



ClimDev-Africa

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Theme:

Development First: Addressing Climate Change in Africa

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Final Report

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Abbreviations and Acronyms

ACCE	Africa Carbon Credit Exchange
ACMAD	African Centre of Meteorological Applications for Development
ACPC	African Climate Policy Centre
AfDB	African Development Bank
AGRHYMET	Centre Régional de Formation et d'Application en Agro météorologie et Hydrologie
AMESD	African Monitoring of the Environment for Sustainable Development
ATPS	African Technology Policy Studies
AUC	African Union Commission
CCDA	Climate Change and Development in Africa
CDM	Clean Development Mechanism
ClimDev	Climate for Development in Africa
COMESA	Common Market for Eastern and Southern Africa
COP	Conference of the Parties
CSC	Climate Services Centre
ECOWAS	Economic Community of West African States
GCOS	Global Climate Observation System
GDP	Gross Domestic Product
GFCS	Global Framework for Climate Services
ICPAC	IGAD Climate Prediction and Applications Centre
ICT	Information and Communication Technologies
IGAD	Intergovernmental Authority on Development
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land Use, Land Use Change and Forestry
NAMAs	Nationally Appropriate Mitigation Actions
NEPAD	New Partnership for Africa's Development
NMHS	National Meteorological and Hydrological Services
OSISA	Open Society Initiative for Southern Africa
PACJA	Pan African Climate Justice Alliance
RECs	Regional Economic Communities
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SADC	Southern African Development Community
SEA	Swedish Energy Agency
SIDS	Small Island Developing States
TERI	The Energy and Resources Institute
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

Foreword

The United Nations Economic Commission for Africa (UNECA) plays an important role in providing technical assistance to African countries to stimulate economic development. While the continent has made remarkable progress in recent years, the adverse impacts of climate change present a formidable threat that already limits the economic progress and the fight against poverty in many African nations.

Mitigating climate change risks requires the collaborative effort of policy makers, scientists, researchers and practitioners. These diverse stakeholders must together ensure that Africa identifies the most vulnerable sectors and builds its resilience through appropriate adaptation policies, strategies and investments. Indeed, instituting adequate adaptation measures has become the primary focus as African leaders work to minimize exposure to this menace. Fortunately, the continent is rich in low carbon development potential, which is effective for reducing greenhouse gas emissions.

The first Climate Change and Development in Africa (CCDA-I) Conference report highlights key areas that are critical for supporting the development of appropriate policies and investment towards building Africa's capacity to adapt to climate change. These include climate science, data and service delivery; climate resilient development and adaptation; low carbon development; and the economics and finance of climate change. The report is a result of joint efforts between the African Union Commission AUC, African Development Bank (AfDB) and UNECA.

CCDA-I had significant input into Africa's participation at the seventeenth Conference of the Parties (COP17) to the United Nations Framework Convention on Climate Change (UNFCCC) in Durban, South Africa, in December 2011. There, Africa spoke with one voice and presented the continent's priorities as the global discussion on climate change mitigation and adaptation ensued. We envisage that this report will further enrich and strengthen Africa's position at the upcoming United Nations Conference on Sustainable Development (Rio+20 Summit) in Rio de Janeiro, Brazil.

As UNECA moves forward in the implementation of the climate change agenda, it expects further consolidation of the recommendations emerging from CCDA-I. To this end, we will facilitate country specific policy recommendations and bankable projects that will directly address environmental and climate change risks and vulnerability. In this regard, Africa must be able to tap into the available international finances to support its adaptation programmes and effectively mobilize domestic resources. We accordingly call upon its development partners and other stakeholders to lend their support to these efforts.

Abdoulie Janneh

United Nations Under-Secretary-General and Executive Secretary of the

United Nations Economic Commission for Africa

Dedication to Prof. Wangari Maathai

The first Conference on Climate Change and Development in Africa (CCDA-I), which convened in Addis Ababa from 17 to 19 October 2011, was a significant concerted effort by Africa and its development partners to seek lasting solutions to one of the most formidable challenges of our time – the devastating impact of climate change on the global economy, and particularly in Africa.

Coming on the heels of the seventh Africa Development Forum (ADF-VII), CCDA-I was indeed the most important outcome of ADF-VII in that it marked another milestone in Africa's unwavering determination to confront the danger that threatens to erode all the development gains that the continent has made in the last two decades.

Whereas ADF-VII marked the first regional commitment to confront climate change head-on, CCDA-I was an opportunity to establish a basis for the development of climate resilient policies that would put Africa on a growth path that is both cost-effective and sustainable.

Sadly, one of the moving forces behind the success of ADF-VII and indeed the global awakening on climate change - Prof. Wangari Maathai could not attend CCDA-I. She died between the two conferences, on 25 September 2011.

It is, therefore, with humility and hope that we dedicate the report of CCDA-I to Prof. Wangari Maathai. We do so with humility because it would be difficult to pretend that the outcome of CCDA-I could adequately reflect the force of commitment and leadership that earned Prof. Wangari Maathai the prestigious Nobel Peace Prize in 2004 for her contributions to sustainable development. At the same time, we look to the future with hope because even as she is gone, she lives on through the many grassroots initiatives that she either led or founded.

In fact, the establishment of the African Climate Policy Centre (ACPC) by UNECA could, in a way, be attributed to some of the ideas and thinking that her movement helped to advocate in Africa.

CCDA-I was the first major activity of ACPC. By dedicating this first report of the annual conference to Prof. Maathai, we commit to ensuring that her work and the ideas she stood for shall endure, with the high sense of responsibility that it calls for. This entails conscious, determined and sustained effort to develop focused and implementable policies that can easily help African countries to adapt to, and mitigate the impact of climate change.

Executive Summary

As the impacts of climate change heighten across the globe, the need for solutions to increase the resilience abilities of whole sectors of economies, communities and households, especially in the African continent, is all the more urgent. Africa is the most vulnerable region to the impacts of climate change and climate variability – and as a result it needs to formulate appropriate policies to promote the resilience of its people. This requires that the three communities of research, policy and practice come on board in developing appropriate policies.

The first Conference on Climate Change and Development in Africa (CCDA-I) was organized under the auspices of the African Climate Policy Centre – the technical instrument of Climate for Development in Africa (ClimDev Africa) which is a joint initiative of the African Union Commission, UNECA and the African Development Bank, all of whom were involved in the organization of CCDA-I.

The overall objective was to establish a forum for dialogue, enhance awareness raising, and mobilize effective commitment and actions from policy makers, academics and practising stakeholders with the aim of effectively mainstreaming climate change concerns into development policies, strategies, programmes and practices in Africa. CCDA-I also aimed to strengthen Africa's position and participation in international climate change negotiations with a view to ensuring adequate reflection of the continent's concerns and priorities in a post-2012 international climate change regime.

At the end of CCDA-I, key knowledge gaps in major sectors relevant to Africa's development and the impact of climate change variability were identified. A high-level dialogue preceded the thematic discussions and was graced by global personalities from the policy, research and practice communities who highlighted the need for strong political leadership in climate change and the importance of a people-centred approach in adapting to climate change. A number of technical papers were presented on studies in the following sectors: water resources and management in Africa; energy resources and energy use efficiency; agricultural development and infrastructure in Africa. The studies reviewed the development context in the sectors and the challenges and opportunities that arise due to climate change and climate variability.

Designed under the theme "Development First: Addressing Climate Change in Africa", the conference ended with specific recommendations in each of the four key thematic areas. The key recommendations are highlighted below.

Climate science, data and information service delivery:

- Mainstreaming of climate change in the development policy, planning and practice of African governments.
- Building capacity for climate data collection, analysis and dissemination.
- Global institutions like the World Meteorological Organization urged to partner with and support the establishment of capacity in African governments and institutions.

Climate resilient development and adaptation:

- African Member States were called upon to scale up investment in water control and management to enhance development and protect livelihoods.
- African Member States were encouraged to identify and scale up all avenues for increasing agricultural productivity through integrated mechanisms such as water management, soil enrichment and enhanced fertilizer inputs, thereby increasing land-use efficiency as recommended by the New Partnership for Africa's Development (NEPAD), and to establish specific funding mechanisms for this purpose.
- African parties to UNFCCC are urged to consider hydropower development, covering various scales, as a clean development option and access financing for investment through the Clean Development Mechanism (CDM) of the Kyoto Protocol.

Climate resilient and low carbon development in Africa:

- African Member States, with the involvement of private and civil society organizations, are urged to develop strategies to advance low carbon development, taking into account the specific needs and context of African countries.
- African Member States and regional economic communities (RECs) are urged to strengthen regional cooperation in service provision in sectors such as energy and agriculture to enable countries to focus on areas of comparative advantage.
- African Member States are called upon to safeguard the rights and livelihoods of forest-dependent communities, guaranteeing indigenous peoples' forest access and livelihoods under the Reducing Emissions from Deforestation and Forest Degradation (REDD+) regime.

Economics and finance of climate change:

- African climate negotiators are urged to negotiate for a clear and internationally agreed baseline for new and additional finance with a view to enhancing transparency and building trust between developed and developing countries.
- Research institutions, including UNECA, ACPC and other centres of excellence, are urged to investigate and build evidence of the costs of adaptation and mitigation in Africa and to generate a range of estimates for those costs.
- African Member States are encouraged to develop portfolios of projects and programmes for investment that are in line with development plans and priorities.

Finally, the conference participants recognized the need to institutionalize gender aspects in climate change policies and emphasized the need for symbiotic actions by policy makers, academics, researchers, practitioners and development partners as they each try to tackle the effects of climate change in the different parts of Africa. Each CCDA conference clearly provides an opportunity for this, but between the meetings, mechanisms for expert engagement among themselves and with Governments and institutions are necessary.

Concluding Remarks

Outcome statement

The first Conference on Climate Change and Development in Africa (CCDA-I) ended on 19 October 2011 in Addis Ababa, Ethiopia, with an 18-point outcome statement (see next section on the recommendations statement of CCDA-I). The statement calls on the stakeholder community to be more concrete in action, each in their specific areas, against the impacts of climate change in Africa. The outcome statement urges Governments to adopt climate change policies that are informed by research results that are based on science. It also calls for more engagement of the media in coordinated and sustainable awareness campaigns on the causes, impacts and course of action needed to prepare African populations for the devastating effects of the phenomenon.

Closing the conference, the Deputy Executive Secretary of UNECA, Ms. Jennifer Kargbo, said she was delighted to observe that, although the conference had initially been planned for about 300 participants, over 700 people had actually attended the opening session. Ms. Kargbo also observed that throughout the plenary sessions and even at breakout sessions, participation had been sustained and dynamic. She said that it was pleasing to note that the recommendations of the conference addressed all the constituencies of stakeholders. The implication was that the recommendations could be immediately implemented. Ms. Kargbo said in conclusion:

This is important because, all too often, the need for a direct link between research, policy and practice has not often been adequately stressed. Working in tandem, these three categories of actors can better deliver on the promise we made to victims of climate change during the 2010 Africa Development Forum. We promised to henceforth make climate change one of the main defining factors of good governance and true leadership in Africa.

Recommendations Statement of CCDA-I

- The first conference on Climate Change and Development in Africa (CCDA-I) was held from 17 to 19 October 2011 at the United Nations Conference Centre in Addis Ababa. The conference was jointly organized by the Climate for Development in Africa (ClimDev Africa) partners including the African Union Commission (AUC), United Nations Economic Commission for Africa (UNECA) and the African Development Bank (AfDB), supported by the United Nations family and development partners. The meeting brought together some 500 participants from African member States, regional economic communities, river basin organizations, non-governmental organizations, the private sector, academia and development partners.
- The conference was opened by HE Mr. Hailemariam Dessalegn, Deputy Prime Minister and Minister of Foreign Affairs of the Federal Democratic Republic of Ethiopia. Opening statements were also delivered by Mr. Abdoulie Janneh, United Nations Under-Secretary-General and Executive Secretary of UNECA; Mr. Erastus Mwencha, Deputy Chair, AUC; and Dr. R.K. Pachauri, Director General of the Energy and Resources Institute (TERI) and Chair of the Intergovernmental Panel on Climate Change (IPCC). A statement was also read on behalf of the president of the African Development Bank by Dr. Abdirahman Beileh, Director, Agriculture and Agro-industry Department, AfDB.
- In his opening statement, Mr. Dessalegn called on African countries to integrate climate change adaptation into their respective national development plans. He emphasized that adaptation was the critical response to the impacts of climate change and highlighted the need to stabilize atmospheric concentrations of greenhouse gases. He ended by noting that the outcomes of the conference would be a significant input into the Durban COP17. Statements by other opening ceremony speakers also emphasized the importance of adaptation and mitigation, and underscored the need for concrete actions to achieve cuts in emissions to maintain global warming at its lowest possible level.
- The overall objective of the conference was to establish a forum for dialogue, enhance awareness-raising, and mobilize effective commitment and actions through bringing together policy makers, academicians and practising stakeholders with the aim of effectively integrating climate change concerns into development policies, strategies, programmes and practices in Africa. The CCDA-I conference also aimed to strengthen Africa's position and participation in international climate change negotiations with a view to ensuring adequate reflection of the continent's concerns and priorities in a post-2012 international climate change regime.
- The title and theme of the conference, "Development First: Addressing Climate Change in Africa", reflects the need to integrate development and climate policies, and emphasizes the importance of African ownership of the policy formulation and decision-making process. In addressing the theme, the participants considered the following four sub-themes:

- Sub-theme 1: Climate science, data, information and service delivery
- Sub-theme 2: Climate resilient development and adaptation
- Sub-theme 3: Climate resilient and low carbon development in Africa
- Sub-theme 4: Economics and finance of climate change

High-level Dialogue

- A high-level dialogue was organized as part of the conference, featuring a number of distinguished personalities, including: HE Ms. Jennifer Webster, Minister, Ministry of Finance, Guyana; HE Dr. Tewolde Berhan Gebre Egziabher, Director General, Ethiopian Environmental Protection Authority; Ms. Connie Hedegaard, European Union Climate Change Commissioner; Dr. R.K. Pachauri, Director General of TERI and Chair of IPCC; Mr. John Ashton, Special Representative for Climate Change of the United Kingdom of Great Britain and Northern Ireland; and Mr. Arba Diallo, Former Executive Secretary of United Nations Convention to Combat Desertification.
- The high-level dialogue set the stage for the conference by highlighting the need for strong political leadership in the area of climate change and the importance of a people-centred approach to building adaptive capacity. The participants in the dialogue underscored Africa's development challenges in the context of climate change, including how African countries are pursuing their climate change agenda, and what this means for the continent's future and Africa's climate change negotiating position. More specifically, they concluded that climate change and development in Africa were inseparably interlinked, requiring strong institutions that were capable of undertaking policy analyses, generating knowledge and providing climate services. In this context, the participants further stressed the interlinkages between adaptation and mitigation; the impact of climate change on livelihoods, such as reducing agricultural productivity and increasing water stresses; the importance of energy access for development, including transition to modern, non-grid energy technologies; the need for leveraging existing finances, including exploring innovative mechanisms; and the opportunities that would emerge from pursuing REDD+ as a development option. The conference participants, therefore, called for effectively mainstreaming climate change concerns into development planning.

Climate science, data, information and service delivery

- The participants considered and discussed the sub-theme and corresponding topics, which covered and dealt with the review and state of climate science, data and information in Africa. They emphasized the crucial role of climate information in national development planning, in managing climate opportunities and risks, and for mitigation and adaptation. Further, they emphasized the need for scientific facts and knowledge established through climate science and concluded that having in place sound data, information, knowledge, and service delivery mechanisms was essential to enable Africa to reach a common understanding of the evidence as well as the extent of the impact of climate change on its economic growth and social

development. Climate information would serve as a sound basis for adopting evidence-based, action-oriented measures for addressing climate change in Africa.

- After thorough deliberations the following recommendations were made on this sub-theme:-
 - African Member States are urged to mainstream climate change into their development policy, planning and practice;
 - African Member States are urged to build capacity to collect, analyse and use climate data and information and to ensure this information is accessible to and usable by decision makers and practitioners at all levels. In this regard, UNECA and ACPC, in collaboration with AUC, AfDB and other institutions, are called upon to provide support to African Member States;
 - Regional centres of excellence are called upon to scale up Africa-focused climate research so as to improve the science base and reduce prediction uncertainties in climate variables relevant to users. In this regard, research should be relevant to local needs, practical and policy-driven;
 - African Member States are urged to engage African scientists at home and in the diaspora in the process of climate policy formulation and to encourage and enhance their participation in the process of generating new knowledge, such as the modelling of climate change, as a contribution to capacity development in Africa;
 - Global institutions, such as the World Meteorological Organization (WMO) and the Global Climate Observation System (GCOS), are called upon to scale up their support to Africa in all aspects of capacity-building in climate data and information;
 - African institutions and researchers, in collaboration with climate research and modelling partners, are called upon to strengthen their research programmes so as to improve the performance of global and regional climate models in representing African climate and its drivers;
 - African institutions and researchers are called upon to identify and prioritize urgent scientific questions hindering practical action on adaptation so as to better understand and resolve inconsistencies between model projections and other research findings on likely rainfall trends across Africa;
 - UNECA, AUC, AfDB and other partners should strengthen and expand networks, including a network of centres of excellence for data, climate science and applications in Africa. This network would serve as a repository of knowledge on climate change issues and help in building the capacities of individual countries and national meteorological and hydrological services in Africa;
 - Regional centres are urged to use advanced technologies (e.g. remote sensing, geographic information systems and other relevant technologies and applications) to improve Africa's data capturing, storage, retrieval, analysis, and information generation and dissemination;

- African Member States, with the support of regional climate centres and centres of excellence, are urged to rehabilitate and upgrade meteorological and hydrological stations to international standards capable of collecting climate data and information;
- African Member States are urged to include observation system needs when preparing their national climate adaptation plans;
- African Member States and their regional institutions are urged to actively engage with the implementation of the emerging Global Framework for Climate Services (GFCS) currently coordinated by WMO, to ensure the availability of, and access to, actionable climate information for decision-making in all climate sensitive sectors.

