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Building Capacity around the world by strengthening National Meteorological Societies & Regional Meteorological Societies and creating Collaborations

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IFMS GLOBAL MEETING/CONFERENCE #7 - 2021

SESSION 4: December 8, 2021

GLOBAL WARMING & CLIMATE CHANGE (GW&CC)

IFMS has been created to unite all National Meteorological Societies of the world to achieve more than they could individually. It also assists in building Institutional and Societal Capacity

Introduction

Global Warming and Climate Change (**GW&CC**) are creating a lot of news around the world. It is a topic which not only interests the professionals in the field of meteorology but also general public, bureaucrats and politicians. Therefore, IFMS decided to include a full session on the issue of GW&CC in its IGM/C-07 being held in November and December 2021.

This Session will consist of 2 parts as follows.

Part 1: Public Lecture on Causes of Global Warming & Climate Change (**GW&CC**), its Remedies and how to cope with the effects of GW&CC. (40 to 45 minutes).

Part 2: Panel Discussion on topics discussed in Part 1 – 75 minutes.

We have a very strong panel to discuss the GW&CC and respond to the questions posed by participants in this Session.

Public Lecture on Global Warming and Climate Change

Dr. Harinder P. S. Ahluwalia is the President of the International Forum of Meteorological Societies (**IFMS**) which aims at creating collaboration between the National Meteorological Societies of the world to leverage each other's strengths. IFMS endeavors to create capacity around the world to handle adverse effects of Global Warming and Climate Change in all countries. Previously he was the President of the Canadian Meteorological and Oceanographic Society (**CMOS**). He is also the President and CEO of Info-Electronics Systems Inc. (**IES**) based in Montreal with an office in New Delhi. Incorporated in 1981, IES is a systems engineering, development and implementation company in Hydrometeorology, Remote Sensing and environment monitoring. Dr. Ahluwalia has been a member of the National Round Table on Environment and Economy advising the Government of Canada on Sustainable Development issues. He is a strong proponent of PPP model for weather business as well as cooperation between nations to achieve optimum results in this border-less issue - weather. He has won many awards for his outstanding contribution to Canada and hi-tech industry. He is a member of many societies and is a Fellow of CMOS. He has published a number of papers/articles in Meteorology and Electromagnetics.

Abstract:

There are two parts to the issue of Global Warming and Climate Change (GW&CC). The first part is to understand what is causing it and how we can reduce it. The second part is: knowing that it is happening and is intensifying over time, how we can protect our life and property from the natural disasters caused by GW&CC.

In the first part we will discuss:

a) What is GW&CC and what is causing it,
b) How we can reduce, if not eliminate, it,
c) What are the impacts of GW&CC on our health/life and property,
d) Where we can learn much more about it,

The Second part will deal with knowing that GW&CC is happening, how we can protect ourselves from its adverse effects. We will discuss the following topics:

a) What is required to protect ourselves e.g., accurate impact-based weather forecasting, Multi-Hazard Early Warning Systems, building Institutional and Societal Capacity, etc.
b) We will also discuss what is IFMS doing in Capacity Building in the above areas.

More ideas will be exchanged in subsequent Panel discussion in which the experts will provide their views and through Q&A clarify doubts of participants.

Moderator

Dr. Mike Farrar is the director of the National Centers for Environmental Prediction (NCEP). NCEP delivers national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to help save lives and protect property. As director, Mike oversees the planning, science and technology, and operational responsibilities related to NCEP's nine national centers.

In his previous roles, Mike served as the Chief Scientist for weather operations for the U.S. Air Force (USAF), senior VP and chief operating officer of the University Corporation of Atmospheric Research (UCAR), director of the Environmental Modeling (EMC) and the Meteorological Development Laboratory (MDL) in NWS, and VP of strategic and business development for Science and Technology Corporation. He began his career as a uniformed USAF meteorologist where he served for 24 years in several leadership positions in forecast operations, scientific development, program management, training, budgeting, planning/policy, and collaboration with U.S. and international partners.

