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ICSU

International Council for Science
REGIONAL OFFICE FOR AFRICA

REPORT ON

THE CONSULTATIVE WORKSHOP

ON THE SCIENCE OF CLIMATE CHANGE AND

SOCIO-ECONOMIC PROSPERITY IN AFRICA:

POST-COPENHAGEN (UNFCCC/COP15)

17–19 March 2010, Addis Ababa, Ethiopia

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ACRONYMS

ACMAD	African Centre of Meteorological Application for Development
AfBD	African Development Bank
AMCOST	African Ministerial Conference on Science and Technology
AR4	Fourth Assessment Report
AUC	African Union Commission
Climdev-Africa	Climate for Development in Africa Programme
COP 15	15 th Conference of the Parties
EU	European Union
FSSD	Food Security and Sustainable Development Division
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
IAP	InterAcademy Panel
ICSU	International Council for Science
ICSU ROA	International Council for Science Regional Office for Africa
ICT	Information and Communication Technology
IKS	Indigenous Knowledge System
IPCC	Intergovernmental Panel on Climate Change
ISTD	ICT, Science and Technology Division
MDGs	Millennium Development Goals
MoU	Memorandum of Understanding
NASAC	Network of African Science Academies
R&D	Research and Development
REDD	Reducing Emissions from Deforestation and forest Degradation
S&T	Science and Technology
STI	Science, Technology and Innovation
TWAS	Academy of Sciences for the Developing World
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WFP	World Food Programme
WMO	World Meteorological Organization

THE SCIENCE OF CLIMATE CHANGE AND SOCIO-ECONOMIC PROSPERITY

IN AFRICA: POST-COPENHAGEN (UNFCCC/COP15)

Addis Ababa, Ethiopia, 17-19 March 2010

Summary-*The United Nations Economic Commission for Africa (UNECA) and the International Council for Science Regional Office for Africa (ICSU ROA) organized a three-day highly successful consultative workshop in Addis Ababa, Ethiopia with an ultimate aim of preparing an implementable Climate Change Roadmap for Africa. Over 60 senior scientists, economists, lawyers, policymakers and company executives were in attendance. The workshop deliberated on the outcomes of December 2009 Copenhagen Climate Change conference (UNFCCC/COP 15) and adopted four resolutions dealing with an African Ecological Footprint Initiative, a Climate Change Roadmap for Africa, Climate Change Funding Opportunities for Africa and publication of a book on Climate Change in Africa by African climate experts.*

BACKGROUND

As a follow up of the 1992 Earth Summit which took place in Rio de Janeiro, Brazil, about 160 nations met in Kyoto, Japan in December 1997 and adopted the Kyoto Protocol which is the first legally binding programme aiming at combating global warming. The Kyoto Protocol (Appendix I) is an international treaty linked to the United Nations Framework Convention on Climate Change (UNFCCC, adopted in New York on 09.05.1992) and its main feature is that it sets binding targets for 37 industrialized countries and the European Community for reducing greenhouse gas (GHG) emissions. These amount to an average of 5% against 1990 levels over 5-year period, 2008-2012.



The Kyoto Protocol entered into force in February 2005 and calls on nations to share the costs of reducing greenhouse gas emissions, and on nations to adapt to the consequences of global warming caused by these emissions.

On 18 December 2009, the Heads of State and Government, Ministers and other heads of delegations present at the 2009 UN Climate Change conference in Copenhagen, Denmark (UNFCCC/COP 15) agreed on Copenhagen Climate Change Accord (Appendix II) whose Articles 1 & 2 read as follows:



the

1. “We underline that climate change is one of the greatest challenges of our time. We emphasize our strong political will to urgently combat climate change in accordance with the principle of common but differentiated responsibilities and respective capabilities. To achieve the ultimate objective of the Convention to stabilize greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, we shall, recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius, on the basis of

equity and in the context of sustainable development, enhance our long-term cooperative action to combat climate change. We recognize the critical impacts of climate change and the potential impacts of response measures on countries particularly vulnerable to its adverse effects and stress the need to establish a comprehensive adaptation programme including international support.”

2. “We agree that deep cuts in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity. We should cooperate in achieving the peaking of global and national emissions as soon as possible, recognizing that the time frame for peaking will be longer in developing countries and bearing in mind that social and economic development and poverty eradication are the first and overriding priorities of developing countries and that a low-emission development strategy is indispensable to sustainable development.”

The main outcome of UNFCCC/COP15 and its Copenhagen Climate Accord is generally regarded as a “political statement of intent” which has no binding agreement on how to tackle Climate Change and its consequences (e.g. agreement and enforcement on drastic reduction of emission of greenhouse gases). This Accord is also regarded as “watering down” the legally binding Kyoto Protocol.



UNESCO (2009) reported on the estimates of global CO₂ emissions from burning fossil fuels and showed that they stood at a record 8.4 gigatons in 2006 and that this amount is 20% above the 2000 level. The same report argues that emissions grew 3.1% annually between 2000 and 2006, more than twice the rate of growth during the 1990s.