Climate resilient development and adaptation

- The sub-theme focused on the major issues related to climate resilient development and adaptation in Africa including the socioeconomic challenges and risks posed by climate induced hazards and disasters, monitoring measures and the analytically-informed policy responses for good climate risk management. Particular emphasis was placed on key livelihood sectors such as agriculture, water and health to underscore the importance of countries adopting climate resilient development and adaptation measures. The conference participants stressed that it was imperative for African countries to move along a development pathway that emphasized poverty reduction, economic growth and the enhancement of human well-being, while increasing resilience to the physical impacts of climate change.
- The following recommendations emerged from the discussion on the sub-theme:
 - African Member States are urged to strengthen their policies and interventions for effective climate change adaptation planning. In this regard, particular emphasis should be placed on increasing land-use efficiency, water-use efficiency and access, and agricultural productivity, with a view to enhancing climate resilience, especially in food production and security in Africa;
 - UNECA, AUC and NEPAD, RECs and regional centres are urged to establish a work programme on agriculture under the Cancun adaptation framework that serves to link means of implementation (finance, technology transfer and capacity-building) with essential components such as early warning systems, tools for seasonal weather communication, irrigation, fertilizer application, advances in crops (better seeds) and animal husbandry (breeding), and farmer-to-farmer technology sharing;
 - African Member States are called upon to scale up investment in water control and management to enhance development and protect livelihoods;
 - African Member States are encouraged to identify and scale up all avenues for increasing agricultural productivity through integrated mechanisms such as water management, soil enrichment, and enhanced fertilizer inputs, thereby increasing land-

use efficiency as recommended by NEPAD, and to establish specific funding mechanisms for this purpose;

- African Member States are urged to work together with agricultural institutions to assess the cost and benefits of different policies and scenarios for moving countries towards increasing productivity as well as climate resilient and low carbon development pathways;
- African parties to UNFCCC are urged to consider hydropower development, covering various scales, as a clean development option and access financing for investment through the Clean Development Mechanism of the Kyoto Protocol;
- African Member States are urged to build capacity for research in climate change adaptation in the areas of agriculture, water management, energy, transport, and land-use planning and management;
- African Member States and research institutions are urged to consider climate change and the water sector in Africa within the framework of African river basins, since water supply and demand are usually considered in that context. Experiences dealing with climate change in any of the basins should be shared among, and the knowledge transferred to, other African river basin institutions;
- UNFCCC is urged to establish more formal relationships with relevant institutions to monitor the latest science and developing crises in agriculture due to the effects of climate change, particularly in Africa, and to request those institutions to report regularly to the Conference of the Parties on their findings;
- Regional research institutions, including UNECA, ACPC and centres of excellence, are encouraged to consider disaster risk reduction and disaster risk management as instruments for climate change adaptation, and to employ existing frameworks, strategies and programmes for disaster risk reduction that also consider climate change, such as the Hyogo Framework for Action 2005-2015;
- African scientists are encouraged to broaden the overall knowledge on the greenhouse gas emissions/climate change/agriculture/water nexus in African regions;
- African Member States are urged to scale up groundwater development in Africa, in order to meet challenges and opportunities across Africa resulting from climate change; the focus should be on resource availability, transboundary challenges, policy harmonization, accessibility, renewability, security and sustainability;
- African Member States and regional institutions are urged to establish continent-wide mechanisms to cope with climate-change-induced risks such as flood, drought and desertification in Africa;

- African Member States, RECs, UNECA, ACPC, civil society organizations and other partners should scale up climate change awareness and advocacy.

Climate resilient and low carbon development in Africa

- The participants underscored the need for Africa to explore low carbon development within the context of the green economy. In this regard, they also addressed the challenges of access to energy, including the transition to modern, non-grid energy technologies; improvement of forest governance to capitalize on REDD+ financing; and identification of opportunities in land use, land use change and forestry (LULUCF) across Africa. It was recognized that the pathway to a low carbon future would be complex, requiring policies that created an enabling environment for public and private sectors as well as cross-sectoral collaboration. The participants further exchanged views on best practices in emissions-reducing options as well as on carbon sequestration opportunities.
- The following recommendations emerged from the discussion on the sub-theme:
 - African Member States, with the involvement of private and civil society organizations, are urged to develop strategies to advance low carbon development, taking into account the specific needs and context of African countries;
 - African Member States and RECs are urged to strengthen regional cooperation in service provision in sectors such as energy and agriculture to enable countries to focus on areas of comparative advantage;
 - Regional research institutions, including UNECA and ACPC and other centres of excellence are encouraged to map out priority sectors to achieve low carbon development;
 - African Member States are urged to formulate and implement supportive policies that promote access to affordable, reliable and clean energy services to reduce poverty, improve health, increase productivity and promote economic development. In this regard, each Member State is encouraged to choose the appropriate energy mix for its specific economic and resource situation;
 - African Member States are encouraged to utilize existing international policy frameworks (e.g. CDM, Nationally Appropriate Mitigation Actions (NAMAs), etc.) and funding sources to promote and implement renewable energy development and deployment;
 - African Member States and RECs are urged to increase cooperation and knowledge sharing in the areas of sustainable transport policy and practice, to enable transport to facilitate low carbon development across Africa.

- African Member States, with the involvement of the private sector, civil society organizations, research community and other diverse stakeholders are encouraged to engage in the design and implementation of REDD+ policies and projects;
- African Member States are encouraged to implement conservation policies in a manner that does not constrain their development;
- African Member States are called upon to safeguard the rights and livelihoods of forest-dependent communities, guaranteeing indigenous peoples' forest access and livelihoods under the REDD+ regime.

Economics and finance of climate change

- Discussion under the sub-theme focused on the cost of climate change impacts on development in Africa. In this regard, the participants underscored the need for effective actions including innovative financing mechanisms to adapt to and mitigate the effects of climate change within a sustainable economic growth and poverty reduction context. They further underscored the need to strike a balance between efforts on climate action and meeting immediate development imperatives.
- The following recommendations emerged from the discussion on the sub-theme:
 - African Member States, with the support of research institutions at all levels and centres of excellence, are encouraged to strengthen the existing capacity of African researchers and policy makers to assess the risks posed by climate change and its economic implications;
 - African climate negotiators are urged to negotiate for a clear and internationally agreed baseline for new and additional finance with a view to enhancing transparency and building trust between developed and developing countries;
 - Research institutions, including UNECA, ACPC and other centres of excellence, are urged to investigate and build evidence of the costs of adaptation and mitigation in Africa, and to generate a range of estimates for those costs in Africa;
 - African Member States are encouraged to develop portfolios of projects and programmes for investment that are in line with development plans and priorities;
 - Research institutions, including UNECA, ACPC and other centres of excellence, are urged to carry out analysis to leverage new climate funding through innovative engagement in the climate dialogue process and the Green Climate Fund; and are urged to develop new business models and innovative financial mechanisms to address the need to balance climate action and immediate development needs;

- African Member States, with the involvement of the private sector, civil society organizations and the research community, are urged to build the capacity of energy entrepreneurs to engage and employ innovative financing mechanisms for climate-related investment, such as CDM and NAMAs.

Other recommendations

- The participants recognized the need for improved gender balance in areas of work related to climate change and development, and the need for greater media engagement.
- UNECA and ACPC were urged to help improve on the current levels of understanding of climate change issues in the region through greater involvement of the media in their activities and as partners in future CCDAs. In that regard, the participants took note of existing areas of improvement in the way the media covered climate change issues in Africa and underscored the urgent need to fill the gaps through specific and continuous training sessions.
- The participants also requested that UNECA, ACPC and other relevant organizations establish a platform for exchange between senior government officials, researchers, civil society organizations, the private sector and other actors.

I- Introduction

The first Climate Change and Development in Africa Conference was held at the United Nations Economic Commission for Africa in Addis, Ethiopia, from 17 to 19 October 2011 and brought together over 500 participants from the areas of policy, research and academia, practitioners, civil society and the media to deliberate and share knowledge on how Africa can turn the challenges brought about by climate change into a development opportunity. The deliberations covered four key thematic areas: climate science, data, information and service delivery; climate resilient development and adaptation; climate resilient and low carbon development in Africa; and economics and finance of climate change.

The conference aimed at establishing a forum for dialogue to enhance awareness and mobilizing effective commitment and actions, particularly from the three communities of policy makers, research and academia and practising stakeholders with the aim of effectively mainstreaming climate change concerns into development policies, strategies, programmes and practices in Africa. CCDA-I also aimed to strengthen Africa's position and participation in international climate change negotiations with a view to ensuring adequate reflection of the continent's concerns and priorities in a post-2012 international climate change regime.

The conference was jointly organized by the African Union Commission, the United Nations Economic Commission for Africa and the African Development Bank under the ClimDev Africa programme and was facilitated by the African Climate Policy Centre.

The report captures the proceedings and main outcomes of CCDA-I. It is organized in three main sections. Section I contains the outcome statement and the key recommendations. Section II provides the introduction and details of the deliberations, while Section III presents the discussions in the plenary and breakout sessions. The breakout sessions were organized under the four thematic areas of climate science, data, information and service delivery; climate resilient development and adaptation; climate resilient and low carbon development in Africa; and economics and finance of climate change. The conference programme is presented in the appendix.

II- Opening Remarks

A- Welcoming remarks by HE Mr. Abdoulie Janneh, United Nations Under-Secretary-General and Executive Secretary of UNECA

In his opening statement, Mr. Janneh noted that the CCDA conference came at a time when the impacts of climate change were being strongly felt – droughts had ravaged the Horn of Africa and left nearly a million people facing starvation, with no access to food, clean water, energy and public health services. The impact of climate change in Africa was clearly aggravated by the low resilience of the continent, the lack of adaptation and the dependence of livelihoods predominantly on rainfall.

Mr. Janneh observed that there was abundant evidence that the impact of climate change would be felt most acutely in the water sector, with increased frequency and severity of droughts, greater variability in rainfall patterns, the retreat of glaciers which affected major rivers, and a rise in sea levels. In Africa, agriculture contributed significantly to the economies of most countries and directly supported the livelihoods of the majority of the population. However, the sector was predominantly rain fed – subjecting it to great risk from droughts and floods. Similarly, recent incidences of flooding in many parts of the continent had also led to huge destruction in infrastructure and loss of jobs and livelihoods.

Mr. Janneh said that there was consensus among experts that climate change was now posing a great threat to Africa's development, particularly to the continent's ability to overcome poverty and achieve other millennium development goals. Consequently, there was an urgent need for the continent to invest in improving its ability to adapt to the effects of climate change and focus on the resilience of the key sectors that supported the economies and livelihoods of the people. Thus, African countries had to effectively manage the risk of climate change by adopting models of development that were sustainable, socially inclusive and low-carbon based.

It was instructive that African leaders had repeatedly emphasized that adaptation was the key focus of the continent with regard climate change. However, adaptation without significant cuts in emissions to maintain global warming at its lowest possible level would be futile, Mr. Janneh noted. To that end, in bringing together policy makers, researchers and academics and practising stakeholders, the conference was playing a key role as a forum for expert dialogue, awareness creation and mobilization of effective commitments and action at country level. Additionally, it would strengthen Africa's position and participation in international climate change negotiations and ensure adequate reflection of the continent's concerns and priorities in the post-2012 international climate regime. The forum had to focus, therefore, on coming up with concrete and implementable proposals on how Africa would be able to improve its adaptive capacity and turn climate change into a development opportunity for its people.

Exploiting the development opportunities that climate change presented required integration of the current efforts in low carbon development for the immediate needs of the continent with long-term climate change scenarios. In other words, concerted efforts were needed to link policy and practice and address Africa's development priorities in a coherent and comprehensive manner. Africa's development had to be more inclusive, more sustainable and friendlier to the environment. Pockets of success at local, national and regional levels should be documented and scaled up and where necessary

incorporated into international initiatives. In conclusion, Mr. Janneh said that CCDA-I would provide input into the upcoming international negotiations on climate change – COP17 in Durban, South Africa, later in the year and the United Nations Conference on Sustainable Development to be held in Rio de Janeiro, Brazil.

B- Keynote statement by Dr. R.K. Pachauri, Director General of TERI and Chair of IPCC

In his keynote statement, Dr. Pachauri observed that Africa faced unique challenges with regard to climate change, but also had unique assets and opportunities that could be harnessed for the benefit of the development of the continent. Noting that one important challenge was to make development truly sustainable, he said that making development more sustainable could enhance capacity for mitigation and adaptation, reduce emissions and reduce vulnerability. Delving further into the concept of sustainable development, Dr. Pachauri noted that according to the Bruntland Commission, sustainable development would help the present generation to meet their needs without compromising the ability of future generations to meet theirs.

Dr. Pachauri emphasized the need for appropriate policies to steer sustainable development and the lack of linkage between policy and practice in Africa. Policies were often formulated without the necessary institutions, regulations and governance measures to put them into practice. New policies therefore needed commensurate institutional mechanisms for their successful implementation. Turning to the absence of detailed scientific assessments in Africa, Dr. Pachauri underscored the need for south-south and south-north cooperation in the scientific assessment of what the impacts of climate change would be for different regions of Africa. He observed that through such cooperation, appropriate policies could be rapidly generated and integrated into development directions and actions, and institutions set up to deal with the impacts of climate change.

Citing the example of IPCC which dedicated its Nobel Prize money in 2008 to a fellowship programme to train scientists from least developed countries, including most definitely from Africa, Dr. Pachauri observed the need to develop strong scientific capacity in the continent. He emphasized the need for the rest of the world to listen to the voice of Africa. Many impacts of climate change could be reduced, delayed or avoided by mitigation and adaptation efforts and investments over the next two or three decades. The world needed to recognize the urgency of climate change mitigation for those who suffered the worst consequences of the impacts of climate change.

In conclusion, Dr. Pachauri drew attention to the IPCC Fourth Assessment Report, which stated that the least cost path of mitigation for the world that would stabilize temperature increase at between 2 and 2.4 degrees Celsius would require that carbon dioxide emissions peaked no later than 2015. Acknowledging that institutional and other barriers existed that prevented steps being taken to reduce greenhouse gas emissions that actually had negative costs, he called on Africa to engage actively in the negotiations and with one voice in the field of climate change.

C- High-level statement by HE Mr. Erastus Mwencha, Deputy Chair, AUC

In his statement, Mr. Mwencha noted that although Africa had contributed the least to greenhouse gas emissions, it currently faced numerous and severe negative impacts arising from the adverse effects of climate change. Those included droughts, floods and storms that had exacted a significant toll on lives and livelihoods in various parts of Africa. Those extreme climate events were projected to continue with increasing frequency and severity. He further observed that such impacts were hampering Africa's efforts to attain its development goals, including the millennium development goals. In his view, therefore, the theme of the conference centring on "Development First", was appropriate to Africa's concern to address climate change challenges in its quest for accelerated, equitable and sustainable development.

Mr. Mwencha underscored the link between CCDA-I and COP17 and the seventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (MOP7) to be held in Durban, South Africa, later in 2011, and the need for Africa to strike a common position on climate change negotiations and speak with a single united voice. He said that the African pavillion at COP17 would be used to showcase the impact of climate change in Africa and also to raise the profile of climate change and development issues in order to capture opportunities for green development on the continent.

Africa, like the rest of the world, had huge expectations of the forthcoming COP17 and MOP7. The meeting in Durban was expected to build on the positive gains and momentum achieved in Cancun, Mexico, in terms of making advances in some key areas. Mr. Mwencha acknowledged the efforts of the African group of negotiators in ensuring Africa's voice was effectively presented in all the key aspects of the negotiations for fair, balanced and concrete outcomes.

In conclusion, he informed the conference about the African Strategy on Climate Change that was currently under development. The strategy had four themes, namely: climate change governance; mainstreaming climate change in development; harnessing education, science, research and innovation for climate change; and promoting regional and international cooperation and partnerships in climate change. Through such processes, he noted, the continent was building synergy and harmony among the various initiatives, including the ClimDev Africa programme.

D- Opening of the conference by HE Mr. Hailemariam Dessalegn, Deputy Prime Minister and Minister of Foreign Affairs, Federal Democratic Republic of Ethiopia

Mr. Dessalegn opened his remarks by noting that the effects of climate change were already manifesting themselves in Ethiopia, as in many parts of the continent. Ethiopia had been the epicenter of droughts for decades which severely impacted the largely rainfall dependent agricultural sector. The increased climate variability (droughts and floods) was posing a significant challenge to Ethiopia, affecting food security, energy supply, poverty reduction and the sustainable development efforts of the Government.