Mike holds a B.S. in physics from Purdue University, a B.S. in meteorology from The Pennsylvania State University, an M.A. in national resource strategy from the Eisenhower School of the National Defense University, and M.S. and Ph.D. degrees in meteorology from Florida State University.

Opening Remarks of Dr. Mike Farrar

Session #4 on Global Warming and Climate Change will first provide a brief summary of climate change with a focus on the evolution of the science and policy options over the last few decades and where we find ourselves in 2021. Now that the vast majority of the world's nations acknowledge the role of humans in climate change and note that it is already happening, the panel will cover the logical responses to climate change, which fall in 3 basic areas: (1) *Mitigation* -- actions we can take to reduce the flow of greenhouse gases into the atmosphere, and thereby lessen the severity of global warming in the long term; (2) *Adaptation* -- actions we can take to

adapt, or better live with, the current and future state of the planet that has higher temperatures and sea level; and (3) *Intervention* -- actions we may consider taking to directly change the Earth's energy balance to reduce the impact of greenhouse-caused global warming. After that introduction, each panelist will provide their perspective on how their current and past professional roles relate to climate change and its impacts, how climate change has impacted their country or region and what their biggest concerns are for the future, and finally what gives them hope for improving the situation for their region and the world at large.

Panelists

1. **DI** is the Director General of India Meteorology Department (**IMD**).

Dr. Mohapatra joined IMD in 1992 and was working in Odisha when the Super Cyclone of 1999 struck the coast killing more than 15,000 people.

Mohapatra is affectionately known as 'cyclone man of India' for having accurately predicted the path of ferocious cyclonic storms many times.

The scientist has received many national and international awards including the Young Scientist Award of Ministry of Earth Sciences and Achievers Award from the IMD for his research and service in the field of atmospheric sciences.

The IMD is responsible for weather and climate-related forecasts for the country. It is also mandated to warn against severe weather phenomenon like cyclones, dust storms, heavy rain and snow, cold and heat waves, among others.

Opening Remarks of Dr. Mrutyunjay Mohapatra

2. **Prof. Tsegaye Tadesse** is a research professor of applied climate and remote sensing in the School of Natural Resources (SNR), University of Nebraska-Lincoln. He is also a Geospatial coordinator of the National Drought Mitigation Center (NDMC). Professor Tadesse's experience and primary research interests are centered on modeling climate, remote sensing, and environmental data using geospatial and data mining techniques to monitor and predict hydro-climatic extremes (e.g., drought and flood) in support of risk management in agricultural, natural resources, and food security applications. These interests stem from the fact that integration of climate, satellite, and biophysical data such as land use/land cover better characterizes climate-vegetation and human-environment interactions, as well as natural processes such as hydrologic cycles. The opportunity to work at the NDMC and participate in various research projects in the Geospatial technology (GIScience) program area of the NDMC has allowed Professor Tadesse to develop an active and diverse climate and water resources research and outreach programs, particularly in the areas of drought monitoring, climate variability and change, food security, and vegetation phenology. Professor Tadesse has established strong research collaborations with several federal agencies (e.g., NASA, NOAA, USDA, and USGS) and international institutions such as the Food and Agriculture Organization (FAO) and reginal centers such as the IGAD Climate Prediction and Applications Centre (ICPAC).

Opening Remarks of Prof. Tsegaye Tadesse

The recurrent droughts in Africa, exacerbated by climate change, created a need for more effective drought planning and the development and implementation of appropriate mitigation strategies. The integration of a drought risk management approach into the national policies would allow long-term development intervention measures to be adapted to the changing climate. New measures that allow anticipating and coping with drought by focusing on long-term drought resilience in addition to short-term response are needed to keep up with the evolving climate conditions. Strategically, Africa needs to ensure food security for an ever-increasing population while reducing its drought vulnerability and protecting the environment. African countries should also strengthen their efforts to tackle the crosscutting and multidisciplinary global challenges that include climate change, energy, food, agriculture and nutrition, global health and water.