In June 2009, the InterAcademy Panel (IAP) issued a statement to the UNFCCC conference in Bonn, Germany on ocean acidification. The statement argues that over the past 200 years, the oceans have absorbed approximately quarter of the CO₂ produced from human activities and that this huge amount of CO₂ would otherwise have accumulated in the atmosphere causing greater Climate Change. Hence, the absorption of this huge amount of CO₂ has made oceans to become more acidic. The changing ocean chemistry causes the marine food supplies to be significantly reduced in regions dependent on fish protein, e.g. the African countries along the Atlantic and the Indian Oceans and around the Mediterranean Sea.



The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) notes climate-related changes. A consensus, based on current evidence, now exists within the global scientific community that human activities are the main source of Climate Change and that the burning of fossil fuels is largely responsible for driving this change. The AR4 has projected that by 2020, between 75 to 250 million people in Africa would suffer from

water stress as a consequence of Climate Change. In some African countries agricultural yields are likely to decline by 50% by the same year. This will greatly affect the attainment of the Millennium Development Goals (MDGs) and development aspirations of Africa. Consequently, the continent which is a minor emitter of greenhouse gases and least contributor to global warming is projected to bear the brunt of the negative impacts of Climate Change.

Summary of the Main Global Initiatives on Combating Climate Change

- 1988 IPCC (Intergovernmental Panel on Climate Change) was established by WMO and UNEP to provide the governments of the world with a clear scientific view of what is happening to the world's climate.
- 1992 Earth Summit in Rio de Janeiro, Brazil.
- 1994 UN Framework Convention on Climate Change (UNFCCC) was established and has 192 Member States.
- 1997 Kyoto Protocol (adopted by 160 Nations): Combating Global Warming - industrialized nations to reduce their carbon emissions (GHGs) below 1990 levels by 2012: Average of 5% against 1990 levels over 5 yrs, 2008-2012.
- 2000 World Summit on Sustainable Development, Johannesburg, South Africa
- 2005 Carbon Trading Mechanism commences.
- 2007 Bali, Indonesia Conference on Climate Change: drastic reduction of GHGs emissions set at 25-40% by 2020 compared to 1990 level. Topics of interest included monitoring, mitigation and adaptation technologies: Clean Technology & Green Growth.
- 2009 World Climate Conference III (WCC3) decides to establish Global Framework for climate services to strengthen production, availability, delivery and application for science-based climate predictions and services.
- 2009 Copenhagen Climate Change Accord (UNFCCC/COP15): Political Statement of Intent.

Africa's Concern on Climate Change

The African political leadership and its scientific community are faced with the following scientific and socio-economic challenges:

- (i) Understanding of the science of Climate Change and the catastrophic consequences of Climate Change. Monitoring, mitigation, adaptation and resilience to natural and human-induced hazards and disasters in Africa (e.g. droughts, floods, landslides, tropical cyclones, wildfires, earthquakes, tsunamis, submerging islands and desertification).
- (ii) Impact of climate change on ecosystems and biodiversity (natural life-supporting systems) in Africa, e.g. food security and safety in the face of global environmental change.



- (iii) Political, economical, technological, ethical and social responses to the catastrophic consequences of Climate Change, and
- (iv) Global consensus or an agreement on combating causes of climate change, e.g. due to historic GHG emissions by industrialized nations and by the fast-growing economies such as China, Brazil India and South Korea.

In 2009, the Academy of Sciences for the Developing World (TWAS) reported that despite the dismal contribute (only 1% to global carbon emissions); the 50 least developed countries (LDCs) with the world's poorest people are most vulnerable and are at great risk due to the increased prevalence of flooding and drought. According to the 2009 report of Global Humanitarian Forum, 99% of global deaths and about 90% of global economic losses linked to Climate Change are felt in the developing countries, including much of sub-Saharan Africa.

Numerous UN reports show that Africa is vulnerable to endemic floods and droughts. The 2007 report of the World Food Programme (WFP) indicates that the total volume of food aid delivered in Africa was 5.9 million metric tons, which was 16% below the amount in 2006. This is an evidence for chronic famine in Africa and that the continent is always under UN feeding campaigns that involve other international aid and food agencies.

In 2007, the Network of African Science Academies (NASAC) with 13 signatories of national science academies made a statement to the African Union Heads of State and Government Summit on, "Building Science, Technology and Innovative capacities in Africa," and urged the African leadership to urgently act on Climate Change. NASAC argues that Africa not only lacks the resources to cope and adapt to the consequences of Climate Change, but it (Africa) also does not have adequate capacity in science and technology to successfully address the socio-economic consequences of disastrous climate changes.



Positive Outcomes from Copenhagen (UNFCCC/COP15)

- UNFCCC/COP 15 accepted that at global temperature rise of **2°C** (i.e., 450 ppm concentration level, IPCC), the Climate Change becomes dangerous (e.g. causing glacial melting, sea- level rise, flooding and drought) and may be catastrophic. Despite that the Copenhagen Climate Accord recognizes **2°C**; it (Accord) does not endorse it.
- The Accord Green Climate Fund for developing countries: a pledge of US\$ 30 billion a year for 2010-2012 was made and it was promised that the fund could reach US\$ 100 billion a year by 2020 for mitigation and adaptation to the negative consequences of Climate Change.
- 24 January 2010: BASIC countries (Brazil, South Africa, India and China) resolved to help developing countries most vulnerable to Climate Change. Besides technical support, funding to a tune of US\$ 10 billion was pledged for supporting developing countries. Brazil National Space Agency offers free satellite services to monitor forests and desertification in Africa.

