



The African Climate Change Fellowship Program

Report of the Workshop to Assess Needs and Opportunities



11-13 March 2008
White Sands Hotel and Resort, Dar es Salaam, Tanzania

THE AFRICAN CLIMATE CHANGE FELLOWSHIP PROGRAM

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LIST OF ACRONYMS

AAS - African Academy of Sciences
ACCFP – African Climate Change Fellowship Program
ACTS – African Centre for Technology Study
ARC - Academic, Research and Consultancy
CCAA - Climate Change Adaptation in Africa
CIFOR – Centre for International Forestry Research
COP – Conference of Parties (of the UNFCCC)
COSTECH - Tanzania Commission for Science and Technology
ICRISAT – International Crops Research Institute for the Semi-Arid Tropics
ICSU – International Council for Science
IDRC – International Development Research Centre
IRA - Institute Of Resource Assessment, University of Dar es Salaam
MDGs – Millennium Development Goals
PACOM – Pan-African Committee for START
PASS - Pan-African START Secretariat
START - global change SysTem for Analysis, Research and Training
TWAS – The Academy of Sciences for the Developing World
UNFCCC – United Nations Framework Convention on Climate Change

EXECUTIVE SUMMARY

The International Development Research Centre (IDRC) of Canada is financially supporting the pilot phase of the African Climate Change Fellowship Program (ACCFP), a new program intended to build capacity for advancing and applying knowledge for climate change adaptation in Africa. In preparation for the implementation of the Fellowship Program, a workshop was held 11-13 March 2008 at the White Sands Hotel and Resort in Dar es Salaam, Tanzania. The workshop assembled members of scientific, public sector, development, intergovernmental and civil society organizations to inform the design and implementation of the ACCFP. The workshop yielded numerous recommendations that are now being incorporated into the program. The recommendations from the workshop and actions taken to implement the recommendations are presented in this Executive Summary. Further details about the proceedings of the workshop are contained in the body of the workshop report.

The workshop was organized and hosted by the global change SysTem for Analysis, Research, and Training (START), the Institute of Resource Assessment (IRA) at the University of Dar es Salaam, and the African Academy of Sciences (AAS), which are also responsible for implementing the Fellowship Program. Seventy-six participants from 30 countries, including 23 African countries, attended the workshop to discuss adaptation capacity needs, the potential for fellowships to help meet these needs, the appropriate design of an effective fellowship program, the engagement of institutions to host fellows, the roles of host institutions, conditions for success and sustainability of the fellowship program, and challenges to be overcome. A series of white papers was prepared to present views on these issues from the perspectives of community based organizations, municipal governments, national ministries for environment and resource management, and regional development organizations. The papers were circulated in English and French prior to the workshop to set the context for and to stimulate discussion. Simultaneous French-English translation was provided during the workshop to facilitate the participation and contributions of both Francophone and Anglophone Africans. Participants included representatives from universities, scientific research institutions, government ministries and agencies, national and international non-governmental organizations, intergovernmental organizations, and community-based organizations.

The workshop sought to achieve four objectives:

1. Identify and elaborate priority capacity building needs of government, civil society, and scientific institutions for technically skilled and knowledgeable people to advance climate change adaptation policy, planning and implementation in Africa.
2. Identify and prioritize various types of fellowship opportunities that would help build needed capacities.
3. Identify priorities for Research and Development interventions related to climate change in Africa and, in doing so, identify potential target institutions with comparative advantages and make recommendations for targeted recruitment of fellowship applicants.
4. Mobilize and network institutions that are interested to host African Climate Change Fellows.

Participants in the workshop were unanimous in their view that there is a priority need for programs to build capacity for climate change adaptation in Africa and enthusiastic in their

expectation that the ACCFP will make an important contribution in this regard. The workshop confirmed the need and appropriateness of a fellowship program that is targeted to provide professionals, researchers, teachers and students with opportunities that will enhance their capabilities for advancing and applying knowledge for adapting to climate change and acting as effective advocates for adaptation. Participants concurred with plans to award four different types of fellowships – Policy Fellowships, Doctoral Research Fellowships, Post-Doctoral Fellowships and Teaching Fellowships – that will enable the recipients to undertake experiential learning, education, research and/or training activities. Participants also highlighted the potential for the fellowships and the program to link participating institutions in a network for adaptation knowledge sharing.

Discussions in the workshop highlighted a number of challenges for implementation of the program. A critical challenge that was discussed is the need to maximize the impact of the ACCFP, particularly during the pilot phase. The initial plans for the ACCFP would have Fellowship applicants propose an institution of their choosing to host their activities. Participants in the workshop noted that this would likely result in the placement of individual fellows scattered across a large number of institutions. This would risk diffusing the impacts of the program and would miss opportunities for synergistic benefits that could be attained by multiple Fellows being placed together at a common institution. Also, a wide scattering of Fellows at numerous Host Institutions is potentially ill suited for establishing sustainable relationships between Host and Home Institutions, as well as with the Fellowship Program. Finally, an approach that depends on applicants proposing their own Host Institutions without guidance from the Program risks placement of some Fellows with Host Institutions that may not be suitable.

Workshop participants identified many potential impediments that could discourage prospective Host Institutions from participating in the Fellowship Program and agreed that additional incentives are needed for Hosts, possibly to include some small compensation for inputs provided by Host Institutions, as well as other incentive mechanisms described below. Time was thought to be the most constraining impediment. Effective supervision of a visiting Fellow by a Host Institution requires significant time from senior personnel who are typically overburdened with existing research, teaching, mentoring, management and service responsibilities. There are other resource costs as well for Host Institutions. It was recognized that Fellows will bring benefits to their Host Institutions, but these may not be sufficient by themselves to offset the costs of hosting a visiting Fellow. This problem is exacerbated by the time periods planned for the different types of Fellowships, which many thought to be too short to enable Fellows to provide significant benefits to their Hosts.