Noting that Ethiopia was a highly vulnerable country, Mr. Dessalegn observed that traditional coping strategies might not be sufficient for many of the extreme impacts of climate change. Consequently, African countries needed to invest in improving the resilience of their populations through appropriate strategies for combating and mitigating the effects of climate change. He cited a number of national policy initiatives and sectoral strategies that were being undertaken by Ethiopia, such as the Plan for Accelerated and Sustainable Development to End Poverty, the Agriculture and Rural Development Policy and Strategy, the Water Resource Management Strategy, and the National Policy on Biodiversity Conservation and Research. They were all part of the carbon neutral development policy of the Government of Ethiopia.

Mr. Dessalegn explained that the Conference of African Heads of State on Climate Change had recognized that as far as Africa was concerned, adaptation was the critical response to the impact of climate change on the continent. Only through adaptation initiatives could Africa mitigate the present and future losses from climate variability and change. However, that should be a process that was well integrated in national overall development planning, including the design and implementation of programmes and projects across all the relevant sectors.

Concluding his remarks, Mr. Dessalegn said that many countries on the continent experienced several challenges with regard to the development and implementation of strategies and policies in response to climate change. He cited, for example, the lack of strong coordination mechanisms both at national and regional levels; lack of capacity; and the absence of a centre or institution for research and development on climate change adaptation. He welcomed the establishment of the African Climate Policy Centre at UNECA and the broader ClimDev Africa programme and expressed the hope that those initiatives would meet the expectations of African countries in policy formulation and the design of practicable projects at country level.

HE Mr. Dessalegn declared the conference officially open.

III- High-level Dialogue on Development First: Addressing Climate Change in Africa

This section captures the essence of the presentations made by various speakers on the subject of climate change during the session chaired by **Mr. Erastus Mwencha**, Deputy Chair, AUC.

A- Summary of Panelist Interventions

H.E. Ms. Jennifer Webster, Deputy Minister for Finance, Republic of Guyana

Ms. Webster said that global action on climate change had to be approached in a way that promoted justice. The theme of the event, “Development First”, was particularly endearing to her. In an important respect, it reflected what Guyana had been attempting to do over the years with regard to climate change. She noted that the choice between climate change and development was a false choice.

She noted, in particular, the cooperation between Guyana and Norway on REDD+ under which \$250,000 million was being paid by Norway for the global environmental services the forests of Guyana were providing annually, at the rate of \$5 per ton for five years, the second largest REDD+ deal in the world. The initiative had afforded Guyana the opportunity to maintain 99.9 per cent of her forest cover, and was seen as a great model for REDD+ projects. Guyana was in the second year of the five-year programme.

She observed that the idea of development first should not be seen as an agenda only appropriate for developing countries. Developed countries used the principle to sell climate policies to their people. They justified climate policies on the basis of the number of new jobs that could be created and the long-term competitive advantage afforded to their countries. She cited Germany, the United Kingdom and Australia as examples.

Ms. Webster said that a legally binding international agreement was crucial for the creation of a new economy of the future that would make combating climate change and promoting social and economic development compatible and not competing objectives. She indicated that even though a projected rise in temperature of 4 degrees Celsius was likely, there was no sign of meaningful action on the part of the historical polluters. Thus, despite some positive developments such as fast start finance to stimulate mitigation and adaptation actions in developing countries agreed in Copenhagen and the long-term pledge to mobilize \$100 billion annually by the year 2020, no funding had arrived in meaningful quantities, and certainly not fast enough. The failure by many developed countries to honour their pledges implied that the developing countries might have to bear catastrophic consequences as a result of climate change. Lack of financial flows was blocking the emergence of new technologies and the creation of new businesses and jobs. In contrast, there were tens of thousands of jobs in low-carbon sectors in the European Union, and millions of prints of academic and newspaper analysis on climate change.

Ms. Webster expressed regret that the gulf between pledges and the actual flow of funding was proof of insincerity on the part of the developed world. The developed countries had assumed that funding had

been flowing, but the reality was different, hence their responsibility for the breeding of much mistrust and cynicism.

Ms. Webster expressed the view that the experience of Guyana was relevant for Africa. She pointed out that globally forest-related emissions were greater than the emissions of the European Union. Therefore, the sums that Guyana was receiving were not only used to preserve its forests, but were also a means of financing its transition to a low carbon economy. In subsequent years, Guyana would use such climate finance to leverage more private investment to achieve a low-carbon growth path.

The success of the Guyana case rested on several critical considerations. First, solutions for Africa should embrace the voice of communities within Africa and take into account their aspirations and demands. Such programmes could not be designed in Europe or elsewhere, a point often misunderstood by well-meaning bureaucrats. They had to be based on a genuine partnership where both sides learned from each other.

The second vital consideration revolved around the imperative of finding a partner willing to pay for environmental services and to offer significant resources capable of making a real difference.

The third essential feature of a successful partnership rested on the positive mobilization of the people in both countries, based on processes of awareness-raising that engaged people across wide sectors of society through debate and discussion, which helped to sustain the strategy.

Dr. Tewolde Berhan Gebre Egziabher, Director General of the Ethiopian Environmental Protection Authority

The Director General of the Ethiopian Environmental Protection Authority, Dr. Tewolde Berhan Gebre Egziabher reminded the participants that Africa, as a region, had contributed least to current climate change, generating only around 3 per cent of global annual emissions. He surmised that Africa's net emissions would be negative after accounting for the amount of carbon sequestered within its territory. Yet, as shown by IPCC and several other reports, Africa was the region that suffered the most. Adaptation was, therefore, the most important issue for Africa, and if not taken up with the seriousness it deserved, the continent would disappear. To minimize the risk of the collapse of development efforts, Africa should devote its energies towards programmes promoting adaptation.

Dr. Tewolde, also noted that Africa's mitigation efforts were very significant due to its large tracts of land that could be reforested, a fact that should shame people of conscience responsible for causing climate change in the first place. Adaptation and mitigation were therefore interlinked for Africa. Development had to be stable, and to achieve that Africa needed to both mitigate and adapt.

On renewable energy resources, Dr. Tewolde said that Africa had vast and abundant supplies, but they needed to be harnessed in meaningful ways so that the twin ambitions of realizing development and combating climate change could be fulfilled.

H.E. Ms. Connie Hedegaard

Ms. Connie Hedegaard, Commissioner of the European Union, began her statement by expressing the view that Europe and Africa were key economic partners with mutual interests. She said that pursuing development and addressing climate change were inextricably interwoven, and that those connections

should underpin the diplomacy of cooperation. She also stressed the importance of access to energy, noting that it was an essential prerequisite for driving any development.

On fast start finance, Ms. Hedegaard articulated the position that funding from Europe had started flowing with impacts already being felt in the field. She observed that Africa had been the largest recipient of fast start funding (\$800 million), which was new and additional, and supported other significant climate-related efforts in the region, including mainstreaming climate change in official development assistance. She said that it was absolutely critical that all developed countries delivered on their fast start pledges made in Copenhagen.

Europe already had legislation stating that from January 2013, no new projects would be funded under the Clean Development Mechanism in emerging economies, and the focus would shift to funding CDM projects only in the most vulnerable and least developed countries. It had been recognized that CDM projects in Africa had not been as numerous as originally expected and the new legislation would enable Africa to get an appreciable share of CDM projects.

Ms. Hedegaard shared her concerns about the prospects for COP17 in Durban, South Africa, noting that the success of the meeting had been linked to European Union countries agreeing to a second commitment period of the Kyoto Protocol. She wondered why that should be the case when, in fact, Europe contributed only 15 per cent of global emissions. Europe had set domestic targets of a 20 per cent reduction in carbon dioxide emissions by 2020 and an increased contribution of renewable energy production to 20 per cent of total electricity generated by 2020. Focus was also increasingly being directed towards achieving energy efficiency.

Ms. Hedegaard said that the European Union and Africa should work together to influence others to make reduction commitments and expressed the belief that the voice of Africa was effective.

Dr. P. K. Pachauri, Director General of TERI and Chair of IPCC

Dr. Pachauri, speaking as a leading authority on climate change and energy, presented statistics that illustrated a sombre picture of the risks from climate change in various economic sectors and their implications for human livelihoods. Agricultural productivity, for example, was projected to decrease by about 50 per cent by 2020 in some countries, adversely impacting livelihoods. Africa would experience increased water stress with scarcities projected at between 75 and 250 million cubic meters in 2020 and between 350 and 600 million cubic meters by 2050. Climate change would exacerbate those conditions.

Moreover, net revenue from crops could fall by as much as 90 per cent by 2100. Food security would decline to abysmally low levels. At present, most farmers were producing just about enough to meet their own needs; since they could not supply large quantities of grain to the global marketplace, their livelihoods would be seriously affected.

Climate change would also provoke massive species losses. About 20 to 25 per cent of mammalian species in national parks in Africa could be endangered and become extinct. Tourism would thus be gravely affected. Also, the rate of malaria transmission in the highlands would grow.

Dr. Pachauri said that the need to build climate resilience infrastructure underpinned by adaptation programmes would be key in overcoming the adversities. He said international cooperation could go a long way in assisting in that regard. The cost of adaptation with regards to sea-level rises could amount

to 5 to 10 per cent of gross domestic product. About 40 per cent of Africa's population lived in coastal areas.

Dr. Pachauri said that the key sources of emissions were agriculture, biomass burning and the construction sector. He noted that mitigation in Africa had the potential to generate enormous opportunities and co-benefits such as a growth in jobs, reduction of other pollutants, stemming the decline of yields, and improvement in health conditions.

He also argued that expanding energy access, particularly by harnessing renewable energy sources, was important in stimulating economic development. The advantages associated with those sources included lower risks of accidents and reduced vulnerability to supply disruptions.

Mr. John Ashton, Special Representative of the United Kingdom for Climate Change

Mr. Ashton had earlier proposed that the first CCDA conference should be dedicated to the memory of the late Nobel laureate and leading icon of environmental conservation in Africa, Professor Wangari Maathai. The proposal was endorsed by acclamation and a one-minute silence was observed in her honour.

In his intervention, Mr. Ashton said that the language of mitigation and adaptation created barriers among people. He recommended that the phrase "the politics of opportunities" should be used instead of referring to costs and burdens.

The fundamental division was not between developing and developed countries; nor Annex I and non-Annex I countries, rather it was between those who advocated for a legally binding approach and those seeking to institutionalize volunteerism. He argued that there was no precedent in history for a challenge such as climate change being met by volunteerism. What was needed was an approach that valued legally binding agreements.

Mr. Arba Diallo, Chair of West African Global Water Partnership and former Executive Secretary of United Nations Convention to Combat Desertification

Mr. Diallo raised a number of issues to stimulate the thinking of the participants. He stressed that climate change would aggravate the pattern of life of people living in the Sahelian belt, whose ways of existence had hardly changed in the previous one hundred years. Without proactive financial support arrangements to enhance the capacity of communities to adapt, the vagaries of climate change would wreak havoc on them and disasters would become a doleful way of life.

He said the money pledged by donors had not been forthcoming. In the risky era of climate change, the interests of communities would be best served if funding was genuinely seen to be flowing and enhancing climate resilience and the adaptive capacities of communities.

Dr. Abdurahman Beileh, Director, Department of Agriculture and Agro-industries, African Development Bank

Dr. Beileh pointed out that AfDB spent about \$3.5 billion a year to support development projects in Africa, some of which was directed to environmental causes. He said that climate finance was assuming a greater role in the priorities of the bank's programmes and activities.

B- Summary of discussions

Questions

- What about science, data and climate change?
- Are there research efforts on behavioural change?
- Is the finance provided new and additional?
- Are there concrete examples of how the false dilemma between mitigation and adaptation can be avoided and of the politics of opportunities?

Responses

- Dr. Pachauri: There are some publications about behavioural change, but this is an area where not enough has been done. The issue is brought up in the IPCC Fourth Assessment Report. Data is critical and observation and measurement sites should be set up.
- Ms. Hedegaard: Finance is 100 per cent new and additional.
- Studies are based on climate data and science information and this must be enhanced.
- Examples of where a focus on the politics of opportunities can help overcome most of the challenges identified are the lack of climate finance, the need for legally binding agreement, and the need for massive energy provision to the poor.

IV- Summary of Plenary Sessions

A. Summary of Plenary on Sub-themes 1 and 2

Chair: HE Ms. Tumusiime Rhoda Peace, Commissioner, Department of Rural Economy and Agriculture, African Union Commission.

Keynote remarks were made by Prof. Bruce Hewitson, University of Cape Town, South Africa, and Dr. Abebe Haile Gabriel, African Union Commission.

The panellists for the session were Prof. Shem O. Wandiga (University of Nairobi), Mr. Kaliba Konare (World Meteorological Organization), Dr. Seleshi B. Awulachew (UNECA/ACPC), Prof. Elfatih Eltahir (Massachusetts Institute of Technology), Dr. Fatima Denton (Climate Change Adaptation for Africa), Mr. Alex Alusa (Kenya) and Dr. Coleen Vogel (South Africa).

The keynote remarks and discussions focused on the two sub-themes:

- Sub-theme 1: Climate change data, information and service delivery, presented by Prof. Hewitson.
- Sub-theme 2: Climate resilient development and adaptation, presented by Dr. Abebe.

In her introductory remarks, the Chair said that an effective response to climate change required strong investments in Africa, because the continent had serious data constraints. Consequently, there was a need for transition from the challenges arising from climate change and climate variability to building capacity for resilience and adaptation.

Keynote Remarks

Prof. Bruce Hewitson, University of Cape Town, South Africa

Mr. Hewitson said that the topic represented complexities and challenges, because inappropriate data and information led to inappropriate adaptation and mitigation. The serious knowledge gaps that existed on the continent might lead to actions and responses that were risky and counterproductive. He stressed that climate models generally tended to simplify the deterministic components of a system and poorly captured, if at all, the chaotic and stochastic components. For Africa, the lack of observational data represented the biggest challenge to model validation. He suggested that the following key points needed to be addressed:

- Laying out the information landscape of communities, language and agendas, data chains and knowledge networks;
- Barriers between scientists, language complexity, conspiracy community;
- The line of thinking of data, and the close coupling between science and society;
- How to transform data into information and knowledge as a basis for action;

- The current status of information;
- The emerging “confusion of information”;
- The knowledge network as an integration of knowledge chains, i.e. what are the consequences of the knowledge gap? How does it inform us? What is the best global climate model to use?
- The problem of validation of climate models for Africa.

He emphasized that decisions and actions on climate change did not need perfect information. However, all necessary efforts were needed to provide information on a scale that would support decision-making at various levels on the continent. He noted too that experts needed to be aware of the theoretical limit of data predictability when downscaling from global models. Furthermore, for Africa, the models did not often integrate local surface data due to unavailability – hence the difficulty in defending the results when global models were downscaled to make local projections.

He suggested that a possible way forward was to change the climate data portal into an information gateway. Consequently, in producing information, the following questions should be borne in mind:

- What are the best investments in knowledge production for informing adaptation?
- Is the message plausible?
- Is the message defensible?
- Is the message actionable?

Consideration had to be given to whether regional information was credible, defensible, and actionable, and in building climate information, each piece had to be put in the right place. In conclusion, he drew attention to a new initiative, CORDEX-Africa¹, which was the largest, but underfunded, opportunity to engage in developing messages.

Dr. Abebe Haile Gabriel, African Union Commission

Dr. Abebe noted that there was scientific consensus that Africa was the continent most vulnerable to the impacts of climate change and was expected to warm faster than other regions (1.5 to 4 degrees Celsius on average during the present century), but it was the least capable of coping with the impacts of climate change. Africa’s high vulnerability was due to several factors, including the natural fragility of its ecosystems, exposure to frequent natural disasters (droughts and floods) and the dependence of livelihoods and economic activities on highly climate sensitive natural resources and rain-fed agriculture.

Dr. Abebe explained that as a result of the natural disasters triggered by climate change, African countries might often experience substantial declines in the productivity of economic activities that could threaten and erode their development gains and further hamper progress towards the achievement of development targets, including the millennium development goals. A major prerequisite for building adaptation capacity, namely access to relevant climate data and forecasting information,

¹ The Coordinated Regional Downscaling Experiment in Africa established by the World Climate Research Programme

was still a major challenge for many countries on the continent. It was imperative, therefore, to seek answers to some fundamental questions concerning adaptation to climate change and climate variability in Africa, such as the cost of adaptation, the options available, and whether it imposes an additional burden or presents an opportunity for growth and development.

He said that implementing adaptation measures that reduced vulnerability and built resilience involved putting in place incentives, policies and institutional mechanisms, including support in terms of technology, financing and capacity-building, to enable climate smart approaches, for example, climate agriculture for the agricultural sector. Sustainable land management also needed to be holistically addressed.

Concluding his remarks, Dr. Abebe noted that adaptation measures that reduced vulnerability and built resilience, particularly in the agricultural sector, should address the historical legacies in the sector, including under-investment. In addition, there had to be a deliberate transition from vulnerability to building resilience by improving climate change governance, mainstreaming climate change in development, enhancing knowledge systems and forging strategic partnerships and cooperation to support such transition.