- A step forward was made on Reducing Emissions from Deforestation and Forest Degradation (REDD) negotiations. REDD intends to provide safeguards of indigenous people's rights and fight against forest conversion into plantations.
- The Accord includes a commitment to set up a technology mechanism for enhancing technology transfer. Generally the Accord gives a direction leading to international cooperation to support the developing countries move towards sustainable growth and development through low-carbon technologies (e.g. efficient use of energy).

OBJECTIVES OF THE CONSULTATIVE WORKSHOP

In order to help Africa identify new pathways for sustainable growth and socio-economic development, the United Nations Economic Commission for Africa (UNECA), in collaboration with the ICSU Regional Office for Africa (ICSU ROA) organized a three-day workshop on, **"The Science of Climate Change and Socio-Economic Prosperity in Africa: Post-Copenhagen (UNFCCC/COP 15),"** on 17-19 March 2010 in Addis Ababa, Ethiopia. The consultative workshop focused on science, technology and innovation (STI) uptake in line with UNECA's S&T programme to support innovative approaches to Africa's development challenges.



African experts on climate change, e.g. environmental and earth scientists, meteorologists, economists, social scientists, lawyers and policymakers, examined the outcomes of the just-concluded Copenhagen Conference (UNFCCC/COP 15) and interrogate the Copenhagen Climate Accord within the Africa's socio-economic development context. Issues pertaining to knowledge sharing and technology transfer, and adaptation to

Climate Change were addressed by this group of experts. Equally important for discussion was the source of financial capital for investment in Climate Change initiatives in Africa.

The consultative workshop dealt with the following topics:

- Current status of research work on Climate Change in Africa (e.g. research infrastructure, data management, modeling, human resources training and retention initiatives), as well as channeling scientific research to improve policy-making, particularly in areas of high technical expertise.
- Capacity of African governments and their institutions to handle the disaster risk management cycle (e.g. mitigation, preparedness, early warning, response, recovery and decision-making support on adaptation to the consequences of hazards and disasters).
- Technologies and Innovations at Africa's disposal for mitigation and adaptation, and the cost associated with deployment of such Climate Change technologies and innovations.
- Substantial disconnect between African climate scientists, and policy- and decision makers on Climate Change issues.
- Informing the inter-relationship between science and policy and determine how to promote the legitimacy and role of science in policy-and decision making processes in Africa.

- Africa’s collaboration with the international community (e.g. community of practice on earth observations) dealing with Climate Change initiatives.
- The 2009 Copenhagen Climate Change Accord (UNFCCC/COP 15).
- Climate changes and their impacts on Africa’s sustainable growth and development.
- The Climate Change Roadmap for Africa.

Composition of participants

Over 60 scientists drawn from Angola, Botswana, Central African Republic, Côte d’Ivoire, Egypt, Ethiopia, Ghana, Kenya, Malawi, Morocco, Nigeria, Senegal, South Africa, Sudan, Tanzania, Uganda, Zambia and Zimbabwe, as well as representatives and experts from the African Ministerial Conference on Science and Technology (AMCOST), African Centre of Meteorological Application for Development (ACMAD), European Climate Foundation, Global Footprint Network, McKinsey Company, and International Council for Science-Regional Office for Africa (ICSU ROA) were in attendance.

OPENING CEREMONY OF THE CONSULTATIVE WORKSHOP

A three-day consultative workshop on, “the Science of Climate Change and socio-economic prosperity in Africa: post-Copenhagen (UNFCCC/COP 15)”, was officially opened by Ms. Aida Opoku-Mensah, Director of the ICT, Science and Technology Division (ISTD) of the UNECA. She outlined the objectives of the workshop (see above) and stressed on the importance of the workshop whose focus is on Climate Change threats to sustainable growth and development in Africa, and to the threat of failing to attain the objectives of the Millennium Development Goals (MDGs) by 2015. She pointed out that every participant of the workshop knows that Climate Change is emerging as one of the most important challenges of the 21st Century that calls for an urgent and innovative action by the global community. Ms. Opoku-Mensah pointed out that there is overwhelming scientific consensus that the world needs to take urgent action to mitigate Climate Change; and work on integration of climate science and policy for effective adaptation to Climate Change in Africa. She further noted that Africa entered the 21st Century facing monumental challenges to its survival and long-term sustainability. At the core of these challenges is the continent’s ability to master science, technology and innovation (STI) and to successfully apply these tools to address critical problems related to health, food, water and the mitigation and adaptation to Climate Change. This is where the significance of research and development (R&D) provides the backbone for climate science and adaptive technologies on the continent becomes critical.

Mr. Josue Dione, Director of Food Security and Sustainable Development Division (FSSD) of the UNECA, on his part, made a brief remark on UNECA’s work in driving Africa’s Climate Change agenda. He said that Climate Change has become a key challenge to Africa’s sustainable development and that Africa needs to build its scientific capacity to choose its options in the Climate Change agenda basing on its own terms. Mr. Dione stressed that the outcomes of the consultative workshop will be very crucial in obtaining inputs from the African scientific community to chart the way forward. He further pointed out that UNECA is working very closely with its partners particularly the African Union Commission (AUC) and the African Development Bank

(AfDB), through the African Climate Policy Center, to coordinate and drive Africa's Climate Change programme. He emphasized the importance of the involvement of the African scientists in this endeavor.