3. **Dr. Ladislaus Chang'a** is a Principal Meteorologist and the Director of Research and Applied Meteorology at Tanzania Meteorological Authority. He has been working in the area of climate and Meteorology since 1995. He has contributed in establishing TMA Research Journal and TMA Statement on the status of Tanzania climate, a publication that is issued on annual basis.

He is the IPCC Focal Point for Tanzania and a Secretary of Tanzania Meteorological Society.

Dr. Chang'a also serve as Part-time Lecturer at the University of Dar Es Salaam, teaching Climatology, Climate Monitoring and Prediction for BSc students, and the Science of Climate Change for MSc students. He is actively involved in supervision and mentoring of MSc and PhD students.

Dr. Chang'a actively participate in the Conference of Parties of the United Nation Framework Convention on Climate Change (UNFCCC) and in the implementation of the IPCC activities in Tanzania.

Opening Remarks of Dr. Ladislaus Chang'a

Evidences and Impacts of Climate Change in Tanzania are increasingly manifested through documented increase in frequency and intensity of extreme events including strong wind, heavy rainfall, hailstorm, higher temperatures, droughts and floods, and devastating socio-economic and ecological impacts including loss of life and properties caused by these extremes. Between 1981 and 2020 several incidences of droughts, floods and record-breaking rainfall have been observed in many parts of the country. Most of these extreme weather events including record breaking rainfall have been observed in the past five years (2015, 2016, 2017, 2018 and 2019), which is consistent with global warming patterns and trends as documented in very recent publications (Chang'a et.al., 2019, 2020). The nights are getting warmer than the days across much of Tanzania and this is consistent with the observed global warming patterns (IPCC, 2018, 2019, 2020, 2021). In Tanzania, each of the last four decades have been successively warmer than any preceding decades since 1961, while at a global scale each of the last four decades have been successively warmer than any preceding decades since 1850 (WGI report, 2021). The averaged global warming levels was around 1.20C in 2020 and is currently around 1.20C above pre-industrial. In Tanzania warming levels was 0.80C in 2019 and has been 0.6^0C in 2020. Unfortunately, warming is increasing year after year consistent with the increasing GHG emission.

The IPCC Special Report on Global warming on 1.50C indicates that if we continue with business-as-usual scenario, a global warming of 1.50C will be reached by 2030. Under this warming level, Coral Reefs are projected to decline by 70 to 90%. Urgent, Significant and Effective Adaptation ACTIONS

and SUPPORTS, particularly for developing countries are required, and ambitious mitigations actions are also required to serve humanity and the Planet.

4. **Dr. Joseph Romanus Mukabana** is a Senior Scientific Officer, Capacity Development and Research at World Meteorological Organization (WMO) Regional Office for Africa, Addis Ababa, Ethiopia

As Senior Scientific Officer (SSO) (2019 to date) Dr Mukabana is responsible for collaboration with technical departments at the WMO Secretariat to build the capacity in Numerical Prediction (NWP) in Africa and enhance the access and use of NWP outputs and climate products from Global Producing Centres (GPCs) and Regional NWP Centres by National Meteorological and Hydrological Services (NMHSs) in Developing and Least Developed Countries (LDCs) to improve forecast skills at the National level - and also facilitate enhanced delivery of real-time weather observations from NMHSs in Developing and LDCs to GPCs to improve the quality of global forecasts. Dr Mukabana is further responsible for outreach to Research Communities in Developing Countries and LDCs in Africa including the Climate Research for Development (CR4D) in Africa initiative, foundations in all fields of geosciences, as well as meteorology, climatology and atmospheric sciences, plus hydrology, oceanography, social and economic sciences to ensure full participation in the work of WMO and the Inter-governmental Panel on Climate Change (IPCC).