It was observed by several participants that a more proactive approach to screening and targeting prospective Host Institutions and matching Fellows with Host Institutions could greatly increase the value of the Fellowship experiences. The need for a Memorandum of Understanding (MoU) among the Host Institution, Home Institution, Fellow and Fellowship Program was repeatedly voiced during the workshop. Each MoU would clearly describe the roles, responsibilities and expectations of all parties. It was noted in discussions that selection of Host Institutions and negotiation of the MoUs should be given adequate time so that appropriate Hosts are selected and all parties fully understand their responsibilities, have included provisions to assure that each will derive adequate benefit, and that each is fully committed to carrying out the terms of the MoU.

It was originally planned that Fellowships would be implemented in two rounds of awards, each with a separate call for applications, review and placement process. There was a general consensus among workshop participants, however, that implementing two rounds of awards within the relatively short time period allotted for the pilot phase would impose high administrative burdens.

Discussion of these and other challenges resulted in the following recommendations from the workshop:

- The pilot phase of the Fellowship Program should target a relatively small number of institutions in Africa to host Fellows that have the necessary capabilities and commitment to provide valuable Fellowship experiences;
- Efforts should be made to place multiple Fellows with common Host Institutions;
- MoUs should be negotiated and agreed that clearly define the roles, responsibilities and expectations of all parties and that make provision for adequate benefits and incentives for the Host Institutions, as well as for the Fellows and Home Institutions;
- Consideration should be given to the placement of Post-Doctoral Fellows so as to provide a benefit and added incentive to institutions that host other types of Fellows;
- Fellowships of longer duration, financial compensation and other mechanisms to benefit and provide added incentives to Host Institutions should also be considered; and
- Fellowships should be awarded in a single round.

Implementing these changes to the Fellowship Program would yield a number of advantages. Targeting a small number of institutions with high qualifications to host multiple Fellows and providing more time to negotiate and agree MoUs would increase the impacts of the Program; provide valuable opportunities for Fellows to interact with and learn from their peers; build stronger capabilities at Host Institutions to become centers of excellence for supervising and mentoring Fellows; and establish stronger and longer lasting relationships among Host Institutions, Home Institutions and the Fellowship Program.

Strategic placement of Post-Doctoral Fellows, award of longer Fellowships, Fellows bringing their own project funds, and financial payments to Host Institutions would provide important additional incentives for prospective Host Institutions to participate in the pilot phase and increase the likelihood that they would want to participate in the Fellowship Program after the pilot phase. Placement of Post-doctoral Fellows at the same host institution as 2 to 4 other Fellows would have a number of benefits for the Host Institutions. The Post-Doctoral Fellows could assist the host institution to mentor and supervise other Fellows, thereby lowering the burden on the host institution. Post-doctoral Fellows can also benefit Host Institutions by helping with teaching and contributing to research projects.

These benefits can be increased by extending the Post-Doctoral Fellowships from 12 months to 18 months. Extending the time period of Policy and Doctoral Fellows to 6 and 12 months respectively, and placing a small number of Fellows with the same Host Institution, also increases the potential for Host Institutions to derive benefits from participation in the Program. The longer the period of time that Fellows are at Host Institutions, the greater the potential value of the Fellows to the mission of the Host Institutions. Extending the duration of the Fellowship would also increase the benefits to the Fellows. Finally, awarding Fellowships in a single round would reduce the administrative burden and facilitate the placement of multiple Fellows with common Hosts.

Following the workshop, the ACCFP Executive Committee submitted a request to IDRC to modify the Program to reflect the recommendations described herein. That request was approved and action has been taken to implement the changes. It was decided that the program would select approximately 10 to 12 institutions as Recommended Host Institutions based on the breadth and depth of their climate change adaptation related capabilities, as well as their interest and commitment to participate in the program, with the intention to place one Post-Doctoral Fellow and 2 to 4 other types of Fellows at each. Fellowship applicants may propose any host institution of their choosing, but they will be encouraged to select from the list of Recommended Host Institutions and priority will be given to qualified applicants that select from this list. Adjustments have been made to the program budget to allow for small financial compensation to be paid to the Host Institutions to cover their direct and administrative costs. It was also decided to extend the maximum duration of the fellowships from 3 to 6 months for Policy Fellows; from 6 to 12 months for Doctoral Research Fellows; from 12 to 18 months for Post-Doctoral Fellows; and from 1 to 2 months for Teaching Fellows.

In May 2008, the ACCFP Executive Committee invited 30 institutions to submit proposals to be Recommended Host Institutions. The invited institutions were identified from responses to a survey of institutional interests, missions, and capabilities that was conducted in late 2007, as well as through consultations. Eleven institutions have since been selected to be Recommended Host Institutions for the inaugural round of Fellows. Each of these institutions has agreed, in principle, to host up to 5 Fellows, to provide appropriate supervision, and to be bound by limits on administrative and direct cost fees established by the Program. At a later stage, after selection of applicants for fellowship awards, MoUs will be agreed and signed with the participating institutions to formalize the agreements. A Call for Fellowship Applications is in preparation and will be issued in mid-summer 2008.

WORKSHOP REPORT

1 Introduction

The International Development Research Centre (IDRC) of Canada is financially supporting the pilot phase of the African Climate Change Fellowship Program (ACCFP), a new program intended to build capacity for advancing and applying knowledge for climate change adaptation in Africa. In preparation for the implementation of the Fellowship Program, a workshop was held 11-13 March 2008 at the White Sands Hotel and Resort in Dar es Salaam, Tanzania. The workshop was organized and hosted by the global change SysTem for Analysis, Research, and Training (START), the Institute of Resource Assessment (IRA) at the University of Dar es Salaam, and the African Academy of Sciences (AAS), which are also responsible for implementing the Fellowship Program. Members of scientific, public sector, development, intergovernmental and civil society organizations were assembled to inform the design and implementation of the ACCFP. The workshop yielded numerous recommendations that are now being incorporated into the program. The recommendations from the workshop and information about the proceedings of the workshop are presented in this report.

