Carbon Trade on Agro forestry Land: A Case of Zongi Community, Tigray, Ethiopia.**

*Stella Nwawulu Chiemela*

The study attempts to determine the economic value of carbon in Zongi by eliciting households' willingness to accept (WTA) using contingent valuation method (CVM) in the form of double bounded closed ended WTA questions. The study also assessed the probability of respondents' participation in a carbon trade programme. The survey was conducted using 138 randomly selected respondents. Tree planting was used as a discriminating factor to predict the environmental perception of respondents. The willingness to accept carbon trade compensation on cultivated land and bush land varied between 3417-4085birr (61506 - 73530USD) and 948-1251birr (17064 - 22518USD) at 95% confidence interval respectively. The result confirmed that tree planting can show discriminant validity in the prediction of environmental perception and some socioeconomic factors showed to be determinants of respondents' willingness to accept compensation. This study empirically proved that households' private land size, income, proximity to bush land, trees on farmlands are the key determinants of



acceptance of carbon trade. Therefore, significant socio-economic variables should be considered while designing carbon trade related projects at household level.

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### **Climate finance in Ghana: trends and progress in climate-related investments**

*Ama Pokua Fenny*

Climate adaptation and mitigation comes at a cost which may stretch the resources available in developing countries for national development. It is estimated that developing countries may need up to \$500 billion per year by 2050 for climate adaptation alone. In this regard, there have been many critical questions such as how the funds should be channelled so that they reach those most in need, and how to ensure that the funds are used most effectively. In Ghana, climate change is already having an enormous impact, spreading across all sectors of the Ghanaian economy, agriculture, water, energy and health. However, securing a sustainable, climate-resilient future will require significant financial investment. The study aims to track and report external financial flows that support climate change mitigation and adaptation in Ghana using data from the OECD DAC External Development Finance Statistics. The results show that the total from both bilateral and multilateral climate-related development finance flows reached USD 77 million in 2013 of which 60% was for adaptation. Given that adaptation funds have often targeted poor and vulnerable countries, particularly in sub-Saharan Africa and South Asia this is not surprising. Indeed, both regions are highly vulnerable to climate change, including disasters associated with climate extremes. Further analysis, show that agriculture, forestry, fishing and rural development sector accounts for 47% of total funds, water and sanitation sector (12%), energy generation and supply (3%) with the transport and storage sector receiving no funds. Providing a comprehensive picture of the climate finance landscape in Ghana is important as it counts as a first step to ensuring the effective and productive use of available financial resources.

## **POSTER ABSTRACTS**

### **Perceived Effect of Climate Change on Vegetable Farmers Livelihood In Ogun-State, Nigeria**

*Nathaniel Siji Sangotegbe*

University of Ibadan, Ibadan, Nigeria

There has been a declining trend in level of vegetable production in Ogun state Nigeria over the recent years, and this can be attributed to climate change. However, information on the perceived effects of climate change on the livelihood of producers is lacking. The study therefore assessed the perceived effect of climate change on the livelihood of vegetable farmers in Ogun State, Nigeria. Multi-stage sampling technique was used in selecting 132 vegetable farmers. Data were analyzed using frequencies, percentage, Chi-square and Pearson Product Moment Correlation (PPMC). Average age was  $47.1 \pm 14$ , over half (56.1%) were males, 87.1% were married, with an average of 6 persons per household. Major vegetables cultivated were corchorus olitorus, Celosia argentea, Abelmoschus esculentus and Talinum triangulare, as 59.2% had engaged in production for more than 10 years. Radio (Mean = 1.18) and friends (Mean = 1.17) were the most frequently used sources of information on climate change. They were aware also aware of longer dry season, low rainfall, delayed onset of rainfall and severe flooding. There was low level of knowledge on effect of climate change



on vegetable production, while 50.8% of respondent perceived effect of climate change on their livelihood to be high. The study recommends that information disseminators should go beyond sensitization and awareness on climate change, but should educate citizen and farmers on its effects, so as to inform appropriate adaptation strategies of vegetable farmers in the state.