Dr Mukabana is former Director of the WMO Africa Office and Least Developed Countries and the African Ministerial Conference on Meteorology (AFLDC & AMCOMET) Secretariat (2014 – 2019), Director of the Kenya Meteorological Department (2000 – 2013) and Senior Lecturer at the University of Nairobi (UoN) Department of Meteorology (1985 – 2000) where he taught Dynamic Meteorology, Tropical Meteorology, NWP using Limited-Area Models (LAMs) and Quantitative Methods. He has knowledge in Regional Climate Modelling (RegCM), including Climate Change monitoring, detection and attribution.

He spent fourteen years at the UoN where he holds a Senior Lecturer position; he taught Dynamic Meteorology, General Circulation of the Atmosphere, Tropical Meteorology, Synoptic Meteorology, Micro-meteorology, Numerical Weather Prediction (NWP) and Quantitative Methods, among others. In November 1997, Dr Mukabana received the “Best Young Scientist” Award for his PhD research work titled, “Numerical Simulation of the Influence of the Large-scale Monsoonal Flow on the Diurnal Weather Patterns over Kenya”, during the fourth WMO Meteorological Technical Conference for Eastern and Southern Africa, in Kampala, Uganda.

Opening Remarks of Dr. Joseph Romanus Mukabana

Africa Union (AU) Climate Change Strategy recognizes that Africa is experiencing unprecedented times as evidence of warming over land regions and frequency and intensity of extreme events are increasing. The recent IPCC Special Report on Global Warming of 1.5^0 C indicates that climate impacts would hit hard Africa and Small Islands Developing States (SIDS) compared to the Developed World. The report further specifies that global warming of 1.5^0 C could result into reduction in crop yield, increased multiple risks, and could trigger greater proportion of people susceptible to poverty.

Over the past decade, frequencies and severity of natural disasters have increased across Africa and have caused major economic, environmental, and social losses with huge impacts on vulnerable and marginalized groups. Africa is also experiencing slow onset disasters with long-term impacts to economies and to the People. The projected impacts will significantly affect the Continent’s productive sectors, particularly water resources, agriculture, land, energy, health,

trade, tourism and the natural resource base, causing major economic, ecological and social impacts that can significantly undermine efforts to achieve the aspirations of AU Agenda 2063.

The Pan African Vision framed in the African Union (AU) Agenda 2063 is that of: 'An integrated, prosperous and peaceful Africa, driven by its citizens and representing a dynamic force in the global arena.' Attainment of this Vision is threatened by the impacts of climate change unless decisive efforts are made globally to adapt to and mitigate its effects. Although climate change has been the subject of much political controversy, the scientific evidence is overwhelming that 'warming of the climate system is unequivocal' (International Panel on Climate Change, 2013).

5. **Mr. Kung-Yueh Camyale Chao**, is the Executive Director of International Climate Development Institute (ICDI), Taiwan

Kung-Yueh Camyale Chao has been working in the public affairs fields for 20 years, and he is currently the Executive Director of International Climate Development Institute (ICDI). In addition, Camyale also served as the General Secretary of the International Forum of Meteorological Societies (IFMS) from January 2016 to September 2018, and has been elected as the Treasurer of IFMS since Sep 2019.

Camyale was involved in many international activities e.g., Future Collaboration in Future Earth, CSO Representative in EBRD etc. Prior to this position, Camyale served as the Deputy Director of APEC Research Center for Typhoon and Society (ACTS) for 4 years.

Camyale studied Ph.D. in Politics at the University of York in the UK, and also studied Ph.D. in Educational Policy and Management at the National Taipei University of Education. He was Lecturer in various Universities including Tamkang University, Taipei City University of Science and Technology, and teaching "Smart City Governance" course at Soochow University. Camyale is also a certified trainer of UNDRR.

Opening Remarks of Mr. Kung Camyale Chao

Camyale Chao will share his experiences for his participation in UNFCCC / COP meetings since 2009, and suggest to promote climate services with various partners. In addition, capacity building from community level, and mainstreaming the climate change in the society will be essential.