Panel Discussion

Key issues raised by the panellists:

- How can different knowledge products emerging from science which are sometimes conflicting be reconciled and merged together to support decisions on climate change?
- How do we frame a real dialogue?
- Can an analytical approach proactively give to adaptation more resource opportunities with more development agencies?

Dr. Seleshi B. Awulachew (UNECA/ACPC)

Dr. Awulachew noted the recent global food crisis and economic crisis and pointed out that in many parts of the world, humans were already facing water scarcity. He pointed out that climate change, referred to as climate crisis, would exacerbate current and future situations. Accordingly, Africa must explore:

- opportunities and challenges of climate change;
- policy information linkage to analytical work;
- capacity of African scientists and practitioners to provide information;
- economics of water scarcity (availability, access) and addressing pathways, including access to energy and fertilizers, and food security through adaptation and mitigation; and
- integrated intervention in agriculture with a way forward to look at low carbon development opportunities.

Mr. Kaliba Konare (WMO)

Mr. Konare underscored the complexity of climate change and each of the climate components affecting Africa. The expectations of users were very high, almost to a level beyond what available science could provide. He noted that the science of climate was a vicious circle and for science to progress in Africa the continent needed to have a climate information service working integrally with existing global initiatives. Consequently, there was a significant need to improve the climate data and climate information system.

Prof. Eltahir (Massachusetts Institute of Technology)

Prof. Eltahir noted that water was the most vital resource on any continent. To exploit water and other resources sustainably, Africa had to focus on the following key areas:

- planning on the basis of climate information and how it can enhance the management of countries' existing resources.
- addressing the challenges of water scarcity, looking at water in the context of African river basins, and addressing adaptation in that context.
- issues of uncertainties with regard to climate change projections;
- population pressure and the paramount importance of addressing development, climate change and population seriously and jointly; and
- the central role of education - climate change is a long term issue and countries must strengthen the education system and focus on providing the next generation of scientists and policy makers with sufficient knowledge and skills to strengthen their adaptation, mitigation and development capacity.

Dr. Fatima Denton (Climate Change Adaptation for Africa)

Dr. Denton highlighted the following key issues that Africa needed to focus on:

- expanding the knowledge base on climate change issues;
- creating institutions that will increase agricultural production through sustainable technologies such as drip irrigation;
- enhancing effective communication as a means of sharing knowledge, including indigenous knowledge, and breaking down existing barriers;
- understanding the knowledge gap and the main driving forces of resilience; and
- translating the risks into opportunities and the opportunities into benefits.

Mr. Alex Alusa (Kenya)

Mr. Alusa noted that Africa had major climate data gaps and an acute lack of meteorological coverage. Therefore, the following aspects needed to be addressed:

- intraconnections within the continent – connecting Africa from North to South, East and West;

- building strong and efficient analytical framework components for translating data into information for statistics and modelling application;
- the communication nexus between science and policy at the level of government management;
- the role of climate change in anti-poverty initiatives and prioritizing climate change issues as well as poverty alleviation in countries' strategies;
- good governance as a challenge in terms of policy implementation and harmonization;
- population pressure; and
- a comprehensive and integrated approach to resolving adaptation challenges and the need to integrate technological approaches to addressing climate change and land use problems, for example, ensuring that irrigation technologies are coherent with other water management strategies.

Dr. Coleen Vogel (South Africa)

Dr. Vogel raised several questions concerning scientific models that incorporate real life stories and experiences. She also focused on the role of local communities. She highlighted the following questions that were critical in bringing the issues into clear focus:

- Which stories to use to illustrate models? And how do aspects of values, ethics, principles and justice come into science?
- Who frames the dialogue? The North or the South? What is the role of the elites?
- What would move local communities?
- How can we involve people?

Prof. Shem O. Wandiga (University of Nairobi)

Prof. Wandiga asserted that small molecules had huge impacts on climate change. Since there were no programmes to monitor NO₃ and CO₂, the current climate change prediction was inaccurate. Climate change had different impacts on a local scale, with the huge implication that adaptation also had to be localized. Africa therefore needed to improve its prediction on a small scale. Unfortunately there was no sufficient scientific capacity to undertake that at present.

Resilience could also be viewed as changing lifestyle, which meant being able to do more with fewer resources. In that regard, Africa had to:

- improve resource use efficiency, such as use less water and increase production;
- improve the business environment in order to maximize its existing immense opportunity; and
- modernize the agro-industry sector, for example, shifting in beer making from use of wheat to millet which is more drought resistant and has less demand for water.

Summary of Discussion

Questions

- There is a wide data gap in Africa; what innovative solutions can be adopted?
- How can we ensure that policies in Africa are well harmonized with regard to the role of local communities' knowledge and local engagement?
- Given that indigenous knowledge can help to improve climate model predictions on a local scale, do the panellists agree that adaptation funds should press the need for African Governments to open the democratic process and embrace more participative good governance?

Responses

- Solutions for Africa do exist. We need to choose an actionable intervention.
- Any approach that does not involve people will not be successful because we need to complement the process, not replace it.
- As mentioned above, taking into account the indigenous factor can also help in climate modelling.

B. Summary of Plenary on Sub-themes 3 and 4

Chair: Mr. Josue Dione, Director, Food Security and Sustainable Development Division, UNECA.

Keynote remarks were made by Mr. Youba Sokona, ACPC Coordinator at UNECA, and Abdirahman Beileh, Director, Department of Agriculture, AfDB.

The panellists for the session were Prof. Lloyd Chingambo (Africa Carbon Credit Exchange - ACCE), Ms. Angela Kallhauge (Swedish Energy Agency - SEA), Mr. Deprose Muchena (Open Society Initiative for Southern Africa - OSISA), Mr. Mithika Mwenda (Pan African Climate Justice Alliance - PACJA), Mr. Frode Neergaard (Organisation for Economic Co-operation and Development), Prof. Kevin Urama (African Technology Policy Studies - ATPS), Mr. Ambachew Admassie (Ethan Bio-fuels Ltd).

The session focused on the following two sub-themes:

- Sub-theme 3: Low carbon development, presented by Mr. Sokona
- Sub-theme 4: Economics and finance, presented by Dr. Beileh

Keynote Remarks

Mr. Youba Sokona (ACPC/UNECA)

Mr. Sokona made some key observations in the context of climate change and low carbon development. He said that the evidence of climate change was unequivocal, mitigation measures were slow and

sparse, and adaptation had started but further adaptation was now unavoidable. However, although low carbon development was increasingly recognized as an important subject for adaptation, there was no internationally agreed definition. Furthermore, low carbon development pathways differed in each country and across income groups. Consequently, there was a need to recognize that low carbon development offered opportunities for Africa for five key reasons. It enabled countries to: (i) avoid “lock-in” carbon-intensive technologies; (ii) tap into global funds; (iii) utilize renewable energy potentials with low-cost technologies; (iv) diversify energy sources; and (v) build their own capacity for new development.

Low carbon development pathways should focus on local needs as well as cover all key infrastructures such as greenhouse gases and critical sectors such as power and energy, transport, agriculture and forestry. Although low carbon development might incur high initial cost, the benefits exceeded the costs in the long term. Relevant policies could create impact on various sectors with regard to greenhouse gases. A number of barriers (economic, financial, policy, etc.) existed that hindered low carbon development pathways and therefore each community should contribute individually and collectively to tackling those barriers.

Mr. Abdirahman Beileh (AfDB)

Mr. Beileh informed the participants that AfDB made sure all development projects it supported in all sectors underwent a rigorous environmental assessment and were environmentally friendly. That was part of the bank’s commitment, as with other multilateral development banks. He also noted that many funds were available globally for climate change, but for a variety of reasons, the disbursements were very low. Africa received only 12 per cent of those funds, much less than other regions. Estimated adaptation costs were \$13-19 billion per year and mitigation costs were estimated at \$9-12 billion by 2015. On that basis, AfDB had developed a framework and action plan for climate change and estimated a budget of \$6 billion over five years. AfDB had many examples and experiences of both mitigation and adaptation projects. It was hosting the Congo Basin Forest Fund funded by the United Kingdom and Norway with an initial commitment of GBP100 million. Thus, AfDB was well-positioned to host the African Green Fund as requested by African leaders at the African Union summit in Malabo. The proposed fund would be critical in delivering climate finance in Africa.

Panel Discussion

Prof. Lloyd Chingambo (ACCE)

In his presentation, Prof. Chingambo said that Africa had a fundamental problem of preparedness. The private sector should be engaged in the development process to help mobilize funds needed to finance development. Fast start finance was a reality, but African countries needed to understand how to access those funds. In some cases, they did not know where the funds were. There was a strong need for capacity development in key areas of technical expertise to help countries to tap into the funds.

Africa should not wait for external funding to tackle climate change. African countries had to mobilize internal resources at the same time as negotiating international financing.

Ms. Angela Kallhaug (SEA)

Ms. Kallhaug said that African countries should focus on the opportunities that climate change presented to the continent as they seek solutions. In particular, African countries should:

- focus more on communicating opportunities and solutions rather than problems;
- elaborate what climate change means for Africa;
- focus on how to use existing support and mobilize existing capacities; and
- maximize all existing opportunities to move from the challenges of climate change to solutions that address its impacts.

Mr. Deprose Muchena (OSISA)

Mr. Muchena emphasized the need to look at the macroeconomic policy framework in Africa, the status of which was currently completely inadequate. Africa needed to integrate low carbon development approaches which were pro-poor, pro-growth, pro-environment, pro-women and pro-youth. He lamented that too often, development programmes in Africa concentrated too much on the domestic market and were therefore unable to integrate with global markets.

He said that African countries needed to remove barriers to trade and movement. It was inconceivable that African countries with abundant natural resources should have high rates of poverty. Countries should promote development and democracy in order to mobilize their abundant human resources, particularly in women and youth, and the private sector.

African countries needed to improve their financial systems in order to mobilize both local and international financing for investment in climate resilient development.

Mr. Mithika Mwenda (PACJA)

Mr. Mwenda said that the lesson from the recent financial crisis was that the market economy was no longer sustainable. African countries should look at low carbon development features to identify existing challenges and opportunities for development. He said that Africa should clearly define its priorities in a global dialogue as different regions and continents had different priorities. In the United States of America, for example, the main question was how to increase jobs, while in Africa, it was how to develop or protect livelihoods and alleviate poverty.

Prof. Kevin Urama (ATPS)

Mr. Urama said that Africa could develop as much as developed countries but with lower carbon consumption by leveraging natural resources such as wind and solar power for diversified renewable energy. In spite of the large potential of renewable energy and low carbon technologies, the current share of use of those energy resources in Africa was extremely small compared to other regions. He said that the major part of African emissions came from agricultural activities, which used poor technologies and traditional biomass. The low carbon development pathway for Africa meant increasing efficiency

and productivity, especially in the agriculture sector which contributed the largest carbon emission across sectors. Africa should not pursue a high-carbon pathway as it would surely need to undo the damage down the line just as other developed countries were currently doing. Africa should find its own development pathway.

Mr. Ambachew Admassie (Ethan Bio-fuels Ltd)

Mr. Ambachew noted that the question of standards for measuring and quantifying low carbon development needed to be settled as well as the issue of global target for different regions. He noted that it would also be necessary to establish a global valuation of CO2 reduction and to facilitate access to carbon markets and funds.

Summary of discussion

Three key issues emerged in the discussion:

- There is a need to include women and to integrate climate change into the educational curriculum to educate children early enough on the subject. Climate change response policies need to address both of these aspects;
- African countries need to mobilize internal sources of financing and not over-rely on international funds for investment in climate resilient development, even though international financing is critical for the continent; and
- Capacity development is necessary to enable African Governments to access available climate funds, invest in appropriate projects that address citizens' vulnerability, and properly account for utilization.

V- Parallel sessions

A. Sub-theme 1: Climate science data, information and service delivery

Topic 1.1: Climate science (policy, practice and research)

The Chair, Mr. Rupa Kumar Kolli, World Meteorological Organization, introduced the topic with an elaboration of the role climate science had played in establishing the debate about climate change and the role climate services could play in addressing climate and climate change, which affected every aspect of our lives. Mr. Kolli introduced the presentations which addressed the role of new technologies, observation networks and climate research in improving climate science. Two case studies were also presented.

Summary of Presentations

Paper 1.1.1: An assessment of Africa's climate observing networks and data including strategies for rescuing of climatic data – Dr. Buruhani Nyenzi

Dr. Nyenzi provided some background to the paper, starting with the high-level expert consultations held by ACPC in April 2011 with the purpose of identifying key issues concerning climate data and information. He said that the paper was a result of that initiative and a product of several authors.

A network of meteorological stations had been in existence across African countries since before independence, however it was widely recognized that over time there had been degradation in the network, notably in countries that had experienced political instability due to wars and other acute social or economic problems. There were also some significant spatial gaps, for example, across the middle of Africa, including across the Sahara.

The data base management systems in Africa were not uniform throughout the continent, which created difficulty in access and sharing of the data. Most of the African countries archived their data in paper format which could be easily damaged or lost. Strategies had to be devised to rescue data in a continuous process. Climate data in Africa had spatial and temporal gaps. New methods to fill data gaps by using ground observation and remote sensing estimation had been piloted in Ethiopia, and it was recommended that the approach be replicated in other African countries.

Dr. Nyenzi made the following key recommendations:

- climate data needs to be treated as a public good;
- ACPC in collaboration with other stakeholders should work on modalities that facilitate reversal of the deteriorating situation in the climate observation network in Africa;
- the principles of a framework like the WMO Global Framework for Climate Services would be well placed to coordinate climate data management and an observation network across Africa;
- National Meteorological and Hydrological Services (NMHSs) should enter into partnerships with private sector and non-governmental institutions to improve their data observational networks;
- ACPC should support the strengthening of regional climate centres, thus improving management of regional databanks and climate science;

- ACPC in collaboration with national Governments and relevant regional and international organizations should step up efforts to build the capacities of NMHSs in terms of climate observation networks and climate services; and
- ACPC with other relevant institutions at national, regional and international levels should utilize the available African expertise in climate science.

Paper 1.1.2: Targeting climate research and services to development needs in Africa: The Department for International Development-Met Office Hadley Centre Climate Science Research Partnership – Dr. Richard Graham

Dr. Graham gave a presentation on a three-year project that is a partnership between the Hadley Centre, Department for International Development and the United Kingdom Met Office. He indicated that at the inception of the project, there were broad consultations with stakeholders to identify the key climate forecasting needs. That was followed by work on climate science looking at models and their usefulness across Africa. Other components included developing climate services and capacity-building, including a fellowship programme and the holding of training workshops.

Paper 1.1.3: Climate patterns and hydro-climatic scenarios in the Upper Blue Nile Basin – Dr. Solomon Seyoum

Dr. Seyoum delivered a presentation that covered climate drivers and hydrological modelling in the Upper Blue Nile Basin, including downscaling of climate model data to a level suitable for understanding what is happening within the catchment. He referred to the selection of the atmospheric general circulation model ECHAM5, the results of which best resembled historical records. The model was then used to make projections. The results showed that there was a distinction between local and global climate drivers.

Paper 1.1.4: Climate change signals at local scale over Ethiopia: insights from new gridded high resolution gauge, satellite, regional and global climate model rainfalls – Dr. G. Mengistu Tsidu

Dr. Mengistu Tsidu presented a paper on a case study in Ethiopia where the standard data quality method was used for the study and remote sensing applied to fill in data gaps. The research found a clear climate change signal in Ethiopia especially in north-eastern and south-western parts of the country. He informed the participants that Addis Ababa University had high power computing facilities which were available to African scientists by arrangement.

Summary of discussion

Questions and Comments

Mr. Workneh Degefu, president of the Ethiopian Meteorological Society, referred to a statement on the need for ACPC to step up support for NMHSs and noted that the support needed to be very specific and concrete. He suggested that ACPC could bring together a number of experts and work with WMO on a strategy that was workable and implementable.

Prof. El Tahir concurred and added that the problem of data in Africa was mainly as a result of resource limitation. He said that the issue of financing meteorological equipment in areas where there was a

critical and chronic lack of data should be prioritized through initiatives by AfDB under the ClimDev Special Fund.

A representative of the AGRHYMET (Centre Régional de Formation et d'Application en Agro Météorologie et Hydrologie) Regional Centre had two concerns regarding the reliability of climate forecasting. He noted that for agronomy the temporal precision in terms of local scale was more important than the global trend of the season compared to the normal within 30 years. His first concern was therefore the difficulty of providing reliable forecasting and second, the question of access to the climate data system.

A representative from the Centre de Suivi Ecologique of Senegal said that it was time to move beyond a focus on data alone, and to bring together policy, practice and research. Bringing those pieces together would add greater value and meaning to the information. Climate models had limitations in Africa, in addition to the problem of data availability. He noted that the discourse on climate change in Africa did not seem to pay sufficient attention to the question of climate science.

Responses from Presenters

Dr. Nyenzi noted that the issue of data was fundamental and very important and that the need to improve data was clear. A strong recommendation aimed at improving the situation is necessary and he proposed that a small group should draft such recommendations on climate data and information.

Dr. Graham added that the project he had described was the start of a process to improve climate forecasts and build capacity. He said that currently the project was not evaluating models but rather was studying the dynamic processes. With regard to seasonal forecasts there were assessments of the level of skill of forecasts and models, and the skill of seasonal forecasts was less than that of daily forecasts. Knowing the level of skill for each model was especially important.