PLENARY SESSIONS

The workshop's structure contained five plenary and three breakout sessions. The main purpose for the plenary sessions was to introduce and provoke discussions on topical issues of Climate Change. Regional (Africa) initiatives and country experiences were part of the plenary sessions. The breakout sessions provided an opportunity for in-depth discussions on the three identified topics, namely, Ecological Footprints, Climate Change Roadmap for Africa and resource mobilization for Climate Change education, science and research in Africa.

Prof Sospeter Muhongo (Tanzania) gave an account on the various Global Climate Change initiatives starting from the establishment of IPCC in 1988 to UNFCCC/COP 15 conference in Copenhagen, Denmark in December 2009. He went on to give a keynote speech on, "Climate Change and its impacts on sustainable growth and development in Africa." He summarized natural and human-induced hazards and disasters that have affected Africa in last 50 years, and it became apparent that human-induced hazards such as floods, droughts, water-borne infectious diseases, polluted water, ocean acidification, and wildfires are prominent and are linked to emissions of green house gases (GHGs) and subsequent global warming. He also showed using facts and figures, the negative impact of global warming on Africa's water and energy resources, and on food security and safety. Due to the prevailing Climate Change threats, Prof Muhongo advised the African governments to invest in seed science (i.e. production of drought-resistant seeds), R&D on water resources and renewable energies, and in monitoring, mitigation and adaptation to hazards and disasters affecting the continent. He emphasized the importance of space sciences and technologies for Climate Change education, research, monitoring, mitigation and adaptation.

Ms Isatou Gaye from FSSD spoke on the UNECA's Climate for Development in Africa Programme (Climdev-Africa). The ClimDev-Africa programme is a unique regional initiative jointly undertaken by UNECA, the African Union Commission (AUC), and the African Development Bank (AfDB) with highest-level political endorsement. It is designed to respond to Climate Change challenges for Africa's development, with focus on climate-sensitive sectors – agriculture and food security, water resources, energy and health. The aim of the ClimDev programme include increasing the resilience of Africa's population to Climate Change by enabling effective adaptation activities; and addressing the need for improved climate information for the socio-economic development of the continent. ClimDev-Africa programme is being implemented progressively starting in 2009 with an indicative budget of about US \$140m for 4 years (including provisions for additional capacity at AUC and RECs).

Prof Edward S. Ayensu, Executive Chairman of Edward S. Ayensu Associates Ltd, Ghana and Dr Ramzi Elias, Associate Climate Diplomacy, European Climate Foundation, Brussels (Belgium), made a joint presentation on, "Copenhagen (UNFCCC/COP 15) Outcomes", with much emphasis on Climate Change research funding possibilities for Africa. Prof Ayensu pointed out that for the first time the world witnessed the developed countries accepting that Climate Change is real and discussed on how they are going to reduce GHGs emissions. He considered this situation to be a very positive development. He

emphasized on the need for Africa to make use of the financial resources that the international community pledged for supporting the developing world to combat Climate Change. He elaborated on the linkage between Climate Change and human security and safety.

Mr Ramzi Elias observed that despite the negotiation process in Copenhagen in December 2009 (UNFCCC/COP 15) being chaotic; the Copenhagen Climate Change Accord delivered three positive outcomes that can be further improved over time. These are: (a) world leaders were seriously engaged in Climate Change issues, (b) pledges to cut carbon emissions were made by the developed and large emerging economies, and (c) funding pledges to support the developing countries were made. He informed the participants that in order to limit the global warming to **2°C** the world needs to reduce the GHGs emissions by 17 gigatonnes in the next ten years. Achieving this target is possible but it requires all countries to act across all socio-economic sectors. He reported on the EU's Roadmap 2050 project which is aiming at setting Europe on a path towards zero-carbon energy supply by 2050. This plan involves developing a roadmap to fully decarbonise power sector by 2050; identifying grid transmission requirements for next 5-10 years; and identifying near-term policy requirements to make this a reality. Mr Elias also reported on McKinsey global GHGs abatement cost curve.

The presentation by Dr Mathis Wackernagel, President, Global Footprints Network, Oakland (USA) is summarized below under the African Ecological Footprint Initiative.

Oral presentations on regional initiatives and country experiences informed the workshop participants on several Climate Change initiatives ranging from climate data collection, interpretation and modeling, low-carbon growth to international scientific collaborations. Some presentations dealt with monitoring, mitigation and adaptation to Climate Change. The following papers were presented at the workshop:

- Geospatial information products and services in support of evidence-based Climate Change policy development in Africa (Mr Andre Nonguierma, UNECA, Ethiopia).
- Uganda's response to Climate Change: vulnerability assessment and adaptation for water sector (Dr. Tindimugaya Callist, Uganda).
- Climate Change and variability in the Okavango Region (Angola, Namibia and Botswana) by Prof Piotr Wolski (Botswana).
- Climate variability and change in the Greater Horn of Africa (Dr Abebe Tedege, Ethiopia).
- ICTs and Climate Change: towards promoting low-carbon growth (Dr Sizo Mhlanga, UNECA, Ethiopia).
- Lessons learned from low-carbon growth planning in Ghana and other African countries (Dr Karen Haden, McKinsey, Germany).
- Climate Change in West Africa with focus on Côte d'Ivoire: observations and future projections (Prof Abdourahamane Konare, Côte d'Ivoire).
- Climate Change impacts, adaptation and human security in Africa (Prof Salif Diop, UNEP, Kenya).
- Institutional support to African Climate Institutions project to implement the first component of the Climdev-Africa programme (Dr Mohammed Kadi, ACMAD, Niger).