The ACCFP will award small grants to African professionals, researchers, graduate students and teachers for Policy Fellowships, Doctoral Research Fellowships, Post-Doctoral Fellowships and Teaching Fellowships. The fellowship awards will enable Fellows will enable recipients to undertake experiential learning, education, training and/or research activities that will build their capabilities for advancing and supporting climate change adaptation. Execution of the Fellowship activities will also help to link participating institutions in a network for adaptation knowledge sharing. The grants can be used visit other institutions to learn what others are doing to manage climate risks and adapt to climate change, how they assess and prioritize climate risks, current practices for designing and implementing adaptation projects, and approaches for integrating adaptation with program planning and policy; to undertake research that supports adaptation decision making; and to develop and implement curricula for integrating climate change and climate change adaptation into graduate level education. Institutions are eligible to participate in the Program by hosting a Fellow (“Host Institutions”) and/or having their members apply for Fellowships (“Home Institutions”). Host and Home institutions are expected to include, but are not limited to, government agencies, non-government organizations, community-based organizations, private sector organizations, scientific research organizations and educational institutions. Additional information about the ACCFP is provided in Sections 3.1-3.3 of this workshop report.

Seventy-six participants from 23 African and 7 non-African countries attended the workshop, representing universities, scientific research institutions, government ministries, national and international non-governmental organizations, community-based organizations, and intergovernmental organizations (see Appendix 1 for a list of participants). The assembled participants discussed adaptation capacity needs, the potential for fellowships to help meet these needs, the appropriate design of an effective fellowship program, the engagement of institutions to host fellows, the roles of host institutions, conditions for success and sustainability of the fellowship program, and challenges to be overcome. Simultaneous French-English translation was provided during the workshop to facilitate the participation

and contributions of both Francophone and Anglophone Africans. Participants included representatives from.

The opening of the workshop was presided over by Mr. J. Mafunda, Agriculture Director General of the Tanzania Commission for Science and Technology (COSTECH) and attended by representatives of the Government of Tanzania, the University of Dar Es Salaam, and dignitaries from international organizations. The Honorable Dr. Batilda Burian, Minister of State in the Vice President's Office responsible for Environment, officially opened the workshop. In her speech, Dr. Burian stated:

"It is now clear that climate change will constrain the ability of developing countries, particularly those in Africa, to reach their poverty reduction and sustainable development objectives under the UN Millennium Development Goals (MDGs). ... In view of these realities, the need to generate adequate capacity to adapt to climate change impacts in Africa cannot be overemphasized, and that's why the role that this Climate Change Fellowship Programme will play in lessening the magnitude of such impacts needs to be supported by each and every government."

Dr. Burian also announced the launching of the Pan-African START Secretariat at the University of Dar Es Salaam, which will support the Pan-African Committee of START in advancing global environmental change science and capacity building across Africa. Other participants in the opening ceremony include Prof. Pius Yanda, Director of IRA at the University of Dar Es Salaam and Director of the Pan-African START Secretariat (PASS); Mr. Peter McGrath, the Academy of Sciences for the Developing World (TWAS); Prof. Shem Arungu-Olende, Secretary General of the African Academy of Science; Prof. Sospeter Muhongo, Executive Director of the Regional Office for Africa, International Council for Science (ICSU); Prof. Shem Wandiga, Chair of the Pan-African Committee of START (PACOM); Dr. Hassan Virji, Acting Director, International START Secretariat; Prof. R.S. Mukandala, Vice Chancellor, University of Dar es Salaam; and Prof. Yunus Mgaya, Deputy Vice Chancellor for Planning, Finance, and Administration, University of Dar Es Salaam. Dr. Burian's speech and remarks from the Opening Ceremony's officials are provided in Appendix 2 of this report.

A series of white papers was prepared to present views on capacity needs and opportunities from the perspectives of community based organizations, municipal governments, national ministries for environment and resource management, regional development organizations and research and education organizations. The papers, which can be found in Appendix 3 and are also available on-line at http://www.start.org/Program/AfricanCCFP_WP.html, were circulated in English and French prior to the workshop. The papers were presented on the first day of the workshop and served as a catalyst for workshop discussions.

A substantial amount of the workshop program was spent in Working Groups. Four Working Groups were formed to explore capacity needs and opportunities for different categories of organizations: Community-based organizations and municipal government; National government and regional organizations; and Research and education organizations. The Working Groups met multiple times during the workshop and presented their recommendations in the closing plenary. Each Working Group was charged with the following tasks:

- Identify and prioritize capacity needs for climate change adaptation;

- Develop examples of high value Fellowship projects/activities to meet priority capacity needs;
- Identify examples of centers of excellence for hosting Fellows;
- Identify potential barriers to participation of host and home institutions and recommend incentives to induce their participation on a recurrent basis;
- Recommend mechanisms for matching Fellows with host institutions;
- Recommend criteria for evaluation and selection of Fellowship applications;
- Recommend criteria and performance measures for monitoring and evaluating the Fellowship program; and
- Explore mechanisms for building capacity beyond Fellowships and identify key institutions and individuals for involvement in future capacity building initiatives and activities.

The workshop included three Panel Sessions on Adaptation barriers and strengths in Africa, Integration of climate change into graduate and undergraduate education in Africa, and Networking for greater impact. A Capacity Building Forum and Poster Session offered participants the opportunity to showcase their institutions' current capacity building activities and initiatives that promote climate change adaptation in Africa.

The Workshop Programme appears in Section 2 of the report and the workshop discussions and recommendations are presented in the following sections. Section 3 summarizes the history, goals and objectives of the ACCFP and this workshop. Abstracts of the white papers, which present different perspectives of capacity needs and opportunities, and summaries of their discussion are given in Section 4. Sections 5 and 6 review the three Panel Sessions and the Capacity Building Forum and Poster Session. The reports of the Working Group appear in Section 7, followed by a brief report in Section 8 from an impromptu brainstorming session that explored areas of core competencies for climate change education. Section 9 presents closing remarks from the Program partners, and Section 10 summarizes workshop recommendations and follow-up actions. Three Appendices, cited throughout the text of this report, provide a workshop participant list, text from Opening Ceremony remarks, and copies of commissioned white papers.