Dr. Seyoum said that there was a need to study the African climate system. He proposed that a detailed African climate model be prepared based on such studies and research. The scenarios had very good policy implications, for example, in areas where there were increasing or decreasing water resources plans could be made in advance regarding water resource projects.

Dr. Tsidu said that data would be available from the Ethiopian model for anyone to use free of charge at the end of the research.

The Chair asked Dr. Nyenzi to lead the group preparing recommendations on climate science, policy, practice and research.

Recommendations

Good climate data is essential to provide climate services, inputs for running climate models, climate change monitoring, as well as climate change projection.

Many past initiatives to improve and strengthen climatological observation networks have helped to improve climate services in Africa but have not been effective enough for the various users of climate data mainly because of lack of financial and human resources. Many projects developed towards this initiative were not sustainable.

As a way forward, a task team under ACPC should be established and should include experienced and knowledgeable experts to achieve the following:

- Document existing strategies (e.g. WMO, GCOS, ClimDev).
- Develop a workable and implementable strategy with a view to screening specific limited and short-term implementable pilot projects that have noticeable impacts.

The participants recommended that strategies were needed to create awareness among political leaders, decision makers, directors of NMHSs, and stakeholders of the importance of climate data and services in advancing the climate change and development agenda.

Topic 1.2: Lessons learned from various initiatives

The Chair, Dr. Buruhani Nyenzi, opened the session and said that the aim was to address the experiences of regional organizations.

Summary of Presentations

Paper 1.2.1: African Centre of Meteorological Applications for Development (ACMAD) – Mr. Mohamed Kadi

Mr. Kadi introduced ACMAD as an institution established in 1987 by WMO and UNECA and covering all 53 countries of Africa. In the following two decades ACMAD worked to improve climate knowledge and capacity across Africa. He said that ACMAD had been involved in the establishment of the ClimDev-Africa Programme at its outset and had activities in the area of climate risk reduction and climate services for a range of stakeholders. A key lesson learned was that decision-making required climate information at different time scales, but generally at shorter rather than long time scales.

Paper 1.2.2: AGRHYMET – Dr. Hubert N’Djafa Ouaga

Dr. Ouaga outlined the achievements of AGRHYMET in the territory of the Economic Community of West African States (ECOWAS). Established in 1973, its mandate was to invest in food security research and combat drought effects and desertification to create a new ecological balance. The main objective was to collect and process information on food security and desertification. The centre had a scientific board and 120 students in addition to staff.

He said that AGRHYMET addressed a range of issues and phenomena including the impacts of floods, drought and also locust outbreaks. As a centre for training, information and research, AGRHYMET was implementing its projects through cooperation with partners, following the agricultural campaign and the seasonal forecasting in hydrology. The institution was based on three essential projects, namely Agricultural Cooperative Development International, African Monitoring of the Environment for Sustainable Development (AMESD) and ClimDev. Other issues included water and water sources for livestock. AGRHYMET had also undertaken work on tracking fires.

Paper 1.2.3: Intergovernmental Authority on Development Climate Prediction and Applications Centre (ICPAC) – Dr. J.N. Mutemi

Dr. Mutemi highlighted the work of ICPAC in terms of providing climate services to assist societies and economies, including provision of information to help to minimize and prevent conflict over natural resources, for example, between pastoralists during times of stress. ICPAC was covering the region of the Intergovernmental Authority on Development (IGAD) and working closely with NMHSs along with international organizations.

Drawing on the lessons and experiences of its 10 years of intensive climate services, ICPAC was leading a number of practical climate outlook forums dealing with the direct translation of climate forecast

information into food security outlooks, which was a broad application of the forecast. ICPAC was also supporting AfricaAdapt as an information sharing forum.

Paper 1.2.4: Southern African Development Community (SADC) Climate Services Centre – Mr. Brad Garanganga

Mr. Garanganga explained that SADC followed a regional approach in mitigating adverse climate impacts on socioeconomic developments.

He said that the achievements of the SADC Climate Services Centre included providing climate information and prediction services to a range of communities. Additionally, the Southern Africa Regional Climate Outlook Forum process contributed to minimizing negative impacts of adverse climate.

Paper 1.2.5: African Monitoring of the Environment for Sustainable Development (AMESD) – Mr. Danilo Barbero

Mr. Barbero explained that AMESD was an AUC programme in partnership with the European Union, the ACPC secretariat and the five RECs (Economic and Monetary Community of Central Africa, ECOWAS, IGAD, Indian Ocean Commission, and SADC), with an implementation centre in each of the communities.

AMESD aimed to help African Governments in designing, implementing, monitoring and evaluating their regional and continental policies towards sustainable development in order to increase the information capacity of African regional and national institutions. AMESD provided a system for capturing satellite data at each centre which was used by the centres to produce information and services and inform actions on the ground, ultimately towards sustainable development. Training and capacity-building was provided at each stage, including sensitization of users, and AMESD was also engaging policy makers.

Having improved the access to earth observation data, the AMESD network was operational for delivering environmental information products and services that were sustained by capacity-building and targeted to the users.

Summary of discussion

Questions and comments

Clarification was sought regarding the current governing body of ACMAD, the distinction between SADC Drought Monitoring Centre and SADC Climate Services Centre and whether the Climate Services Centre was working with other types of partners.

It was noted that although Africa had pioneered regional climate centres, the human resource capacity needed to be enhanced. WMO was trying to assist and promote such capacity. There were gaps in southern and central Africa and WMO sought advice on how to fill those gaps.

One participant asked about the link between the long-term projections for 2100 and the current situation on the ground.

There was a need for expert responses to those critical questions.

Recommendations and the Way Forward

- establish an alliance between the policy, practice and research education communities on data gaps; mobilize African expertise to link data, research, application and policy;
- demonstrate use of existing data;
- increase Africa-focused climate research;
- collaboration between regional centres and academic institutions;
- network of centres of excellence for climate education research and applications; and
- look at the possible use of information and communication technology (ICT) to improve observation.

Topic 1.3: Data and Information

Chair: Prof. Elfatih Eltahir

Summary of Presentations

Paper 1.3.1: Climate science, data and information in Africa: situation analysis, gaps and policy implications – Dr. Tufa Dinku

Dr. Tufa stressed that climate information and services were critical inputs for effective climate risk management, although the use of climate information was limited for development activities in Africa. National Meteorological and Hydrological Services and regional climate centres had a range of data, information and services but there was a big gap between what was needed and what was provided from NMHSs and the regional centres. That was mainly due to weak investment in NMHSs.

Dr. Tufa proposed that supporting NMHSs with a fraction of climate finance would have an impact on data quality and information availability. He said that NMHSs used most of the resources for operational activities with less focus on research activities which would improve the quality of their services. On the way forward, he advocated the creation of a centre of excellence for climate science and applications in Africa and the strengthening of the research capacities of NMHSs, regional climate centres and universities. He also said that ACPC should act as a bridge between science and policy.

Paper 1.3.2: Climate observations and African development – Dr. William Westmeyer

Dr. Westmeyer introduced the Global Climate Observation System and explained the importance of quality observations for various socioeconomic sectors, for example on disastrous extreme events. In 2006, GCOS and others were involved in the inception of the ClimDev Africa Programme. He underscored the importance of terrestrial and oceanic observations for understanding the climate system of our planet. In his view, the documents of national adaptation programmes of action of African countries revealed that only 13 out of 31 countries were able to resolve the inadequacy of climate information. He also emphasized the value of national and regional coordination having advocacy for sustainable observational networks, identifying sources of funding and integrating various institutes to deal with climate observation activities within a country. He suggested that ACPC should invite the directors of NMHSs to a CCDCA conference to draw up a road map for a climate observation network.

Paper 1.3.3: Analysis of the role of information and communication technologies in climate change awareness – Dr. Shakespear Mudombi

Dr. Mudombi argued that although there were many information products about climate and its impact available, it was still little understood. A key question was how to enhance awareness of climate change. The use of ICT could make a difference to awareness levels on climate change by capacity-building in that sector. ICT could be used to collect and disseminate information and make it available to society. It could also be used as a way of creating awareness about climate variability and change in rural areas.

Summary of discussion

Questions and comments

- Given that the most important weather parameter is rainfall, should rehabilitation or installation of rainfall stations be the natural starting point? The cost involved is low and it is easier to mobilize support from policy makers for this rather than install expensive upper air stations?
- How do we establish a baseline for public awareness in a particular community in order to increase public awareness?
- How can we link climate centres to centres of excellence for climate change?
- How can we optimize funding for such networks?
- How do we develop advocacy for early warning science?
- How do we achieve gender balance of at least 50 per cent in decision-making activities on climate change?
- ClimDev Africa was started in 2006, but the implementation has been very slow. Where does the problem lie?
- How can we conduct a campaign for public awareness about climate change which will impact everybody?

Responses from presenters

Dr. Beileh (AfDB) said that the bank had sufficient funds and mandate to intervene in projects. AfDB could finance government projects and non-governmental organizations. Regional organizations could request money from AfDB. Quality of data and information were extremely important to ensure quality investment. The bank had already put a lot of money into universities, Governments and non-governmental organizations. Most of the funding for research organizations was grant money. The \$30 million for ACMAD was the first commitment from the bank for ClimDev. Regarding the slowness of the process, he said that the question should be directed to Governments and those involved in the process.

Dr. Tufa responded to the question on climate services versus a centre of excellence for climate science. Climate science could support climate services, but they were different. Science was about research. Existing climate centres were mainly operational and engaged in limited research. There was a need for a climate centre that addressed Africa's lack of climate research.

Dr. Westmeyer said that the response from AfDB and ACMAD regarding the costing of climate observations provided an opportunity for a project proposal for the ClimDev Special Fund. There were already a series of existing proposals previously identified for ClimDev Africa and the ClimDev Special Fund.

On raising public awareness, Dr. Mudombi observed that the question was not addressed in his research and was therefore an issue that should be addressed in future work.

Recommendations and the way forward

- Invest in improving the capacities of NMHSs and other climate institutions;

- Make climate data a public good: increasing access increases value;
- Establish a regional centre of excellence for climate science and applications;
- Support effective participation of African scientists in the process of generating new scenarios of climate change;
- Promote and support mainstreaming of climate issues into development policy, planning and practice;
- Build the capacity of decision makers and sectoral specialists in the use of climate information for decision-making at all levels;
- Produce and disseminate comprehensive risk management guidelines, best practices, and proofs of concepts focused on multiple climate-related risks;
- Give high priority to improving climate observation networks through ClimDev Africa; observations underpin development of effective climate services for adapting to climate change;
- Countries should include observation system needs when preparing national adaptation plans; and
- Countries should designate GCOS national coordinators and national committees.

B. Sub-theme 2: Climate resilient development and adaptation

Topic 2.1: Socioecological resilience and climate vulnerability

Chair: Prof. Shem O. Wandiga

Summary of presentations

Paper 2.1.1: Vulnerability and climate change hotspots in Africa mapping based on existing knowledge – Dr. Benjamin Lamptey

Dr. Lamptey highlighted the warming trend of the climate and the impact of the changing climate on the achievement of the millennium development goals. That vulnerability was illustrated by the authors in four sectors, namely water, agriculture, coastal areas and health. In the water sector, although the impact was uneven in Africa, he said that future projections indicated that 350-600 million people would be under water stress by 2050. He noted that agriculture was the sector most vulnerable to climate change because most African economies depended on it and had low adaptive capacity.

Coastal areas were also vulnerable, especially the 40 per cent of the population living in the coastal cities of West Africa. In the health sector, climate change might exacerbate the expansion of diseases like malaria, cholera and meningitis.

Dr. Lamptey concluded his remarks by citing key areas where ACPC needed to help African countries to cope with vulnerability, including identification of relevant interventions. Those included provision of knowledge, advocacy, capacity-building, mobilization of resources, and designing appropriate ways of implementing policy for Governments.

Paper 2.1.2: Climate change and health across Africa: critical issues and options – Mr. Jeremy Webb and Dr. Judy Omumbo

Dr. Omumbo explained the direct and indirect impacts of climate change on health; the indirect impacts were even more important than direct impacts. She emphasized the uncertainty in global climate models for impact studies and noted that factors such as population growth, standard of living and health care facilities modulated the effects of climate change. In the policy area, the Libreville Declaration on Health and Environment in Africa was an existing policy instrument for action on the impact of climate change on health. She acknowledged the conclusions of a workshop convened by ACPC in April 2011 in Addis Ababa which defined a roadmap for the reduction of societal vulnerability to climate variability and change in Africa, in particular by focusing on implications for public health policy and practice.

Paper 2.1.3: Integrated systems approaches to innovative climate change adaptation and resource use in Africa – Prof. Martin P. de Wit

Prof. de Wit explained the aim of the study, which was to explore the parameters of innovation in climate change adaptation and resource use in Africa. He provided background information on Africa's specific context within the internationally shifting development patterns. He also emphasized the need to capitalize on human resources and institutions, arguing that knowledge came both from science and society. Additionally, innovative approaches should be based on intellectual pluralism with scientific as well as practical insights.

Paper 2.1.4: Climate change awareness and resilient adaptation: indigenous drivers of regional science, technology and innovation policy in the Niger Delta – Dr. T.C. Nzeadibe

Dr. Nzeadibe explored the different means by which people receive information about climate change and adaptation measures. In the survey conducted by his team in the Niger Delta, 90 per cent of respondents declared that they were aware of climate change and its impacts. In that connection, he concluded that the role of mass media was critical in creating climate change awareness among the population.

Paper 2.1.5: Managing loss and damage for climate resilience development and adaptation in Africa – Dr. Koko Warner

Dr. Warner explained the study, which focused on loss and damage. Mitigation was important, but action needed to be immediate. Risks should be managed and losses and damages reduced because of four significant developments: intensified hazards (e.g. the hunger crisis in the Horn of Africa); competition for natural resources, water and other bioresources; unproductive land due to intensified hazards; and coastal problems resulting from sea-level rise.

Summary of discussion

Questions and comments

The key questions were:

- How does climate change affect tropical diseases?
- Does the current crisis in the Horn of Africa reflect coping requiring aid?
- Is there methodology to identify climate hotspots?

Responses from presenters

- Africa is burdened with diseases, which in other parts of the world have been largely eradicated. There is no protection from floods and disease in Africa. There is much uncertainty in climate models and therefore it is also difficult to generalize the impact of climate change.
- Coping strategies: the adaptive capacities of farmers was highlighted, for example, adjusting planting dates could be considered as a coping strategy.
- The methodology to identify hotspots makes use of climate variability.

Recommendations and way forward

- The next CCDA meeting should consider other sciences, e.g. ecosystems services.

Topic 2.2: Climate change and water

Chair: Mr. Arba Diallo

Summary of presentations

Paper 2.2.1: Climate change on water resources of Africa and essential interventions – Dr. Seleshi Bekele

In his presentation, Dr. Bekele covered a number of themes, including global drivers of change; Africa's water challenges; development and climate change related water challenges; and responses and major interventions. He highlighted the fact that managing water under climate change was a complex problem due to the existence of gaps in data and knowledge. In particular, there were gaps in data, science base and analytical capacity, in developing adequate responses, and in policy and institutional instruments. Essential interventions were needed to address issues such as the weak analytical capacity of Africa; the lack of policy and institutional frameworks for data capture and sharing; and water scarcity in the economy and poor control management. Interventions should be based on scientific consensus with the aim of achieving water use efficiency since available water resources were rarely efficiently used. Africa needed to improve water resource use efficiency in the supply network, agriculture and hydropower development. He underscored the need for effective appropriate policies to facilitate access to adaptation funds for financing and investment in the water sector. Enhancing governance mechanisms was another area that required critical attention for water use efficiency to be achieved.

Paper 2.2.2: Climate change and water in Africa: a strategic perspective – Dr. Elfatih Eltahir

Dr. Eltahir linked climate change with the millennium development goals, particularly the seventh goal related to environmental sustainability. There were significant uncertainties with regard to the future situation of water availability in Africa. To address the challenges related to water availability and climate change on the continent, he recommended adoption of a proactive approach that consciously sought to avoid future surprises with regard to climate change. In addition, the challenges to water availability should be addressed in the context of natural integrated hydrological units: it was imperative to consider the river basins as a planning unit in order to appropriately orient adaptation measures when tackling the problem of climate change and water in the context of African needs. Africa needed a strategy that was comprehensive and covered a wide range of potential impacts; that was flexible and able to evolve as climate change predictions become more certain; and that was low_cost, which was always desirable. The new strategy should be based on five key pillars: (i) improving regional predictions, (ii) development of regional capacity for adaptation, (iii) limited good faith efforts in mitigation of climate change, (iv) vigorous pursuit of opportunities available, and (v) enhanced efforts in education, research and outreach.

Paper 2.2.3: Ground water resources and climate change in Africa – Dr. Callist Tindimugaya

Dr. Tindimugaya drew attention to the fact that over 90 per cent of the world's freshwater resource was groundwater, and that a changing climate meant changing groundwater resources. Groundwater was a

key source of water for drinking, livestock and irrigation in Africa. Approximately half of the nearly one billion people in Africa relied upon groundwater for their daily water supply. The impact of rapid development and climate change on groundwater was expected to be very severe. Groundwater had enabled communities across Africa to adapt to seasonal or perennial shortages in surface water supply. It was therefore necessary that adaptive groundwater management strategies be based on better collection of groundwater data and enhanced cooperation in the area of transboundary groundwater resources.