BREAKOUT SESSIONS AND MAIN FOCUS AREAS FOR DISCUSSION

The workshop participants divided themselves into three discussion groups and dealt with the following topics: (i) The ecological footprints in a resource constrained world: Africa's perspective and strategy (Chair: Dr Daniel Nyanganyura, ICSU ROA, Zimbabwe; Co-Chair: Dr Mathis Wackernagel, Global Footprint Network, USA), (ii) Climate Change Roadmap for Africa (Chair: Prof Salip Diop, UNEP, Senegal; Co-Chair: Prof Oye Ibidapo-Obe, Nigerian Academy of Sciences, Nigeria) and (iii) Resource mobilization – fast funding for Climate Change initiatives in Africa (Chair: Dr Rispah Oduwo, Ministry of Science & Technology, Kenya; and Co-Chair: Mr Ramzi Elias, European Climate Foundation, Belgium).

MAIN OUTCOMES OF THE WORKSHOP

African Ecological Footprint Initiative

Besides the widely used Gross Domestic Product (GDP) economic measure, there is a need for more sophisticated policy measures as has been clearly demonstrated by “Stiglitz Commission” which assembled twenty (20) leading economists from around the world. This commission on, “the Measurement of Economic Performance and Social Progress”, released its first report on 14 September 2009.¹

The Commission's key findings are:

- (i) GDP is no longer adequate as a prime measure for managing economies. We need more sophisticated tools for tracking economic performance, quality of life, and environmental sustainability.
- (ii) Economic performance, quality of life, and environmental sustainability need to be measured separately in order to understand potential trade-offs between them, so the trade-offs can be overcome.
- (iii) Particularly for environmental sustainability, we need physical indicators beyond monetary measures, since monetary measures are weak descriptors of environmental and resource realities, particularly for mid-to longer-term horizons.
- (iv) The two primary physical measures for environmental sustainability are:
 - (a) The Ecological Footprint, and
 - (b) The Carbon Footprint: one of the Footprint's most significant components.

The Ecological Footprint measures the amount of ecological services people use. This use is expressed in area of productive land and sea required to renew all the resources a person, population or activity consumes; and to absorb the corresponding waste, particularly carbon dioxide emissions, under the prevailing technologies. It is expressed in global hectares, meaning hectares with world-average productivity. In other words, Ecological Footprint measures for any given year the amount that nature provides (biocapacity) and the amount that we consume (footprint) against capacity available to regenerate the consumed resources.

¹ “Stiglitz Report” (Report of the commission on the measurement of economic performance and social progress”) <http://www.stiglitz-sen-fitoussi.fr/en/index.htm>.

From the above definition, it is clear that many African countries have the lowest per capita Ecological Footprints in the world. This is mostly due to the world's escalating resources consumption that brings about Earth's ecological budget constraint. For more information related to Ecological Footprint, please visit: www.footprintnetwork.org.

While the Stiglitz Commission's emphasis is on the Carbon Footprint, Global Footprint Network argues that a "carbon plus" view is necessary in order to understand the significance of current environmental trends.² The Ecological Footprint fully and wholly contains the Carbon Footprint, and takes a comprehensive, more effective approach by tracking a full palette of human demands on the biosphere's regenerative capacity. It can also compare this demand against availability of biocapacity.

With a carbon analysis alone, trends as shown in the example of Tanzania (Figure 1) would not be visible to the assessment – the Carbon Footprint of Tanzania in 2005, for example, was less than 8 percent of the overall Footprint (or about the thickness of the red line in Figure 1).

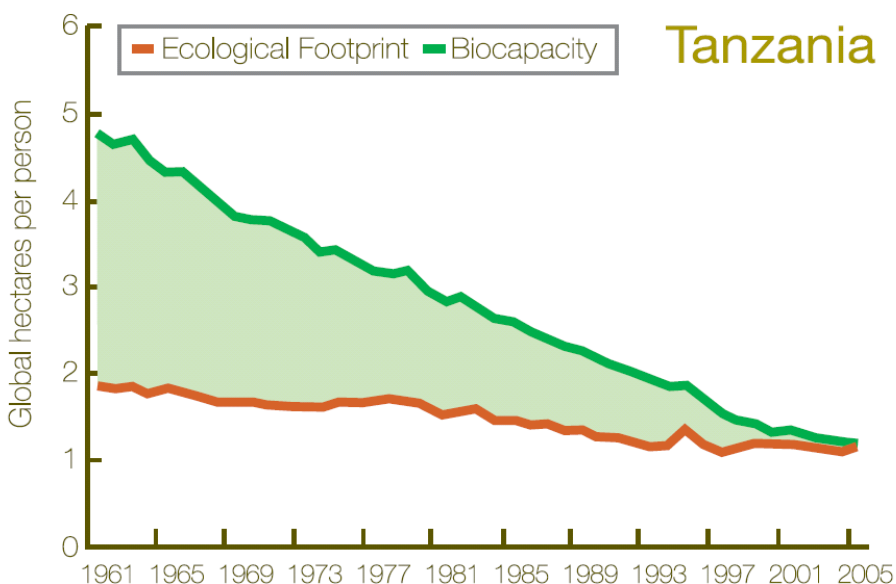


Figure 1: Tanzania's per-person Footprint and Biocapacity since 1961.