2 The Workshop Programme

Date and time	Activity
MONDAY— 10 MARCH 2008	
5.00pm – 7.00pm	Arrival and Registration of conference participants
TUESDAY – 11 MARCH 2008	
8.30 am – 9.00 am	Arrival and Registration of conference participants
09.00 am – 10.10 am	OPENING CEREMONY Chair: Mr. J. Mafunda, Ag. Director General, Tanzania Commission for Science and Technology (COSTECH)
09.00 am – 09.05 am	Introductory Remarks Prof. Pius Yanda, Director of the Institute for Resource Assessment (IRA) at the University of Dar Es Salaam and Director of the Pan-African START Secretariat (PASS)
09.05 am – 09.10 am	Remarks from The Academy of Sciences for the Developing World Mr. Peter McGrath, TWAS
09.10 am – 09.15 am	Remarks from the ICSU Regional Office for Africa Prof. Sospeter Muhongo, Director, ICSU Regional Office for Africa
09.15 am – 09.20 am	Remarks from the Pan-African Committee of START (PACOM) Prof. Shem Wandiga, PACOM Chair and University of Nairobi
09.20 am – 09.25 am	Remarks from the African Academy of Sciences (AAS) Prof. Shem Arungu-Olende, Secretary General, AAS
09.25 am – 09.35 am	Remarks from the International START Secretariat Dr. Hassan Virji, Acting Director, International START Secretariat
09.35 am – 09.45 am	Welcome Remarks Prof. R.S. Mukandala, Vice Chancellor, University of Dar es Salaam
09.45 am – 10.05 am	Opening of the Workshop and Launching of the Pan African START Secretariat (PASS) at the University of Dar es Salaam Hon. Dr. Batilda Burian, Minister of State (Environment), Vice President's Office
10.05 am – 10.10 am	Vote of Thanks Prof. Yunus Mgaya, Deputy Vice Chancellor (Planning, Finance, and Administration), University of Dar Es Salaam
10.10 am – 10.50 am	Group Photo and Tea

Date and time	Activity
10.50 am – 11.20 am	The African Climate Change Fellowship Program and Workshop to Assess Needs and Opportunities Chair: Prof. Iba Kone, Executive Director, African Academy of Science Rapporteur: Clark Seipt
10.50 am – 11.00 am	Overview of the African Climate Change Fellowship Program Dr. Neil Leary, Acting Deputy Director, International START Secretariat
11.00 am – 11.10 am	Relation of the Fellowship Program to Climate Change Adaptation in Africa (CCAA) Dr. Anthony Nyong, Senior Program Specialist, IDRC
11.10 am – 11.20 am	Objectives and Organization of the Workshop Prof. Fred Owino, AAS
11.20 am – 12.20 pm	Perspectives on Capacity Needs and Opportunities (1) Chair: Emily Ojoo-Massawa Rapporteur: Neil Leary
11.20 am – 11.35 am	<i>Community Based Organization Perspective</i> <u>Eric Kisiangani</u> [Practical Action, Kenya]
11.35 am – 11.50 am	<i>Community Based Organization Perspective</i> <u>Khumbo Kamanga</u> [CURE, Malawi]
11.50 am – 12.05 pm	<i>Municipal Government Perspective</i> <u>Linda Phalatse</u> [City of Johannesburg, South Africa]
12.05 pm – 12.20 pm	<i>Policy Integration Perspective</i> <u>Elvin Nyukuri</u> [on behalf of Cynthia Awuor, ACTS, Kenya]
12.20 pm – 1.45 pm	Lunch Break
1.45 – 2.45 pm	Perspectives on Capacity Needs and Opportunities (2) Chair: Lidia Brito Rapporteur: Peter McGrath
1.45 pm – 2.00 pm	<i>Research Fellowships</i> <u>Emma Archer</u> [University of Witwatersrand, South Africa]
2.00 pm – 2.15 pm	<i>Regional Development Organization Perspective</i> <u>Sami Moussa</u> [Climate Change Economist/Independent Consultant, Egypt]
2.15 pm – 2.30 pm	<i>Environmental/ Natural Resource Management Agency Perspective</i> <u>Richard Muyungi</u> [Department of Environment, Tanzania]
2.30 pm – 2.45 pm	<i>Educational Needs for Adaptation Professionals</i> <u>Emma Archer</u> [on behalf of Coleen Vogel, University of Witwatersrand, South Africa]
2.45 pm – 3.00 pm	Formation of Working Groups Facilitated by Neil Leary

Date and time	Activity
3.00 pm – 5.15 pm	Working Groups (see handout for working group charges) <ol style="list-style-type: none"> Community Based Organizations and Municipal Government Facilitators: Linda Phalatse and Isabelle Niang Rapporteur: Lisa Schipper National Government and Regional Organizations Facilitators: Jane Nimpamya and Johnson Nkem Rapporteur: Adriaan Tas Research and Education organizations Facilitators: Emma Archer and Pius Yanda Rapporteur: Richard Kangalawe <i>Coffee and tea will be available throughout the working group session.</i>
5.15 pm – 7.00 pm	Capacity Building Forum, Posters and Reception Chair: Iba Kone
5.15 pm – 5.25 pm	Introduction and Keynote Address Dr. Paul Desanker, Head - UNFCCC Capacity Building and Outreach Unit
5.25 pm – 6.25 pm	Rapid poster presentations from organizations
6.25 pm – 7.00 pm	Poster viewing with beverages and light snacks
7.30 pm – 9.00 pm	Dinner