Dr. Tindimugaya also elaborated on the impact of climate change on groundwater resources, including the recharge, discharge, storage and quality. Future adaptations in response to climate change and rapid population growth were expected to intensify dependence upon groundwater in Africa. However, uncertainties still existed in current projections of the impact of climate change on groundwater resources, ranging from a decline of 17 per cent to a rise of 83 per cent. Nevertheless, appropriate policies were required to guide adaptation in groundwater management; for establishing groundwater and meteorological monitoring networks to assess the human impacts and climate variability effects on groundwater; and for improving human and institutional capacity as well as the hydrogeological knowledge base for sustainable strategy development. Finally, there was a need for effective follow-up steps to improve climate modelling and reduce uncertainty in current projections by undertaking studies to assess how groundwater systems respond to abstraction and climate variability.

Paper 2.2.4: Managing water supply under climate change: The case for small water utilities – Dr. Kenneth K. Odera

Dr. Odera highlighted the pervasive effects of climate change in the Lake Victoria basin. He explained that for water utilities in Bukoba, Tanzania, Masaka, Uganda and Kisii, Kenya, the multifaceted nature of the effects of climate change made it difficult to approach the issue in isolation. Climate change brought added costs to nearly all sectors of the economy. Those included added costs of energy, degraded water quality and water treatment facilities. He concluded by suggesting seven priority steps for action on adaptation and mitigation: (i) propose appropriate adaptation/mitigation measures for affected areas; (ii) assess whether the adaptation is a “no regret” or “low regret”; (iii) detail initial tasks to be completed in implementing each adaptation/mitigation measure; (iv) state whether the adaptation/mitigation measure is an operational or infrastructure type investment; (v) establish a measurement protocol with relevant benchmarks and performance indicators; (vi) provide an initial cost estimate for each proposed adaptation/mitigation measure; and (vii) prioritize adaptation/mitigation measures for implementation.

Paper 2.2.5: Climate change and water challenges in small island nations in Africa: the case of a comprehensive strategy adopted by Mauritius – Dr. K.M. Baharul Islam

Dr. Baharul Islam gave an overview of the current situation and challenges faced by Mauritius as a result of climate change. He emphasized that for Mauritius, a small increase in sea level would have a tremendous impact on the population. The Government was therefore implementing two main policy documents entitled “Maurice ile durable” and the “Green Paper”. He also outlined the Mauritius Model Strategic Recommendations which included development prioritization; a policy formulation process;

democratization of policies; governance as a pillar of sustainable development; institutional perspective; gap analysis and capacity-building.

Summary of discussion

Questions

- Is it realistic to envision watershed management without institutions and legally binding agreements?
- Is there a consensus on the statistical figures presented?
- The rate of degradation is greater than the rate of actions. So what actions do we need to take?

Responses from presenters

- Institutional arrangements to accompany watershed management are critical.
- There are uncertainties related to models, projections and statistical figures. However, there is no reason to wait for a better prediction, we have to act now.
- Actions to be taken include watershed management and storage facilities, which should be done regardless of climate change because they are fundamental for water efficiency. Climate change is an additional reason.

Recommendations and way forward

- ACPC should organize a forum for river basin authorities.

Topic 2.3: Climate change and agriculture

Chair: Mr. Seifu Ketema

Summary of presentations

Paper 2.3.1: Climate change and agriculture in Africa: analysis of knowledge gaps and needs – Dr. Tom Owiyo

Dr. Owiyo noted that Africa was the only region where agricultural yields and production had been low and declining in recent years, despite the sector's significant contribution to GDP in African countries (15-50 per cent). Several factors had contributed to the low performance, including low investment by African Governments, a low level of irrigated agricultural production, low use of fertilizers and other land management technologies, post-harvest losses and other environmental challenges such as soil degradation.

In spite of those challenges, recent global trends presented a great opportunity for African agriculture. Those included the increasing world population, rising income in some parts of the world, changing dietary habits, and the large untapped agricultural potential of the continent. However, besides the traditional challenges facing the sector, climate change and climate variability presented an additional complexity that required urgent attention from African Governments. The development and implementation of appropriate policies was nonetheless hindered by significant knowledge gaps, including uncertainty with regard to the impacts of climate change and climate variability on agro-ecosystems, uncertain climate change projections at global and regional levels, uncertain climate change impacts on agricultural water supply, and weak knowledge-sharing systems.

In conclusion, he said that it was important for African countries to speak with a common voice in climate change negotiations. To that end, there was a need for close collaboration between experts in research (scientists, economists and technicians), policy and practitioners.

Paper 2.3.2: Agricultural water management in the context of climate change in Africa – Dr. Tilahun Amede

Dr. Amede started by discussing the impact of climate change on glaciers, groundwater, river flows and water productivity. Climate change eroded the resource base and decreased yields and productivity, especially in the agricultural sector. African agriculture was largely rain fed and agricultural water was lost through unproductive evaporation. Climate-smart rain water management systems and a strategy to map, capture, store and efficiently utilize water were needed.

He said that interventions required in agricultural water management included investment in irrigation, improving water management at farm scale and improving livestock systems for climate change adaptation. In conclusion, he recommended investment in water storage at all scales, formulation of policy geared towards climate sensitive systems, and the use of transboundary hydrological modelling.

Paper 2.3.3: Contribution to the assessment of climate change vulnerabilities within the livestock sector in North Africa: the case of Morocco – Dr. Fouad Bergigui

Dr. Fouad Bergigui described climate change modelling and climate projections for Morocco. Based on World Bank data, he showed expected yield reductions at different time horizons with respect to climate change. He discussed the livestock sector and its probable vulnerabilities to climate change, the competition from various sectors on feed resources, the effect of heat stress on production, and possible directions for research on the impact of climate change on animal health, particularly livestock diseases.

He said that climate change vulnerabilities within the livestock sector were warning signals for food security and livelihoods in the wider community of Moroccan stockbreeders and other stakeholders within the livestock-agricultural cluster. As such, the signals should be interpreted in due time to come up with an integrated livestock preventive adaptation response strategy by reducing its water footprint while increasing productivity.

Paper 2.3.4: Climate change and agriculture in Africa: the nexus and situation – Dr. Arthur Riedaker

Dr. Riedaker explained the role of agriculture in the food chain with respect to provision of human food and livestock feed. He observed that solar energy held great potential for sustainable development, particularly with regard to adaptation to climate change. On agricultural production, he emphasized that Africa had to come up with sustainable mechanisms for the provision of fertilizers, one of the limitations to production. That might include sustainable agricultural subsidy programmes. Well designed and sustainable subsidies would help the continent to reverse the course of declining agricultural productivity; it was the only region to experience such productivity decline in recent years. Countries in Europe, such as France, had almost reached the productivity frontier with regard to agricultural inputs, in particular fertilizers, and were now negotiating to maintain yield with reduced inputs. The inverse was true of Africa where the opportunity to boost production, especially by use of inputs like fertilizer, was immense.

Dr. Riedaker appealed to experts and professionals not to oppose agricultural subsidies, which in any case were common in developed countries, but to help African countries in designing such subsidies sustainably. He also mentioned that in addition to mineral inputs, water input was essential to increasing agricultural production per hectare and higher yields per hectare resulted in reduction of greenhouse gas emissions. Road infrastructure for market access, as well as access to credit and financial services, were also important to the development of agriculture. A landscape approach to agricultural production offered great promise to improving agricultural productivity as had been witnessed in South Africa.

In conclusion, he proposed five policy recommendations: (i) promote policies and measures to increase efficiency; (ii) set up an effective funding mechanism; (iii) assess the effects of increasing fertilizer input and other actions; (iv) calculate the cost and benefits for farmers and countries of different options; and (v) ACPC should help African countries to develop policies.

Paper 2.3.5: Climate change impacts in Africa and UNFCCC negotiations: policy implications of recent scientific findings – Prof. Doreen Stabinsky

In her presentation, Prof. Stabinsky considered the UNFCCC objective of stabilizing greenhouse gas concentrations in the atmosphere and the need to achieve a level, within a specific time frame, that would mean that food production was not threatened. She focused on the effect of temperature on crop yield and noted that an inverse relationship existed. According to IPCC, the current temperature was 0.74 degrees higher than the historical average of the last century. By 2050 the world would be 1.5 degrees warmer than the historical average temperature of the last century. For Africa, 2010 was the warmest year on record and Africa was warming quicker than the global average.

She said that temperature was the more critical variable for crop production and there was a need to address the impact of temperature increase rather than concentrating only on rainfall. Crops had physiological limits, for example, pollen died above a certain temperature, grain filling processes slowed down, and photosynthesis did not work above certain temperatures.

She noted the research findings from Stanford University which indicated that temperature changes had more significant effects than rainfall in determining crop yields. Climate extremes would become much more common, with relevant temperature thresholds for crops being exceeded on more days in most regions. Growing seasons would shorten as temperatures rose.

In conclusion, she highlighted key policy questions which UNFCCC was struggling with:

- The global goal of the Cancun Agreements is 2 degrees. The African position is 1.5 degrees. The historical droughts are related to 0.47 degrees Celsius. The 2-degree target is too high for the African goal.
- Adaptation should be the immediate concern of country-level planning. Governments should actively engage in greenhouse gas negotiations on loss and damage, particularly with regard to the impacts of slow onset temperature rise on future crop production. The UNFCCC adaptation framework should have specific programmes on adaptation and agriculture.
- Mitigation is a key component of negotiations at the global level. Agricultural emissions of developed countries are 2-3 times those of African countries. Mitigation markets cannot be a stable or predictable funding source for African agriculture. Soil carbon markets which have been proposed to fund adaptation in agriculture in Africa may actually threaten future production as they imply continuous emissions from elsewhere.

Summary of discussion

Questions

- Are there any positive effects of climate change?
- Do you have any suggestions on how to approach the carbon market?
- What about organic agriculture?

- How should we integrate indigenous knowledge into our strategy?

Response from presenters

- Despite uncertainties in climate projections, some regions will benefit from climate change.
- Although Africa has opportunities, carbon markets cannot be a stable or predictable funding source for African agriculture.
- Organic manures are very important for increasing the water-holding capacity of soil and optimizing the effects of fertilizers but at the same time, it is very important to increase the use of mineral fertilizers.
- Indigenous knowledge should be disseminated widely.

Recommendations and way forward

- Develop and adapt methodological tools and models through a multidisciplinary research approach.
- Increase land use efficiency and optimize the use of agriculture inputs (fertilizers and organic matters) in a comprehensive combination in Africa.

C. Sub-theme 3: Low carbon development

Topic 3.1: The green economy in the context of Africa

Chair: Mr. Mounkaila Goumandakoye

Summary of presentations

Paper 3.1.1: Conceptualizing of low carbon development in the context of Africa – Mr. Kevin Urama

Mr. Urama noted that low carbon development entailed the reduction of carbon emissions while simultaneously improving resource efficiency and resource productivity. Given the impacts of climate change on key sectors, low carbon development was an alternative to the “lose-lose, business as usual” scenario for Africa. He described low carbon development as an economic pathway based on resource use efficiency and resource productivity, low carbon technology and innovation, and decoupling CO₂ emissions from GDP growth. Not only did the adoption of low carbon technologies and innovations contribute to the global climate outlook, they also cut costs for African interventions in the long term. The potential for low carbon development on the African continent to include the availability of solar and wind energy and the high hydroenergy potential was currently exploited at only 7 per cent. Additionally, the opportunities in low carbon development for African development included: (i) leveraging climate finance, (ii) prospects for improved energy access, and (iii) human well-being and improved energy security with reduced environmental impacts. The challenges and barriers, however, included: (i) low or poor investment in science and technology; (ii) the high cost of low carbon development, and (iii) policy and environment that weakly outlined the issues of low carbon development.

Paper 3.1.2: Green growth paradigm in Africa – Prof. Myung-Kyoon Lee

Drawing from the experiences of the Republic of Korea with green growth, Prof. Lee outlined why there was a need for a new paradigm to address economic, environmental and social challenges. A new paradigm, he said, needed to foster economic growth while at the same time ensuring climatic and environmental integrity if the challenges of climate change, environmental and ecosystem degradation, resource depletion and deepening inequalities were to be addressed. That was particularly important for Africa given the continent’s high vulnerability to climate change, high poverty levels and income gap, and heavy dependence on climate-sensitive sectors. For green growth to work, government leadership and international cooperation were critical. The Government of the Republic of Korea had committed 2 per cent of GDP to green growth between 2009 and 2010 and pledged a 30 per cent emissions reduction despite being a non-Annex 1 Party to UNFCCC.

In conclusion, he said that Africa had unique potential and opportunities for green growth, including the fact that the continent was at an early stage of economic development with low emissions compared to other regions, had abundant land resources, and had the potential to attract climate finance.

Paper 3.1.3: The green economy in the context of Africa: the case of climate resilient green economy in Ethiopia – Mr. Selam Kidane and Mr. Wondwossen Sentayehu

Mr. Kidane explained that Ethiopia's Climate-Resilient Green Economy was a vision for mainstreaming climate change in development. Climate resilience was critical to maintaining Ethiopia's GDP in the context of projected warming of 0.7-2.3 degrees Celsius by the 2020s and more irregular and heavy rainfall events. Besides the maintenance of GDP, the climate-resilient benefits included adaptation through enhanced resilience and reduced vulnerability, capacity to obtain new and additional finance, climate benefits and development co-benefits, technology transfer and an increase in incomes and decent jobs. In order to ensure a climate-resilient green economy, it was important to have a good process and structure. The structure comprised climate resilience and adaptation on the one hand, and green growth and mitigation on the other. The process involved five steps to a green economy: identifying the priorities of various sectors; developing a baseline reference; enlisting measures; prioritization of measures; and the identification of major milestones for implementation.

Paper 3.1.4: Sustainable resilient low carbon transport: a cross-cutting issue –Dr. Roger Gorham

Dr. Gorham pointed out the mismatch inherent between the climate change and transport sector professions. Despite the fact that the transport sector contributed approximately 24 per cent of emissions in Africa, climate change professionals often did not consider transport within strategies for emissions reduction, such as measurement, reporting and verification monitoring systems. Similarly, transport sector officials did not factor in climate change in their work. For sustainable and low carbon resilient transport to develop in Africa, that blind spot between transport and climate change had to be acknowledged and addressed. There was a need to focus on the links between climate change and transport in light of the high urbanization rates on the continent, which meant that projected emissions from the transport sector were likely to increase if not approached and planned from a low carbon development perspective. While failure to acknowledge the links between climate change and the transport sector was a cause for concern, there were also other challenges in terms of methodology, such as the difficulty of quantifying transport emissions.

Summary of discussion

Questions

- Much talk about the green economy has focused on the supply side (technology issues). What about the demand aspects, in particular the consumption approach in Africa?
- What are the differences or similarities between resilience, green economy, green growth, low carbon development and sustainable development?
- How can cost analysis be conducted when adopting green growth in Africa?

- How can the most vulnerable groups, i.e. women, children and the disabled, be involved and how can indigenous knowledge be built into low carbon development strategies?

Response from Presenters

The panellists noted that the demand side was as important as the supply side and should be factored into low carbon development strategies. In particular, Africa needed to embrace improved production technologies that increased efficiency as consumption and demand for goods and services increased. It was also observed that behaviours on the African continent were often influenced by the West.

Regarding the concepts and terminologies (green economy, sustainable development, etc.), there were some differences depending on the concepts and the objectives to be achieved: green economy for economic efficiency or green growth for growth might have nuanced differences. Importantly, all aimed at low carbon development and it was critical that their achievements should be clearly measured. Regarding concepts, a pragmatic approach should be paramount, particularly in the context of the African continent. A critical look at the resources on the continent and how to exploit them to achieve low carbon development to meet sustainable development needs would be the natural starting point.

Recommendations and Way Forward

The Chairpointed out that the green economy had been on the agenda of the United Nations Environment Programme (UNEP) since 2008. He suggested that it was time for UNEP, UNECA, ACPC and AfDB to come together to create a platform for a community of practice to ensure the reduction of poverty and attainment of sustainable development through green economy strategies.

It was recommended that:

- Indigenous knowledge should be documented and incorporated into low carbon development strategies.
- Low carbon development should consider the role of ecosystem services, which so far has not been effectively captured in the development paradigm.
- There needs to be a new way of assessing socioeconomic progress in terms of ecological services.
- Sufficient mechanisms need to be put in place for climate finance to ensure effective utilization in areas already identified, such as low carbon development strategies, and to form part of the negotiation process.

Topic 3.2: Sustainable energy, energy access and poverty

Chair: Dr. Essel Ben Hagen

Summary of presentations

Paper 3.2.1: Energy access and energy for poverty alleviation in Africa – Dr. Smail Khennas

Dr. Khennas addressed the theory and the methodology for energy access and energy for poverty alleviation in Africa. Key issues of energy access included production, distribution and governance. Energy access was often confused with having electricity; rather it should be regarded as both electricity and other forms of energy. With the trend towards low carbon development, there was a need for African countries and energy providers to adjust to the transition, otherwise they would find themselves unprepared for market shifts in the future.