Tanzania's Footprint represents the biocapacity needed to provide for the average consumption of a Tanzanian resident. The biocapacity is the productive area available within Tanzania. The green surface between the lines shows the shrinking ecological remainder of Tanzania. Once the lines cross, and the red line is above the green one, the country will be running an ecological deficit. Ecological deficits can be compensated by overusing local biocapacity (i.e. using domestic resources at a rate faster than they regenerate) or by using biocapacity from abroad, for instance through

² The Global Footprint Network response is at http://www.footprintnetwork.org/en/index.php/newsletter/bv/commission_urges_gdp_rethink_new_footprint_standards_released

net-import. A carbon analysis alone would not reveal Tanzania’s emerging resource crunch. The Carbon Footprint of Tanzania in 2005 was less than 8 percent of its overall Footprint (about the thickness of the red line). A full Footprint analysis, however, provides a useful context for understanding the Climate Change dimensions for Tanzania, including its potential impact on Tanzania’s future biocapacity.

A second example is given in Figure 2 which shows Malawi’s per capita Footprint and its Biocapacity since 1961.

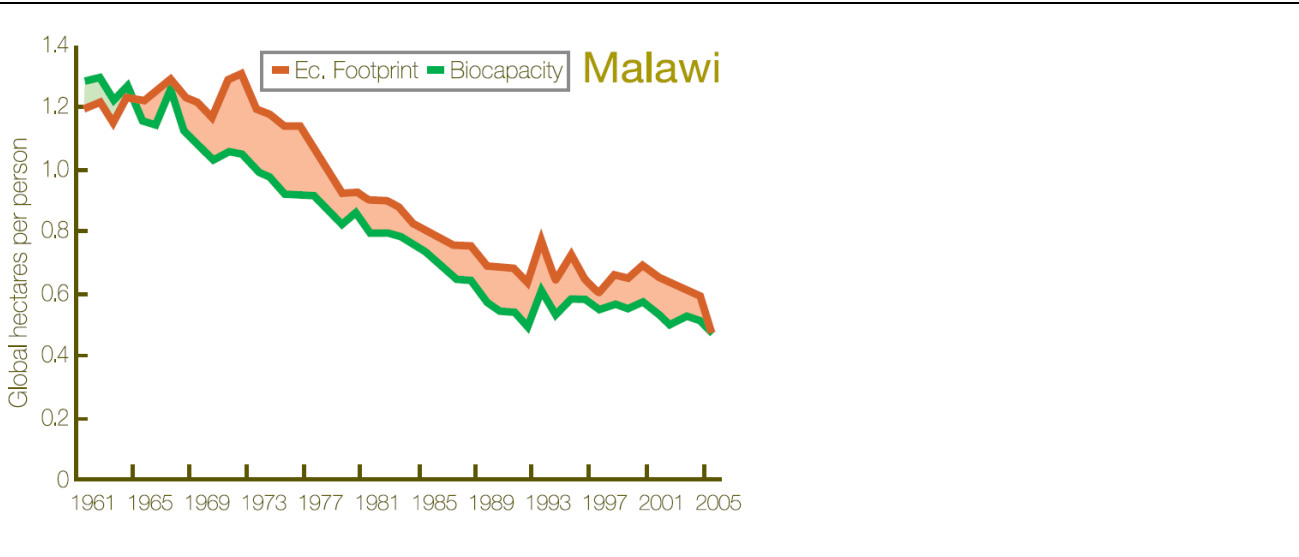


Figure 2: Malawi’s per-person Footprint and Biocapacity since 1961.

Malawi’s **Footprint** represents the biocapacity needed to provide for the average consumption of a resident of Malawi. The **biocapacity** is the productive area available within Malawi. The green surface between the lines shows the ecological remainder of Malawi (up to 1965, and the red surface the ecological deficit (since 1965). Once the lines cross, and the red line is above the green one, the country is running an ecological deficit.

Africa has to establish an Ecological Footprint Initiative as a developmental strategy to provide decision tools for facing consequences of the Climate Change and for building robust national economies that will create wealth and subsequently eradicate poverty from the continent.

[Ecological Footprint](#) analysis demonstrates why aggressive management for sustainability is in the national interest of any country, particularly in the context of [growing resource constraints](#). Without carefully addressing resource constraints, countries might not only severely compromise wellbeing and economic competitiveness, but also move into situations of devastating resource conflicts. On the other hand, preparing for those constraints helps countries seize new opportunities and strengthen their competitive advantage in a resource constrained world economy.