WEDNESDAY – 12 MARCH 2008

9:00 am – 10:00 am	Panel Session 1: Adaptation barriers & strengths in Africa Chair: Anthony Nyong Rapporteur: Clark Seipt Panel Members: <ol style="list-style-type: none"> Euster Kibona, (Environment Management Protection Services, Tanzania) Sami Moussa (Climate Change Economist/Independent Consultant, Egypt) Isabelle Niang (ENDA, Senegal) Paul Desanker, (UNFCCC Capacity Building and Outreach Unit, Malawi) Discuss views on the most important barriers to climate change adaptation in Africa, key strengths in Africa for facilitating adaptation and actions needed to overcome barriers and marshal strengths.
10:00 am – 12:00 pm	Working Groups (reconvene) <i>Coffee and tea will be available throughout the working group session.</i>
12:00 pm – 1:30 pm	Lunch Break

Date and Time	Activity
1:30 pm – 4:30 pm	Working Groups (reconvene) <i>Coffee and tea will be available throughout the working group session.</i>
4:30 pm – 5:30 pm	Panel Session 2: Integration of climate change into graduate and undergraduate education in Africa Chair: Shem Wandiga Rapporteur: Neil Leary Panel Members: <ol style="list-style-type: none"> 1. Peter McGrath (TWAS,) 2. Emma Archer (University of Witwatersrand, South Africa) 3. Chris Gordon (University of Ghana, Ghana) 4. Bruce Hewitson (University of Cape Town, South Africa) Discuss views on needs, opportunities and approaches for integrating climate change science, impacts and adaptation into graduate and undergraduate education in Africa.
THURSDAY – 13 MARCH 2008	
9:00 am – 10:00 am	Panel Session 3: Networking for Greater Impact Chair: Isabelle Niang Rapporteur: Evans Kituyi Panel Members <ol style="list-style-type: none"> 1. Ramadjita Tabo (CGIAR, Niger) 2. Eric Odada (AFRICANNESS, Kenya) 3. Khumbo Kamanga, (CURE, Malawi) 4. Emily Massawa (NEMA, Kenya) Discuss views about mechanisms to encourage collaboration among home, host and other institutions to promote climate change adaptation.
10:00 am – 10:30 am	Coffee and Tea Break
10:30 am – 12:00 pm 10.30 am – 11.00 am 11.00 am – 11.30 am 11.30 am – 12.00 pm	Working Group Reports and Recommendations Chair: Neil Leary Rapporteur: Clark Seipt <i>15 minute report from each, followed by 15 minutes discussion</i> Working Group 1 Working Group 2 Working Group 3
12:00 pm – 12:30 pm	Closing Session: The Way Forward Chairs: Pius Yanda and Fred Owino Rapporteur: Clark Seipt Closing remarks from AAS, IDRC, IRA and START

3 The African Climate Change Fellowship Program and Workshop to Assess Needs and Opportunities

3.1 Overview of the African Climate Change Fellowship Program

Session Chair Dr. Iba Kone (AAS) introduced Dr. Neil Leary, Acting Deputy Director of the International START Secretariat. Dr. Leary provided an overview of the Fellowship Program. He described the program's objective, the types of fellowships that it will offer, and the expected application process.

Dr. Leary reiterated that program funding was provided by IDRC (Canada) as part of the Climate Change Adaptation in Africa (CCAA) program and identified the partner organizations that are collaborating to design, develop, and implement the Fellowship Program – the International START Secretariat and the Pan-African START Secretariat (PASS), the Institute of Resource Assessment (IRA) at the University of Dar es Salaam, and the African Academy of Sciences (AAS). He explained that the program will offer experiential learning, education, research and training opportunities to African professionals, researchers and graduate students that will build their capabilities for advancing and applying knowledge for climate change adaptation in Africa. Dr. Leary emphasized the inclusion of *professionals* in his statement; the Fellowship Program targets not only researchers, scientists, and academics, but also professionals who are responsible for decision-making and management of climate sensitive resources and sectors.

Dr. Leary further explained that, under the Program, four types of Fellowships will be available: Policy Fellowships, Doctoral Research Fellowships, Post-Doctoral Research Fellowships, and Teaching Fellowships. The number, duration, activities, and award amount of the different Fellowship types will vary. To apply for a Fellowship, applicants will propose an activity and must have a letter of support from both Host and Home institutions. Proposal review will be merit-based. An online, searchable database that presents the results of a recent institutional survey that gauged institutions' interest in the program will also be made available in order to help match potential Fellows with institutions in and outside of Africa. The Fellowship Program's timeline is still being finalized, but it is expected that the first call for proposals will be issued as soon as is feasible following the workshop. Dr. Leary stressed the importance of allowing sufficient time for applicants to obtain sponsorship from Host and Home institutions. He encouraged workshop participants to provide their input as to how much time would be reasonable for such communication and planning.

3.2 Relation of the Fellowship Program to Climate Change Adaptation in Africa

Dr. Anthony Nyong, Senior Program Specialist for the International Development Research Centre (IDRC), provided an overview of the Climate Change Adaptation in Africa (CCAA) program and identified the African Climate Change Fellowship Program and its Workshop to Assess Needs and Opportunities as CCAA-supported initiatives. Dr. Nyong introduced the CCAA program by first posing the question: Despite major investments on climate change in Africa, why does it still have weak adaptive capacity? He explained that the CCAA program is a collaboration between the UK Department for International Development (DFID) and

IDRC (Canada) that seeks to significantly improve the capacity of African countries to adapt to climate change in ways that benefit the most vulnerable.

As a precursor to the CCAA program, initial background consultations in 25 African countries investigated adaptation priorities on the continent. Several priority needs emerged from the consultations. First, there is a recognized need to transfer knowledge – to share knowledge with and between communities and to learn from experiences. Second, there is the need for more effective and endogenous assessments of vulnerability and adaptation and the need to retain experts. Dr. Nyong emphasized that until assessments are both effective *and* endogenous, the national governments will not take them seriously. To support his point, he provided an illustrative example of a recent Rift Valley Fever outbreak. A scientific report predicted the outbreak but was not taken seriously; scientists from outside the region provided the report. A third priority need identified via initial consultations is the need to strengthen national institutions so that they can develop and use climate information for decision-making at appropriate scales. Fourth, there is a need to improve institutional frameworks for adaptation implementation, which includes the need for coordination across ministries and sectors.