### **Climate Change Perceptions and Adaptation Practices among Rural Communities in the Nigerian Savanna**

*Felix Olorunfemi<sup>1\*</sup>, Mayowa Fasona<sup>2</sup>, Grace Olouko<sup>3</sup>, Peter Elias<sup>2</sup>, Vide Adedayo<sup>2</sup>*

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Climate change is widely predicted to severely impact natural resource-dependent countries with low adaptive capacity. Like the rest of semi-arid and arid areas of Africa, livelihood in most rural communities in Nigeria is almost completely tied to the natural resource systems. Without appropriate responses, climate change is likely to undermine national development efforts and exacerbate poverty in these rural communities. The wooded savanna is a densely settled zone in Nigeria with agrarian population that relies on small-holder rainfed agriculture. Livelihood is substantially tied to the terrestrial ecosystem and rainfall determines the rhythm of life. The climate is highly variable and responds to local land surface processes including interaction with terrain and vegetation. Future climate projections suggest that the wooded savanna will become drier. This will have severe impact on land and water that presently support food production and rural livelihoods. This study examines the perception of climate change and how the rural communities are adapting to these changes in Nigerian wooded savanna. It combines focus group discussions, key informants interviews and household survey in 11 communities across 10 local councils with vegetal surveys and remote sensing analysis of the land-use/land-cover. Results revealed that perception of communities is consistent with profile from recorded temperature data and substantially consistent with rainfall signals which affects growing periods. Crop switch is the most common form of adaptation to climate change being practiced, but a significant percent do not have any adaptation option. Building partnership that involves community-participation or substantially community-driven is important to sustainable natural resource management and climate change adaptation in the wooded savanna.

### **Climate Variation and Challenges of Human's Health in Nigeria: Malaria in Perspective**

*Vicent Nduka Ojeh*

The patterns of general circulation of the atmosphere which determines the characteristics of global and regional climate variations will be different from what it is currently. Current global warming may lead to significant change in global and regional climate related health challenges on humans. The main purpose of this work is to investigate the potential impact of climatic variations in relation to human health with Malaria in perspective. Mapping of Malaria, its breeding as it relates malaria sickness in human health and factors of climatic variation were done. The climatic parameter that was used includes the average temperature, rainfall amounts, and health indexes of the study area. We investigated the factors responsible for increases or decreases in human's health in relation to climate variations. Six years climate data and in and out patient malaria records from hospitals across six geo-political zones were used and analyzed with bivariate correlation, multiple correlation and regression analyses using the SPSS. The climate variables used in the bivariate correlation analyses include annual and seasonal totals and monthly rainfall in Nigeria. Preliminary result shows that there is a strong relationship between climate variation and challenges in human's health of Malaria diseases in Nigeria with seasonal cycles.

## CCPOP-GHANA 2012/2013/2014 CONFERENCES IN PICTURES



**TOP LEFT:** The Brazilian Ambassador to Ghana Madam Vida Gala exchanges pleasantries with the Vice Chancellor of the University of Ghana & other dignitaries in 2012. **TOP RIGHT:** Ms Joyce Aryeh, a Politician, Industrialist & Entrepreneur delivering a Plenary Address in 2012.



**MIDDLE LEFT:** In 2013, Four Members of the Parliament of Uganda (front row) led by Hon. John Bagoole (extreme right) listen to a parallel session presentation with rapt attention. **MIDDLE RIGHT:** Dr. Joe Oteng Adjei (right), Minister for Environment, Science, Technology & Innovation shares jokes with Prof Adomako-Ampofo, Chair of the Opening Ceremony in 2013..



**BOTTOM LEFT:** The Chief of Mission of the International Organization for Migration in Ghana (Left) engages Prof Audrey Gadzakpo and other dignitaries after delivering the Keynote Address at the 2014 conference. **BOTTOM RIGHT:** Posters & Exhibition were prominent in 2014.