The Ecological Footprint is a cost-effective policy tool for weighing policy options. It links choices with potential consequences. By focusing on national self-interest, it helps to reveal the economic opportunities of development that works with, rather than against the budget of nature. It also

counteracts the perception that such development is an additional economic burden rather than a fruitful investment with quick and reliable returns.

The African Ecological Footprint Initiative will include three phases: (i) scientific review and validation of Footprint assessments to secure the scientific basis and accuracy of the Ecological Footprints of countries; (ii) Interpretation of the results to identify risks and opportunities for a country and/or region's development options in the context of an increased resource constrained future; and (iii) Applications to devise more specific policy-and decision-support tools that aid policy-makers in weighing their options. This initiative builds on the experience gained through bilateral collaborations between the Global Footprint Network and a number of national governments across the world.

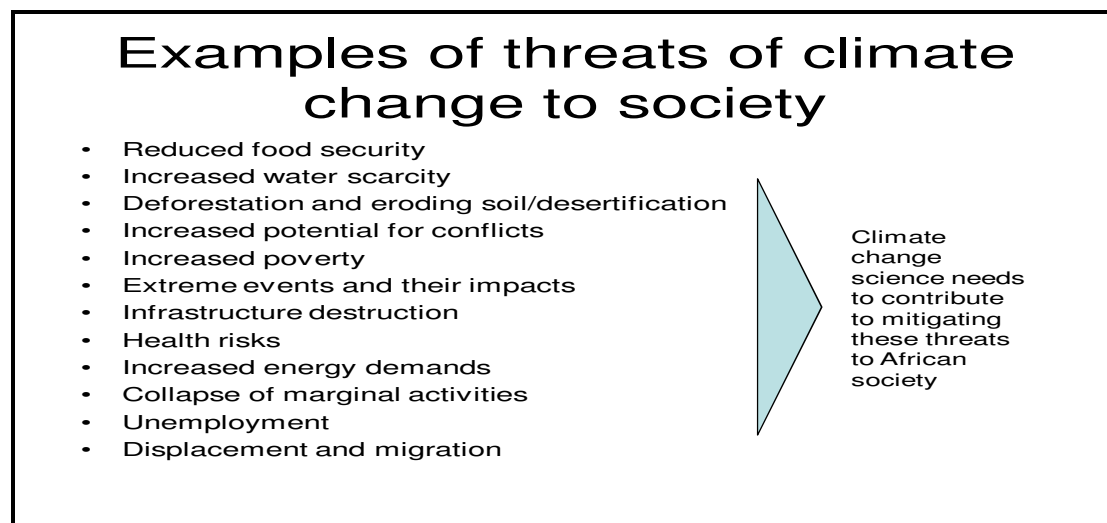
Workshop's Resolution No. 1

Global Footprint Network, UNECA, ICSU ROA and other partners within and outside Africa should embark on the African Ecological Footprint Initiative aiming to produce an African Factbook. The latter will be used as a scientific reference document for Africa's negotiations and partnerships in combating Climate Change and for building robust national economies that drastically reduce poverty from the continent.

The Climate Change Roadmap for Africa

One of the main objectives of holding the UNECA-ICSU ROA consultative workshop was to prepare an implementable Climate Change Roadmap for Africa.

Before coming up with a Roadmap for Africa, the participants of the workshop spelt out some of the threats of Climate Change to the African population (society). These are inserted in the box below.



The contents of the proposed Roadmap include:

(i) Vision

Develop an African climate science, technology and research base that effectively supports the continent in achieving sustainable socio-economic development, reducing vulnerability

to Climate Change, preserving the continent's ecosystems, and helping our nations capture opportunities emanating from the UNFCCC/COP and other regional and international negotiations, policies and scientific and economic partnerships.

(ii) Key Principles of the Roadmap:

- Building solid Climate Change knowledge based on facts and scientific evidence.
- Building on S&T strengths available in the Climate Change initiatives.
- Working in partnerships and collaborations within and outside the continent.
- Creating general awareness and common knowledge on Climate Change and its consequences.
- Using participatory approach involving local communities on the continent.
- Tapping Africa's traditional/indigenous knowledge (IKS).
- Sharing of research facilities, quality data, knowledge, technologies, innovations, human and financial resources for combating Climate Change in Africa.

(iii) Opportunities available for Africa

- Climate Change is high on the African and the Global political agenda resulting in practical support for Climate Change education and research on the continent (e.g. new financial resources and research infrastructure).
- Mainstreaming of Climate Change education and research findings into Africa's planning and development policies. Climate science as a new tool for creation of more wealth to the African population.
- Common threat of Climate Change makes it become a political and a scientific uniting platform for all African countries and creates a possibility to redefine the Africa's relationship with the rest of the world in matters pertaining to Climate Change and sustainable growth and development.
- Africa offers an excellent natural laboratory for R&D on Climate Change research initiatives, including utilization of indigenous knowledge and technologies for adaptation to climate changes.
- Utilization of low-carbon technologies and innovations (e.g. development and utilization of renewable energies) for sustainable green economies in Africa. Carbon markets as a new avenue for financial resources.
- Climate Change education and research; and utilization of low-carbon technologies and innovations give Africa an opportunity to avoid Climate Change mistakes that have been committed by other countries since the industrial revolution. The **Industrial Revolution** was a period from the 18th to the 19th century where major changes in agriculture, manufacturing, mining, and transport had a profound effect on the socio-economic and cultural conditions in Europe and North America.