Dr. Nyong explained that, to address the identified needs, DFID joined with IDRC to develop the CCAA program. CCAA targets four specific outcomes:

1. *Improved research capacity* - African researchers, policy-makers and vulnerable groups are better able to assess climate-related vulnerabilities, and to evaluate and develop adaptation options.
2. *Knowledge and experience applied* - The rural and urban poor apply their experience of adaptation with the knowledge and technologies generated by research to implement improved and effective adaptation strategies.
3. *Shared learning and expertise* - At risk groups, policy makers, and researchers share learning and expertise on climate vulnerability and poverty.
4. *Informed policy processes* - Policy processes are informed by good quality science-based work on vulnerability and adaptation, and by the experiences of the rural and urban poor.

Projects under the CCAA program are characterized by several types of capacity development activities including participatory action research projects, hands-on capacity building training and workshops, fellowships, conferences and workshops, and other demand-led capacity building initiatives. The program also funds the Africans in Diaspora Program that promotes strengthening and use of in-continent expertise.

In response to Dr. Nyong's presentation, Prof. Eric Odada emphasized the importance of strategizing. He asked if factors like climate impacts, poverty, and land degradation should be combined and included in the way that we structure problems and our approaches to those problems, or if we should continue to advance sustainable development and its original emphases (as outlined in initiatives like the Millennium Development Goals) and include climate as an add-on? Dr. Nyong responded that answering this question was beyond the current workshop's scope but did confirm that the goal of the workshop was not to deal with climate change as climate change alone, but to include climate change as part of sustainable development. He closed by posing the question: People throughout Africa and other parts of the world confirm that development issues are important – how does climate fit in?

3.3 Objectives of the Workshop

Prof. Fred Owino, Fellowship Program Associate for AAS, described the organization and objectives of the Workshop to Assess Need and Opportunities. He charged participants with the immediate task of tapping each others' expertise in order to provide a guide for initiating the African Climate Change Fellowship Program – *for Africa*.

Prof. Owino briefly outlined the organization of the workshop and highlighted expectations with respect to its white papers, working groups, and capacity building poster session. He also described four specific workshop objectives:

1. Identify and elaborate priority capacity building needs of government, civil society, and scientific institutions for technically-skilled and knowledgeable people to advance climate change adaptation policy, planning and implementation in Africa.
2. Identify and prioritize various types of fellowship opportunities that would help build needed capacities.
3. Identify priority Research and Development interventions and institutions with comparative advantages. (Prof. Owino recommended that, in doing so, the workshop should review priorities for climate change interventions for Africa, identify potential target institutions with comparative advantages in order to make the greatest impact, and make recommendations for targeted recruitment of fellowship applicants.)
4. Mobilize and network institutions that are hosting African Climate Change Fellows.

Several participants posed thoughtful questions about workshop organization and objectives. Dr. Paul Desanker noted the presence of a large number of Africa's top scientists and asked if discussion ought not focus on the mechanisms of how to implement the Fellowship Program but rather the bigger picture – the development of broader capacity building for Africa. Participants responded by questioning the amount of money available for "big ideas" and for the "big picture" in Africa. Others cautioned that "big money" can mean different things to different individuals and within different sectors and fields. Prof. Sospeter Muhungu encouraged the group to think about the science, to brainstorm about the programs, and to discuss existing and potential networks before addressing money.

Dr. Leary recognized the participants' excellent questions and confirmed that the Fellowship Program's Executive Committee had indeed considered many of the same issues and questions in planning the workshop. He referred participants to the charges issued to the workshop's working groups, the last of which read, "*Explore mechanisms for building capacity beyond Fellowships and identify key institutions and individuals for involvement in future capacity building initiatives and activities.*" Dr. Leary reiterated the workshop's scope while also encouraging participants to voice their opinions on the larger issues, where relevant. Prof. Owino then closed the session, concluding that workshop participants were well-equipped to deal with the issues at stake.

4 Perspectives on Capacity Needs and Opportunities

In preparing for the workshop, the Program partners invited several workshop participants to prepare white papers on selected topics to provide initial ideas to catalyze discussion. Full

texts of the papers were disseminated to participants. English and French language versions of all papers are available online at: http://www.start.org/Program/AfricanCCFP_WP.html. Copies of each paper are also included in Appendix 3 of this report.

Eight papers were presented to the workshop plenary:

- a. “Capacity building needs and opportunities in support of climate change adaptation from the perspective of community based organizations”, *Eric Kisiangani (Practical Action, Kenya)*
- b. “The African Climate Change Fellowship Program needs assessment: community based organizations’ perspectives”, *Khumbo Kamanga (CURE, Malawi)*
- c. “Capacity building needs from the perspective of municipal government”, *Linda Phalatse (City of Johannesburg, South Africa)*
- d. “Capacity building needs and opportunities for policy integration of climate change adaptation”, *Elvin Nyukuri on behalf of Cynthia Awuor (ACTS, Kenya)*
- e. “Developing doctoral and postdoctoral fellowships in support of climate change in Africa”, *Emma Archer (University of Witwatersrand, South Africa)*
- f. “Fellowships in support of climate change adaptation with focus on regional development organizations”, *Sami Moussa (Climate change Economist/Consultant, Cairo, Egypt)*
- g. “Capacity building needs and opportunities from the perspective of environmental management agencies in the context of climate change”, *Richard Muyungi (Department of Environment, Tanzania)*
- h. “Education, skills and other requirements for adaptation to climate change”, *Emma Archer on behalf of Coleen Vogel (University of Witwatersrand, South Africa)*

Papers were presented over two plenary sessions. The chair of the first paper session was Dr. Emily Massawa from the National Environment Management Authority, Kenya. Chair of the second paper session was Prof. Lidia Brito from Eduardo Mondlane University, Mozambique.