Paper 3.2.2: Integrating renewable energy and climate change policies: exploring policy options for Africa – Dr. Yacob Mulugetta

Dr. Mulugetta picked up the discussion from the perspective of opportunities and prospects for integrating renewable energy and climate change policies on the African continent. Outlining the historical energy transitions from wood to coal and oil and gas, he noted that the world had entered a new phase where one part of the world needed to de-carbonize while the other – Africa included – needed to increase energy consumption. Africa had high resource potential to pursue a low carbon development pathway, given that the continent used only 7 per cent of its hydropower potential and other sources were also available.

Paper 3.2.3: Agro-industrial low carbon development options in southern Africa: the case of bioenergy from sugar cane – Mr. Vikram Sebaluck

According to Mr. Sebaluck, sugar cane was the most promising agricultural source of energy in Africa. It had high adaptation potential in many parts of the continent and with improved technologies could produce considerable amounts of energy. The socioeconomic impacts of bioenergy included employment creation, while the environmental co-benefits were reduced carbon emissions.

Paper 3.2.4: Fossil fuels in Africa in the context of a carbon constrained future – Mr. Alemu Mekonnen

Mr. Mekonnen said that fossil fuels (crude oil, natural gas and coal) played vital roles in the energy system and economies of African countries. He noted that Africa had enormous fossil fuel reserves (shares in total reserves): crude oil (9.5 per cent), natural gas (8 per cent) and coal (4 per cent). Over 80 per cent of Africa's electricity was generated from fossil fuels. There are some challenges and opportunities such as the use of fossil fuels for improved energy access, economic growth and poverty reduction, and mitigating the contribution of those resources to climate change.

Paper 3.2.5: Entrepreneurs, enterprises and energy in Africa – Mr. Lawrence Agbemabiese

Mr. Agbemabiese said that poverty had been persistent in Africa due to the development models adopted at independence. There was a close correlation between poverty and energy consumption. In order to support the energy demands of African entrepreneurship, there was a need to increase access to energy by exploring and exploiting sustainable energy sources. Using the Renewable Energy Development approach, which included three types of investment (proof of concept, commercialization and expansion), the poor could afford improved energy end user equipment if they were aware of the availability of the technology and practical benefits to their lives, and were given the necessary financial assistance. Diversifying target groups to include commercial, institutional and domestic markets was appropriate for sustainable business. The entrepreneurial-led models, such as the improved cooking stove, had been largely unsustainable due to their being donor driven and donor supported and therefore often left with no support at the project end.

Summary of discussion

Questions

Questions were raised covering the following issues: the conflict between biofuels and food security; the high cost of renewable energies such as solar panels; land and agro-industry; sociological barriers due to preconceptions that renewable sources of energy are not reliable; using the advantage of experiences from developed countries or emerging countries, for example, in the field of energy supply and demand management.

Responses from presenters

Some of the responses provided were:

- Biomass is used to generate co-benefit for poverty alleviation not as biofuel alone. Hydropower and biomass make up only 2 per cent of the energy balance in sub-Saharan Africa, thus offering huge potential for tapping into.
- There are many policies but the challenge is to implement them, and the continent is only at the beginning of the process.
- There are areas in Africa where land is underutilized and has great potential for improving productivity and production. The issue of biofuels and agriculture needs to be objectively addressed taking into account existing opportunities and challenges that allow for the conflict between biofuels and food security to be soberly managed.

Recommendations and way forward

- Create regulation and legislation (including fiscal and public financing) that could create conducive policies for public private partnerships;
- Create incentives and stable long-term policy for entrepreneurs;
- Move from energy access to energy transition;
- Define “specific, measurable, achievable, result-oriented and time bound” targets for low carbon development;

- Development of scientific database by African institutions;
- Build regional cooperation to create the critical mass for significant technology transfer and low carbon industries and related services;
- Promote behavioural change to develop the African way of utilizing renewable energy resources, not always copying from developed countries;
- Tap into proven renewable technology;
- Take advantage of being latecomers and learn from others (failed or successful), bearing in mind that the development of policy is not enough and resources and technology are also needed;
- Involve civil society and communities to do costing of adaptation and mitigation instead of consultants;
- Explore the value chains on biofuels in the context of the fuel versus food debate;
- Support the emergence of a new powerful lobby of entrepreneurs who can lobby Governments for climate compatible development; and
- Create awareness of and sensitization to the reliability, importance and benefits of renewable energy.

Topic 3.3: REDD+ and LULUCF

Chair: Prof. Francis Yamba

Summary of presentations

Paper 3.3.1: Deliberating REDD+ governance and institutions in Africa – Mr. Mulugeta Ayalew

Mr. Ayalew highlighted Africa's potential for REDD+ and the importance of institutions and governance in REDD+ initiatives. Using experiences from two countries – Ghana and the Democratic Republic of the Congo, he drew attention to the different institutional approaches to REDD+ implementation in the context of each country. He also provided a brief synopsis of what the REDD+ mechanism was, outlining its aim of reducing emissions through “avoided deforestation” by providing incentives for developing countries to protect and better manage their forest resources. In Africa, the primary focus should be on the rights and livelihoods of local communities, capacity development, and intersectoral coordination for REDD+ implementation on the continent.

Paper 3.3.2: Climate change in African forestry: the broader policy context –Mr. Godwin Kowero

Mr. Kowero pointed out that the loss of forests had continued unabated for the last fifty years. The loss of forests could be addressed by incentives, such as REDD+, for their conservation. REDD+ in Africa focused only on the Congo basin rainforest yet other forms of forest existed. In particular, dry land forests should be included in REDD+ initiatives. That was important considering that population distribution was highest within the dry land forests and incentives to avoid deforestation were likely to have the highest impact in that setting; the justification for focusing on dry land forests was that forests and trees did not exist in isolation from households.

Picking up on the debate on food security and fuel, Mr. Kowero noted that often when observers said that there was a lot of land in Africa, they were referring to forested land. That perception was driven in part by the fact that the value of forests was not clearly measured. To capture that value, the debate should not be about food and fuel but about food, fuel and fibre. Similarly, efforts to conserve forests should be approached from the perspective that there were trade-offs to be made with other competing demands that contributed to local livelihoods.

Paper 3.3.3: Climate change and gender – Ms. Terhas Hagos

Ms. Hagos focused on gender aspects of REDD+. She pointed out that gender aspects were important as the crucial role of women was not complemented by legal tenure or ownership rights over forests. The assessment of gender roles was further constrained by the fact that there was a knowledge gap and lack of statistical data on the role of women in forestry. That had implications for policy planning and resulted in a lack of appreciation of the contribution of women.

Paper 3.3.4: What is LULUCF for Africa – Mr. Johnson Nkems

The role of land use, land use change and forestry in addressing climate change in Africa was the main theme of Mr. Nkems presentation. He said that the direction of change, either losing land cover, for example by deforestation, or gaining land cover as in afforestation, was more crucial than just the current distribution of land use. Land and natural resources constituted dynamic systems with multiple drivers. The historic drivers of land use change in Africa were mainly food production, environmental processes, population and settlement and economic activities. The bigger challenge under climate change was how to cope with emerging drivers of land use change, especially given the insufficient knowledge and capacity to address them. Those ranged from security issues, bioenergy, climate change responses (including REDD+), market opportunities such as the green economy, and lifestyle and social organization. Land use change for agriculture remained a major way of addressing food security. Increasing productivity was still based on extensification instead of intensification of agricultural activities.

Summary of Discussion

Questions

Questions were asked on the following issues:

- The definition of REDD+; barriers and intersections with other subsectors; the issue of forests that are located outside the central African region; and parties interested in African forest.
- The question of methodology and particularly whether Africa is ready for REDD+ methodology .
- The level of public participation and action taken, and how to give incentives to private forest owners to keep their forest and avoid loses.
- Whether Africa has a common stand on REDD+, and how to address the issue of measurement, reporting and verification in REDD+ implementation.
- The relationship to transport infrastructure.

Responses from presenters

On the subject of REDD+, the panellists pointed out that the experts had failed to communicate the value of forests. There was a trade-off between REDD+, conservation and land use (agriculture, etc.). There were also some governance issues specifically in South Africa regarding substantive rights. The question of gender should be addressed in a balanced manner among women and men. REDD+ was a big opportunity not only for the forestry sector, but also for land use in general.

The panellists highlighted the lack of statistical data, political will and support as major constraints in building strategy on REDD+. The example was given of the extent to which the Ethiopian Environmental Protection Authority was allowed to act and its efforts to stop people destroying the environment.

There had to be a trade-off with REDD+, poverty alleviation and deforestation. In order to reduce the rate of deforestation, forests had to be viewed as an open resource, while keeping in mind that REDD+ was able to give incentives and that could be used to attract forest owners.

Recommendations and way forward

- Prioritizing co-benefits in land use change decisions;
- Preparedness for new settlements such as small towns (as opposed to rural-urban migrations);
- Need to consider trade-offs between poverty reduction and forests – REDD+ not just for conservation's sake;
- Consider the three Fs in decision-making – food, fuel and fibre;
- Clear policy, legislation, and institutional and regulatory frameworks as well as political will should be in place for REDD+ (to deal with the influence of vested interests);
- Prioritize management of land use and land use change as cost effective measures for mitigating and adopting to climate change;
- Develop methodologies for measurement, reporting and verification for African forests;
- Develop REDD+ initiatives in dry land forests;
- Establish clear messages to communicate the value of forests to livelihoods and economies;
- Address barriers to the equitable involvement of women in forests and REDD+;
- Consolidate data on gender roles in forest conservation and define better the rights of women; and
- Learn from the failings of the Clean Development Mechanism to improve REDD+.

D. Sub-theme 4: Economics and finance

Topic 4.1: Economics of climate change in the context of Africa

Chair: Mr. Emmanuel Nnadozie

Summary of presentations

Paper 4.1.1: Cost of adaptation in Africa – Dr. Aimée Bella-Corbin

In her presentation, Dr. Bella-Corbin said that Africa was particularly vulnerable to climate change because of its low adaptive capacity. She noted that according to a recent study by AfDB, Africa had to date received just \$132 million of adaptation funding or 38 per cent of the funding approved (\$350 million). That demonstrated the scale of the challenge facing Africa, as well as the urgent need for African leaders to engage in debate on sources of future climate finance. Data collected suggested that the costs of adaptation in Africa might be around \$18 billion per year in the period 2010–2050. Taking into account the current gap in adaptive capacity, most studies suggested between \$20 and 30 billion, and possibly as high as \$60 billion per annum for the same period.

Paper 4.1.2: Infrastructure and climate change – Mr. Raffaello Cervigni

Mr. Raffaello Cervigni said that future progress in Africa hinged on growth picking up.. Infrastructure could boost growth fourfold, but there was a financing gap of \$50 billion to fill. He observed that the World Bank Economics of Adaptation to Climate Change study estimated adaptation costs of \$18 billion per year between 2010 and 2050. However, global figures could underestimate national costs, and it was important to broaden the analysis to a wider range of climate outcomes. Climate change affected infrastructure in a number of ways. For example, more frequent occurrences of extreme events meant more storage needed to keep flood risks in check; and more frequent damage to infrastructure reduced the traffic threshold for which paving became optimal. There was a need to develop robust infrastructural decisions and to enhance infrastructural readiness to help attract climate finance.

Paper 4.1.3: Economics of climate change adaptation in Africa – Mr. Tom Downing

Mr. Downing said that evidence was growing on the cost and benefits of climate adaptation in Africa. There was now a clear consensus that investment in adaptation was urgent, and finance was only beginning to come on stream despite years of commitments and programming. He observed that by 2030, the requirement for new investment in climate adaptation, beyond existing development commitments, could well be \$100 billion per year. As a result, developing effective pathways of adaptation, from the current situation to realistic scenarios of climate resilience was the priority. Effective assessments of policies, strategies and measures should be based on robust economic analysis: however, metrics of adaptation could not be easily reduced to one dimension. Given the challenges ahead, uncertainty over future climate change impacts and the economics of adaptation was not an excuse for inaction.

Paper 4.1.4: Contribution of geothermal energy to low carbon development in East Africa – Dr. Meseret Zemedkun

In her presentation, Dr. Zemedkun focused on the East African Rift System, one of the major tectonic structures of the earth where the heat energy of the interior of the earth escapes to the surface. She explained that the energy flow could take place in the form of upward transport of heat by hot springs and natural vapour emissions. Estimated geothermal energy resource potential in the East African Rift System was more than 15,000 MW. Despite this high potential of the East African Rift, only Kenya and Ethiopia had installed a capacity of about 217 MW. Other countries with potential access to the East African Rift System were at their exploration stage or had not gone beyond the resource potential inventory work. One of the main regional geothermal programmes in the region was the African Geothermal Development Facility Programme. Dr. Zemedkun explored the financial and the technical capability of the Programme for realizing the objective of delivering geothermal energy to the subregion; it was evident from the Programme that the resource was reliable, cost effective, and low in greenhouse gas emissions, compared to other sources of power in East Africa. That also underlined the utilization of the resource for industry and agriculture.

Summary of discussion

Questions

The following were the key questions raised during the discussion:

- Could Africa be assisted in mapping and designing roads that are resilient to climate change, given that roads are sensitive to heatwaves, landslides, rainfall and many other challenges?
- Why are there discrepancies in the various estimates of the cost of adaptation. Why not narrow down the discrepancies so that the figures can be worked with?
- Is it possible to import geothermal energy?
- On the question of geothermal energy, have the experts explored the aspect of low- and medium-temperature geothermal systems that could be relevant for distributed systems?

Responses from presenters

The panellists said that the focus of work should be on developing capacity for the future so that Africa was ready to build infrastructure to cope with the effects of climate change. African countries could partner with international companies to map those facilities, but the availability of climate change data would be a critical requirement.

The discrepancies between adaptation cost estimates were largely due to the different methodologies used, with each methodology based on specific assumptions; there were not right or wrong answers.

On the third question, the response was affirmative; it was possible to export geothermal energy. Finally, the objective of the geothermal programme was to use geothermal energy sources.

Recommendations and way forward

- There is a need to develop robust infrastructural decisions and to enhance infrastructural readiness to help attract climate finance;
- More money should be allocated to distributive systems;
- Required responses are huge despite discrepancies in numbers, and this obviously means there is more work to be done, including access to resources;
- Better studies are needed for a better understanding of what will happen, and to integrate socio and cultural dimensions in development planning;
- African leaders should focus on integrating climate change into their development plans. ACPC has a big role to play in designing policies to help African Governments;
- Capacity needs to be developed in the area of the economics of climate change; and
- Developing effective assessments of policies, strategies and measures should be based on robust economic analysis.

Topic 4.2: Climate Finance

Chair: Ms. Alessandra Tisot

Summary of presentations

Paper 4.2.1: Lessons from fast start finance – Dr. Yacob Mulugetta

Dr. Mulugetta noted that at the December 2010 United Nations Climate Change Conference in Cancun, Mexico, the Parties to UNFCCC acknowledged the commitment of developed countries to provide “new and additional” resources equivalent to nearly \$30 billion for the period 2010-2012. The money was described as “fast start finance”. In his presentation, Dr. Mulugetta explored lessons that had been learned from the fast start finance experience and suggested efforts to enhance action on finance under the Convention for the period commencing in 2013.

Paper 4.2.2: Enhancing access to climate finance: understanding the direct access modality and the role of fiduciary standards in emerging climate finance discourse – Dr. Huzi Mshelia

According to Dr. Mshelia, African and other developing countries had an apparently limited understanding of the direct access modality adopted by the Adaptation Fund Board for accessing financing under the Fund. Dr. Mshelia presented an analysis of the concept of direct access, its benefits and limitations; the fiduciary standards of the Adaptation Fund Board; and their consistency with the general objectives and principles of the Conference of Parties in setting up the Fund. He also discussed how those standards were likely to affect the ability of African countries to implement adaptation and what elements of the fiduciary standards were likely to find their way into the emerging Green Climate Fund.

Paper 4.2.3: Tool for the evaluation of investment and financial flows to address the adverse effects of climate change – Mr. Dieudonné Goudou

Mr. Goudou informed the conference that UNDP had developed a tool for assessing investment and financial flows for adaptation and mitigation. The main objective of the tool was to support developing countries in the determination and creation of investment potential in relation to mitigation and adaptation options, and to transform them all into a coherent strategy which was compatible with sustainable development and other national priorities. Mr. Goudou shared results from the evaluation of the tool based on pilot studies in Niger.

Paper 4.2.4: Carbon finance experience in Africa – Dr. Arabinda Mishra, TERI

Dr. Mishra said that the CDM market had witnessed dramatic progress in the past few years, with more projects in the pipeline. However, CDM project development still faced barriers preventing a much larger potential expansion in Africa. Dr. Mishra presented an analysis of carbon finance and CDM for Africa under four aspects, namely the importance of carbon finance both for adaptation and mitigation; the evolution of the global institutional architecture of carbon finance; the trend of the CDM experience in Africa; and the importance of scaling up CDM projects in Africa.