Workshop's Resolution No. 2

UNECA in collaboration with ICSU ROA and other partners should champion the preparation of action lines, shared and differentiated responsibilities and timeframes for the implementation of the Africa's Climate Change Roadmap.

Resources Mobilization – Fast Funding of Climate Change Education and Research initiatives in Africa

The participants of the workshop identified the following questions that are important insofar as funding and resource mobilization is concerned:

- What types of resources are required?
- What are the resources needed for?
- Where are these resources located?
- How do scientists access the resources?
- How are the resources managed and allocated?
- What is the appropriate measure for the impact of the utilized resources?

The participants of the workshop agreed that financial, human as well as institutional (infrastructural) resources are required both at national and regional levels to address the Science of Climate Change and socio-economic prosperity in Africa. They also agreed that both human resources and research facilities for climate research are scarce in Africa. It was also noted that although a critical mass of human resources is available, the required specific skills in climate research are significantly low in terms of both quantity and quality.

It is also recognized that though there are resources at national, regional and international levels, African scientists do not have access to these funds either due to lack of information on their availability and/or on mechanisms for accessing them. It was also noted that lack of high-quality research project proposals to address Climate Change issues, has significantly contributed to the denial of adequate funding for Climate Change initiatives in Africa.

It was strongly recommended that African Climate Change experts should position themselves to utilize the Copenhagen Green Climate Fund for developing countries (a pledge of US\$ 30 billion a year for 2010-2012, increasing to US\$ 100 billion per annum by 2020), and that of the BASIC countries (Brazil, South Africa, India and China) funding pledge to a tune of US\$ 10 billion.

Workshop's Resolution No. 3

UNECA and ICSU ROA, in collaboration with other key partners in Africa, should map out major Climate Change funding opportunities available for Africa. This exercise should also involve mapping out ongoing major Climate Change research activities on the continent. It should also include conducting skills audit and an inventory of functioning research infrastructure for Climate Change education and research in Africa.

It was also recommended that Africa's national and regional socio-economic development plans should incorporate Climate Change.

Climate Change Book Project

The participants of the workshop resolved that African experts on Climate Change should contribute manuscripts for a book to be published within one year. The book will be a testimony to the international community that African climate experts are also conducting sound research work in the various domains of Climate Change. Depending on the contents of the submitted manuscripts, the title for the proposed book will be one of these three titles: (a) Climate Change Science and Sustainable Development: The African Experience, (b) Climate Change Science, Technology and Innovations for Africa's Sustainable Development or (c) The Science of Climate Change and Socio-Economic Prosperity in Africa.

Workshop's Resolution No. 4

African experts on Climate Change to prepare and publish a book on this subject, and that the book should be published within one year from now (by March 2011).

CONCLUSIONS

The three-day consultative workshop organized by UNECA and ICSU ROA deliberated, in-depth, on the outcomes of December 2009 UN Climate Change conference (UNFCCC/COP15) which was held in Copenhagen, Denmark. Hence, the workshop's central theme was on the Science of Climate Change and Socio-Economic Prosperity in Africa. It dealt with topics such as monitoring, mitigation and adaptation to Climate Change and acquisition of technologies and innovations for low-carbon growth and sustainable development of the continent.

The following resolutions were adopted by the participants of the workshop:

Resolution 1- Global Footprint Network, UNECA, ICSU ROA and other partners within and outside Africa should embark on the African Ecological Footprint Initiative aiming to produce an African Factbook. The latter would be used as a scientific reference document for Africa's negotiations and partnerships in combating Climate Change and for building robust national economies that drastically reduce poverty from the continent.

Resolution 2- UNECA in collaboration with ICSU ROA and other partners should champion the preparation of action lines, shared and differentiated responsibilities and timeframes for the implementation of the Africa's Climate Change Roadmap.

Resolution 3 - UNECA and ICSU ROA, in collaboration with other key partners in Africa, should map out major Climate Change funding opportunities available for Africa. This exercise should also involve mapping out ongoing major Climate Change research activities on the continent. It should also include conducting skills audit and an inventory of functioning research infrastructure for Climate Change education and research in Africa.

It was also recommended that Africa's national and regional socio-economic development plans should incorporate Climate Change.

Resolution 4 - African experts on Climate Change to prepare and publish a book on this subject, and that the book should be published within one year from now (by March 2011).

It was also agreed that UNECA, ICSU ROA and other key partners should prepare a Memorandum of Understanding (MoU) for the implementation of the above mentioned Africa's Climate Change

initiatives and that the prepared MoU should be endorsed during the 2nd Science with Africa conference which will be held in Addis Ababa on 2-4 June 2010.

Further Reading:

http://www.ipcc.eu/pdf/assessment-report/ar4/5yr/ar4_5yr.pdf

<http://www.ghf-geneva.org/portals/o/pdfs/human-impacts-report.pdf>

http://wfp.org/sites/default/files/2007_Ann_Rep_English-O.pdf

<http://www.wmo.int>

Appendix I: The Kyoto Protocol

Appendix II: The Copenhagen Climate Change Accord

Report prepared by: Sospeter Muhongo

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