4.1 Community Based Organization Perspectives

Eric Kisiangani (Practical Action, Kenya) presented lessons developed from Practical Action’s work with community-based organizations (CBO) in pastoralist communities in Kenya. He presented CBOs as critical assets for enabling communities to adapt to climate change – they are a permanent presence in rural communities that provide a basis for long-term management models; they enable community based natural resource management (CBNRM) approaches by disseminating knowledge; and they assist rural communities to access services through networking and mobilizing resources. He explained that CBOs need to overcome a number of weaknesses to fulfill their potential role in adaptation. They often lack skills for programming, communicating technical information, understanding climate change vulnerabilities and adaptation strategies, networking, experience sharing, monitoring and evaluation. Mr. Kisiangani proposed that these and other weaknesses of CBOs could be addressed through collaborations between more capable non-governmental organizations with community-based organizations for the purpose of building the capacity of CBOs to

support effective climate change adaptation. African Climate Change Fellowships could be used to facilitate a variety of activities for building the capacity of CBOs (e.g., capacity assessments of CBOs using SWOT analysis, development of capacity building plans, implementation of interventions identified in the plans).

Khumbo Kamanga (Coordination Unit for Rehabilitation of the Environment, Malawi) also presented CBOs as important vehicles for building capacity for climate change adaptation within communities as they have expert understanding of the needs of people in the communities in which they work and are best placed to create a sense of community ownership and feedback mechanisms that are so important to development projects. Mr. Kamanaga argued, however, that it will not do to expect CBOs and their local partners to identify climate change as a local priority as most lack awareness and relevant knowledge. Instead, it is incumbent on the scientific community, development partners and better-informed NGOs to raise the awareness of CBOs and to facilitate their engagement in the issue. Once engaged and informed, CBOs can integrate adaptation capacity building into their activities, which include generating and disseminating knowledge; building local capacity and willingness to act; supporting effective use of knowledge to improve local conditions; acting as conduits for technology transfer; and working to improve laws, policies and institutions. CBOs face challenging capacity building needs of their own, including variable, project driven financing; lack of scientific and technical information; and lack of training to generate and apply information for effective adaptation or transfer of relevant technologies. Kamanga proposed that training of CBOs in the methods of vulnerability and adaptation assessment would substantially enhance their capacity to support local adaptation.

4.2 Municipal Government Perspective

Linda Phalatse (City of Johannesburg, South Africa) discussed the experiences of South African cities in adapting to climate change, confirming that Johannesburg, Cape Town and eThekweni Municipality are already in the process of formulating climate change action plans that include adaptation. She emphasized that building capacity for adaptation at local levels, such as municipalities, is important because this is where vulnerabilities are most prominent. Capacity building that engages civil society and community-based organizations can promote both adaptation and sustainable development of cities. Ms. Phalatse described three core challenges that municipalities face: 1) the lack of precise, credible information; 2) financial considerations; and 3) the need for institutional transformations. She identified specific municipality capacity building needs to include increased awareness and understanding of climate change by local government; tools and mechanisms to bring scientists and communities together to better understand scenarios of future climate change, vulnerabilities, adaptation options, their costs and benefits, and how to incorporate adaptation with sustainable development plans; strengthened management and administrative capacity; and access to financial resources. She identifies a number of potential fellowship projects in her paper.

4.3 Policy Integration Perspective

Elvin Nyukuri, presenting on behalf of Cynthia Awuor (ACTS, Kenya), emphasized the importance of tackling climate change within the wider context of sustainable development. Ms. Nyukuri stressed that development progress is critical to the success of climate change adaptation and that adaptation policies can only be effective and sustainable if built into

development and poverty reduction strategies. Identified capacities needed to facilitate the integration of climate change adaptation with development policy included awareness and sensitization of parliamentary committees; research and knowledge of generation capabilities related to costs and benefits of adaptation; capabilities for communication of knowledge; engagement of CBOs and NGOs; and coordination of policies and strategies across multiple sectors and authorities. Ms. Nyukuri asserted that fellowship programs, like the African Climate Change Fellowship Program, can contribute by engaging early and mid-career professionals and researchers in interdisciplinary, action-oriented research; efforts to integrate adaptation with sustainable development; assessments of adaptation costs and benefits; communication and leadership activities. She added that other mechanisms that are needed include short, targeted training courses and university courses.

4.4 Research Fellowships Perspective

Emma Archer reiterated the critical need for more postgraduate and postdoctoral training in climate change adaptation. She added that those researchers that can currently supervise and mentor young scientists are overburdened or on soft funding, often preventing them from acting as supervisors.

Dr. Jouni Paavola (University of Leeds) commented that ‘team supervision’ could be developed. In this way, older supervisors could also mentor younger ones – similar to the ‘committee’ of supervisors that are common in many US universities but quite rare in Africa.

4.5 Regional Development Organization Perspective

Dr. Sami Moussa highlighted the natural resources sector (agriculture, forestry, fisheries, etc) as the area most sensitive to climate variations and identified Africa as the region most reliant on its natural resources. He recommended that climate change adaptations be merged into current development efforts aimed at tackling poverty, perhaps by appointing national ‘expert teams’. In this way, risk can be minimized and financial resources used efficiently.

Prof. Odada asked if there were sufficiently well-developed climate change techniques available to link into development plans? Dr. Moussa replied that such ‘merging’ could be done over time as new data became available.

4.6 Environmental/Natural Resource Management Agency Perspective

Mr. Richard Muyungi discussed needs and opportunities within the broader context of capacity building. He highlighted the importance of both human development and institutional strengthening and emphasized the need to create environments that are receptive to building systemic capacity at a broader level (e.g. increased public awareness, enactment of rules and regulations conducive to development and supportive policies). Mr. Muyungi distinguished between climate change specific and climate change relevant needs and then provided basic examples of both at the individual and institutional scale. He underscored the importance of practices and procedures for integration and networking at and across these scales. Mr. Muyungi cited approaches to capacity building under the UNFCCC and the Kyoto Protocol and described the guidance and potential for integration offered by related decisions. He concluded that analyses of current needs provides a basis for deciding how to address the

capacity strengths and gaps that we see today so that we might have a clearer understanding of future options and priorities for capacity development.