Paper 4.2.5: African Carbon Facility – Mr. Pal Monojeet

Mr. Monojeet noted that while global carbon markets were taking off, Africa lagged behind with only 7 per cent of the CDM global market share. AfDB was designing targeted financing instruments, such as the Africa Carbon Facility, to assist Africa's carbon markets and attract more green investments to the continent. The goals of AfDB were to address the supply side, the demand side, and the debt-financing barriers to support of the African CDM projects post-2012 and until 2020. Mr. Monojeet discussed the design and operational features of the African Carbon Facility.

Summary of discussion

- There should be a balance between adaptation and mitigation resources, and there needs to be some readiness to absorb them;
- Direct access has created an opportunity and responsibility, so that there is a need to reform the governance structure. Similarly, African countries must develop appropriate communication strategies and national capacities to set up their NIEs and develop an exit strategy for MIEs within recipient nations; and
- African countries have to look at how to integrate climate finance into development finance by creating working methodologies.

Recommendations and way forward

- Carbon finance should be scaled up in a coordinated manner;
- Finance must be determined by developing country priorities, and public sector funds should be used where appropriate to catalyze investments. The private sector also has an important role to play in mobilizing capacity for climate change finance;
- African countries must come together and have one voice at the negotiating table; and
- There is a need to promote capacity-building to help national entities.

Topic 4.3: Roles and experiences of RECs and Member States in climate change

Chair: Dr. Abebe Haile Gabriel

Summary of presentations

Paper 4.3.1: Regional climate change implications and the possible role of regional institutions – Dr. Nagaraja Rao Harshdeep, World Bank

Dr. Harshdeep said that Africa was currently facing many climate risks including droughts and exposure to frequent floods. Climate change was expected to exacerbate those further, thus there was a critical need to mainstream climate change challenges into development planning. RECs, river basin organizations and other institutions such as climate forecasting centres, and universities could play a crucial role in improving the readiness of Africa to tackle the challenges of climate change and development. Africa needed to improve climate investments through progress in critical areas such as information gathering and development of relevant institutions and infrastructure. Information issues could be addressed through the public domain knowledge base and regional planning tools, financing and networking of interoperable hydromet systems, and regional documentation of climate response projects that could be scaled up. Institutions could be improved through capacity-building, training, knowledge sharing and synergistic relationships with REC members and other relevant institutions.

Paper 4.3.2: Common Market for Eastern and Southern Africa (COMESA)

A representative of COMESA gave a presentation on the involvement of COMESA in many climate issues in the subregion and the organization's ability to tackle the many challenges. It was said that COMESA had an important programme for mitigation and adaptation to climate change. It was working to promote the green economy; develop a fund for infrastructure; develop the carbon market; review programmes of Member States; and set up a fund that could be used as leverage for outside funding. COMESA was working to maintain good relationships with lead countries such as the United Kingdom, the United States and Norway.

Paper 4.3.3: Climate change concerns, management and perspectives in the ECOWAS Commission – Mr. Bougonou K. Djeri-Alassani, ECOWAS

Mr. Djeri-Alassani said that a subregional programme on adaptation to climate change and reducing vulnerability had been adopted in March 2010, in Accra, Ghana. He informed the participants that the programme included strengthening scientific and technical capacity in addressing climate change issues and mainstreaming climate change aspects into development at the level of policy, strategies, programmes and projects. Programmes on adaptation to climate change were also being developed and implemented in the subregion.

Paper 4.3.4: Union of Arab Maghreb

A representative of the Union of Arab Maghreb presented a report on climate change prepared in response to a request from UNECA to provide an overview of experiences in the subregion. The report had established an inventory of actions, strategies, and the key actors of climate adaptation. It also

assessed the needs of the subregion in terms of technology transfer and had compiled a list of institutions that were in charge of climate change issues. An action plan had been established, including six main focal areas, including: knowledge building, prevention and risk management, training and capacity-building, integration of adaptation into action plans, funding and financing innovations.

Summary of discussions

- Adaptation must go hand in hand with mitigation;
- Capacity-building was needed at regional and national levels to improve knowledge on climate change scenarios, manage disasters and create an integrated database for adaptation and vulnerability assessments;
- There was a need to mainstream climate change adaptation policies and activities into important sectors including agriculture, energy (hydro and geothermal), biodiversity, and ecosystems; and
- African countries needed to rapidly mobilize funds from internal resources without waiting for external funding in order to avoid affecting the pace of projects.

Recommendations and way forward

- Africa needs to start mobilizing its own communities (at local, national and regional levels) and efforts in raising finances, capacity-building and development activities;
- The private sector should be engaged to play a key role in mobilizing finances within and outside Africa;
- River basin organizations in Africa are well placed to track and address developmental issues on the ground in terms of project implementation, regional integration and cooperation;
- The roles and responsibilities of RECs should be made clear to avoid conflicting objectives with national programmes. This will be important for capacity-building, programme implementation, coordination and interaction activities; and
- RECs need to build links (through networking, partnerships, communications) with other subgroups that are also important key players in addressing developmental and climate change issues, like local communities, farmers and other stakeholders.

Appendix: CCDA-I Programme

Day 1, Monday, 17 October 2011(Conference Room 2)		
0800-all day	Registration for CCDA-I (registration open all day)	
0900-1030	<p>Opening ceremony</p> <ul style="list-style-type: none"> • Welcoming remarks <ul style="list-style-type: none"> ○ HE Mr. Abdoulie Janneh, United Nations Under-Secretary-General and Executive Secretary of UNECA • Keynote statement <ul style="list-style-type: none"> ○ Dr. R.K. Pachauri, Director General of TERI and Chair of Intergovernmental Panel on Climate Change (IPCC) • High-level statement <ul style="list-style-type: none"> ○ HE Mr. Erastus Mwencha, Deputy Chair, African Union Commission (AUC) • Opening of Conference <ul style="list-style-type: none"> ○ HE Mr. Hailemariam Dessalegn, Deputy Prime Minister and Minister of Foreign Affairs, Federal Democratic Republic of Ethiopia 	<p>Master of Ceremony: Mr. Josue Dione, Director, Food Security and Sustainable Development Division, UNECA</p>
1030-1100	Coffee/tea break	
1100-1300	<p>High-level dialogue on Development First: Addressing Climate Change in Africa Panellists:</p> <ul style="list-style-type: none"> • HE Ms. Jennifer Webster, Minister, Ministry of Finance, Guyana • HE Dr. Tewolde Berhan Gebre-Egziabher, Director General, Ethiopian Environmental Protection Authority • HE Ms. Connie Hedegaard, European Union Climate Change Commissioner • Dr. R.K. Pachauri, Director General, TERI, and Chair of IPCC • Mr. John Ashton, United Kingdom Special Representative for Climate Change • Mr. Arba Diallo, Chair of West African Global Water Partnership and former Executive Secretary of United Nations Convention to Combat Desertification • Dr. Abdirahman Beileh, African Development Bank 	<p>Chair: HE Erastus Mwencha, Deputy Chair, AUC Co-chair: Ms. Jane Grimson, Mary Robinson Foundation</p>
1300-1430	Lunch	
1430-1600	<p>Plenary keynote statements Sub-theme 1: Climate science data, information and service delivery Keynote speaker: Prof. Bruce Hewitson, University of Cape Town, South Africa Sub-theme 2: Climate resilient development and adaptation Keynote speaker: Dr. Abebe Haile Gabriel, AUC Panel discussion 1) Dr. Seleshi B. Awulachew (UNECA/ACPC); 2) Mr. Kaliba Konare (WMO); 3) Prof. Eltahir (Massachusetts Institute of Technology); 4) Dr. Fatima Denton (Climate Change Adaptation for Africa); 5) Mr. Alex Alusa (Kenya); 6) Dr. Coleen Vogel (South Africa); 7) Prof. Shem O. Wandiga (University of Nairobi) Discussion</p>	<p>Chair: HE Ms. Tumusiime Rhoda Peace, Commissioner of Department of Rural Economy and Agriculture, AUC</p>
1600-1630	Coffee/tea break	
16h30-18h00	<p>Plenary keynote statements Sub-theme 3: Low carbon development Keynote speaker: Mr. Youba Sokona (ACPC/UNECA) Sub-theme 4: Economics and finance Keynote speaker: Dr. Abdirahman Beileh (AfDB) Panel discussion:</p>	<p>Chair: Mr. Josue Dione,</p>

	1) Prof. Lloyd Chingambo (ACCE); 2) Ms. Angela Kallhauge (Swedish Energy Agency); 3) Mr. Deprose Muchena (OSISA); 4) Mr. Mithika Mwenda (PACJA); 5) Prof. Kevin Urama (ATPS); 6) Mr. Ambachew Admassie (Ethan Bio-fuels Ltd) Discussion	
Day 2, Tuesday, 18 October 2011		
0900-1030	Parallel session I (Conference Room 2) Sub-theme 1 :Climate science, data and information Topic 1.1: Climate science (policy, practice and research) Chair: Dr. Rupa Kumar Kolli Paper 1: An Assessment of Africa's climate observing networks and data including strategies for rescuing of climatic data (Dr. Buruhani Nyenzi et al.) Paper 2: Targeting climate research and services to development needs in Africa: The Department for International Development-Met Office Hadley Centre Climate Science Research Partnership (Dr. Richard Graham) Paper 3: Climate patterns and hydro-climatic scenarios in the Upper Blue Nile Basin (Dr. Solomon Seyoum et al.) Paper 4: Climate change signals at local scale over Ethiopia: insights from new gridded high resolution gauge, satellite, regional and global climate model rainfalls (Dr. G. Mengistu Tsidu) Discussion	Parallel session III (Conference Room 1) Sub-theme 3: Low Carbon Development Topic 3.1: The green economy in the context of Africa Chair: Mounkaila Goumandakoye Paper 1: Conceptualizing of low carbon development in the context of Africa (Prof. Kevin Urama et al.) Paper 2: Green growth paradigm in Africa (Prof. Myung-Kyoon Lee and Dr. Jae Eun Ahn) Paper 3: The green economy in the context of Africa: the case of climate resilient green economy in Ethiopia (Mr. Selam Kidane and Mr. Wondwossen Sentayehu) Paper 4 : Sustainable resilient low carbon transport: a cross-cutting issue (Mr. Roger Gorham) Discussion
1030-1100	Coffee/tea break	
1100-1230	Topic 1.2: Lessons learned from various initiatives Chair: Dr. Buruhani Nyenzi Paper 1: African Centre of Meteorological Applications for Development (ACMAD) Paper 2: AGRHYMET (Centre Regional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle) Paper 3: IGAD Climate Prediction and Applications Centre Paper 4: Southern African Development Community (SADC) Climate Services Centre Paper 5: African Monitoring of the Environment for	Topic 3.2: Sustainable energy, energy access and poverty Chair: Dr. Essel Ben Hagen Paper 1: Energy access and energy for poverty alleviation in Africa (Dr. Smail Khennas et al.) Paper 2: Integrating renewable energy and climate change policies: exploring policy options for Africa (Dr. Yacob Mulugetta et al.) Paper 3: Agro-industrial low carbon development options in southern Africa: the case of bioenergy from sugar cane (Dr. Vikram Seebaluck and Dr. Francis Johnson) Paper 4: Fossil fuels in Africa in the context of a carbon constrained future (Mr. Alemu Mekonnen et al.)

	Sustainable Development (AMESD) Discussion	Paper 5: Entrepreneurs, enterprises and energy in Africa (Mr. Lawrence Agbemabiese) Discussion
1230-1400	Lunch	
1400-1530	<p>Topic 1.3: Data and information Chair: Prof. Elfatih Eltahir</p> <p>Paper 1: Climate science, data and information in Africa: situation analysis, gaps and policy implications (Dr. Tufa Dinku)</p> <p>Paper 2: Climate observations and African development (Dr. William Westmeyer)</p> <p>Paper 3: Analysis of the role of information and communication technologies in climate change awareness (Dr. Shakespear Mudombi)</p> <p>Discussion</p>	<p>Topic 3.3: REDD+ and LULUCF Chair: Prof. Francis Yamba</p> <p>Paper 1: Deliberating REDD+ governance and institutions in Africa (Dr. Olufunso Somorin et al)</p> <p>Paper 2: Climate change in African forestry: the broader policy context (Dr. Godwin Kowero and Dr. Yonas Yemshaw)</p> <p>Paper 3: Climate change and gender (Ms. Terhas Hagos)</p> <p>Paper 4: What is LULUCF for Africa (Dr. Johnson Nkems)</p> <p>Discussion</p>
1530-1600	Coffee/tea break	
1600-1730	<p>Parallel session II (Conference Room 2) Sub-theme 2 : Resilience and adaptation</p> <p>Topic 2.1: Socio-ecological resilience and climate vulnerability Chair: Prof. Shem O. Wandiga</p> <p>Paper 1: Vulnerability and climate change hot spots in Africa-mapping based on existing knowledge (Dr. Benjamin Lamptey et al.)</p> <p>Paper 2: Climate change and health across Africa: critical issues and options (Dr. Judy Omumbo and Mr. Jeremy Webb)</p> <p>Paper 3: Integrated systems approaches to innovative climate change adaptation and resource use in Africa (Prof. Martin P. de Wit et al.)</p> <p>Paper 4: Climate change awareness and resilient adaptation: indigenous drivers of regional science, technology and innovation policy in the Niger Delta (Dr. T.C. Nzeadibe et al.)</p> <p>Paper 5: Managing loss and damage for climate resilience development and adaptation in Africa (Dr. Koko Warner et al.)</p>	<p>Parallel session IV (Conference Room 1) Sub-theme 4: Economics and finance</p> <p>Topic 4.1: Economics of climate change in the context of Africa Chair: Mr. Emmanuel Nnadozie</p> <p>Paper 1: Cost of adaptation in Africa (Dr. Aimée Bella-Corbin)</p> <p>Paper 2: Infrastructure and climate change (Mr. Raffaello Cervigni)</p> <p>Paper 3: Economics of climate change adaptation in Africa (Mr. Tom Downing)</p> <p>Paper 4: Contribution of geothermal energy to low carbon development in East Africa (Dr. Meseret Zemedkun)</p>

	Discussion	Discussion
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Day 3, Wednesday, 19 October 2011

0900-1030	<p>Topic 2.2: Climate change and water Chair: Mr. Arba Diallo</p> <p>Paper 1: Climate change on water resources of Africa and essential interventions (Dr. S.B. Awulachew et al.)</p> <p>Paper 2: Climate change and water in Africa: a strategic perspective(Prof. Elfatih Eltahir)</p> <p>Paper 3: Ground water resources and climate change in Africa (Dr. Callist Tindimugaya et al.)</p> <p>Paper 4: Managing water supply under climate change: the case for small water utilities (Dr. Kenneth K. Odero)</p> <p>Paper 5: Climate change and water challenges in small island nations in Africa: the case of a comprehensive strategy adopted by Mauritius (Dr. K.M. Baharul Islam)</p> <p>Discussion</p>	<p>Topic 4.2: Climate finance Chair: Ms. Alessandra Tisot</p> <p>Paper 1:Lessons from fast start finance (Dr. Yacob Mulugetta et al.)</p> <p>Paper 2: Enhancing access to climate finance: understanding the direct access modality and the role of fiduciary standards in emerging climate finance discourse (Dr. Huzi Mshelia)</p> <p>Paper 3: Tool for the evaluation of investment and financial flows to address the adverse effects of climate change (Mr. Dieudonné. Goudou)</p> <p>Paper 4: Carbon finance experience in Africa (Dr. Arabinda Mishra, TERI)</p> <p>Paper 5: African Carbon Facility (Mr. Pal Monojeet)</p> <p>Discussion</p>
1030-1100	Coffee/tea break	
1100-1230	<p>Topic 2.3: Climate change and agriculture Chair: Mr. Seifu Ketema</p> <p>Paper 1: Climate change and agriculture in Africa: analysis of knowledge gaps and needs (Dr. Tom Owiyo et al.)</p> <p>Paper 2: Agricultural water management in the context of climate change in Africa (Dr. Tilahun Amede et al.)</p> <p>Paper 3:Contribution to the assessment of climate change vulnerabilities within the livestock sector in North Africa: the case of Morocco (Dr. Fouad Bergigui)</p> <p>Paper 4: Climate change and agriculture in Africa: the nexus and situation (Dr. Arthur Riedacker et al.)</p> <p>Paper 5: Climate change impacts in Africa and UNFCCC negotiations: policy implications of recent scientific findings (Prof. Doreen Stabinsky)</p> <p>Discussion</p>	<p>Topic 4.3: Roles and experience of RECs Chair: Dr. Abebe Haile Gabriel</p> <p>Paper 1:Regional climate change implications and the possible role of regional institutions (Dr. Nagaraja Rao Harshdeep, World Bank)</p> <p>Paper 2: Common Market for Eastern and Southern Africa (COMESA)</p> <p>Paper 3: Climate change concerns management and perspectives in the ECOWAS Commission (ECOWAS)</p> <p>Paper 4: Union of Arab Maghreb</p> <p>Discussion</p>

1230-1400	Lunch	
1400-1530	Plenary (Conference Room 2) Summary of parallel sessions Recommendation statements Discussion	Chair: Dr. Abdirahman Beileh
1530-1600	Coffee/tea break	
1600-1730	Closing session (Conference Room 2) Closing by HE Mr. Abdoulie Janneh, United Nations Under-Secretary-General and Executive Secretary of UNECA	