4.7 Educational Needs for Adaptation Professionals

Dr. Emma Archer, presenting Dr. Coleen Vogel's paper, proposed 'Mixing and Matching' – developing new and necessary climate change adaptation courses by “mixing” the most relevant parts of current university-type courses with best practices from elsewhere. Such practices could include (typically) short training courses, e.g. provided by disaster management specialists. Dr. Archer also highlighted the need for new courses to be integrated 'horizontally' (i.e. within a university) and 'vertically' (i.e. between universities/levels of education) and the need for proper course design, accreditation and equivalency. She suggested that Teaching Fellowships could be used to design courses and/or modules. Participant discussion also suggested the possibility of 'joint PhDs' offered by two or more universities and highlighted the need for graduates with 'flexible degrees' that can be used in a variety of careers.

4.8 Discussion

Participant discussion confirmed agreement that capacity building to support adaptation is needed at local levels and that community-based organizations, municipal authorities and non-governmental organizations are important both as sources of capacity and targets for capacity building. Linking civil society organizations with scientific networks was emphasized as a way to generate, share and communicate relevant knowledge and to assure that climate change adaptation is implemented within the context of sustainable development. It was recommended that Fellows' transference of new knowledge and skills to colleagues in their Home Institutions and communities be encouraged and facilitated so as to increase the impact of the program.

There was general consensus among participants that communication and project management training should be provided to Fellows. Committee (rather than individual) supervision should be recommended. The skills that graduate students need to acquire should be identified, multi-disciplinarity should be encouraged, and a full range of issues (i.e., from mitigation to adaptation) should be covered in courses. Joint PhD courses (between universities) should be considered to make best use of the strengths of different universities, and such joint programs should be both South-North and South-South. Participants also recommended that relevant curricula be developed for primary school pupils' through tertiary level students.

5 Panel Sessions

The workshop included three panel sessions. Each panel began with brief remarks from a small number of invited panel members, after which the discussion was opened to all workshop participants. In preparation for the panel sessions, workshop participants were challenged to give thought to the following questions:

- What are the most important barriers to climate change adaptation in Africa, key strengths in Africa for facilitating adaptation, and critical actions needed to overcome barriers and marshal strengths?
- What are the needs, opportunities and approaches for integrating climate change science, impacts, and adaptation into graduate and undergraduate education in Africa?
- What are the needs, opportunities and approaches for encouraging collaboration among home, host and other institutions to increase the impact of the fellowship program and promote climate change adaptation?

Each panel session concluded with closing remarks from the panel members.

5.1 Panel 1: Adaptation Barriers and Strengths in Africa

Panel 1, chaired by Dr. Anthony Nyong, was comprised of the following individuals:

- Ms. Euster Kibona, *Environmental Management Protection Services, Tanzania*
- Dr. Sami Moussa, *Climate Change Economist and Independent Consultant, Egypt*
- Dr. Isabelle Niang, *ENDA, Senegal*
- Dr. Paul Desanker, *UNFCCC Capacity Building and Outreach Unit, Malawi*

Ms. Euster Kibona began by identifying four major barriers to adaptation. First, she described how most communities depend on outside funding activities whose support often does not exceed the subsistence activities generated. She explained that this habit creates resource limitations and a lack of credit, which diminishes the community's ability to adapt. Ms. Kibona identified lack of information as a second barrier to adaptation, employing the example of an agricultural decision-maker and his/her needs for appropriate information about weather, planting, and coping strategies as he/she prepares for the next growing season. She identified the lack of long-term investment in land as an additional barrier to adaptation. Citing the absence of a strong tenure system in many African communities, she called for strategies to conserve land for sustainable future use. Access to technology was identified as a final barrier to adaptation in Africa; often, the technology that is available is very expensive and is not easy to use for communities.

Ms. Kibona then identified six strengths for adaptation in Africa. She explained that the common system of mixed crops and livestock enhances adaptive capacity as it provides adaptation options for communities. She described the ability of subsistence farmers to easily diversify, change planting dates, learn to use various conservation and farming techniques, and interact with and link to social networks as a second strength for adaptation in Africa. Ms. Kibona cited additional strength in the existence of networks that are already helping communities to adapt and called for reinforcement of those networks. She also identified the presence of agricultural extension as a strength for adaptation. Recognizing that the number of extension workers is few, she emphasized the importance of increasing the number of workers that interact directly with farmers. Ms. Kibona discussed the importance of civil society organizations (CSOs) for adaptation and stressed the need to strengthen their ability to increase community awareness and build adaptive capacity at the local level. Lastly, Ms. Kibona spoke of the potential strength that a collection of information on indigenous adaptation knowledge and strategies could offer to Africa.

While Ms. Kibona focused more on adaptation at the community level, Dr. Sami Moussa opted to discuss adaptation barriers and strengths at the national level, particularly with respect to adaptation in agriculture. He identified lack of funds and lack of information (e.g., meteorological data) as barriers to adaptation in Africa. He emphasized that even if information *is* available, it *must* be disseminated to farmers and communities so that they might use it to prepare for change. Dr. Moussa cited resistance to change and sudden change and lack of awareness as additional barriers to adaptation. Emphasizing that changes in practice will not occur overnight, he underscored the need for awareness, preparation, tools, funds, and technology for Africa. Dr. Moussa closed his comments by identifying local indigenous knowledge and Africa's experience with climate change (i.e., multiple impacts in multiple sectors) as strengths for adaptation.

Panel Member Dr. Isabelle Niang identified limited research capacity and limited links between science, policy, and local stakeholders as two major barriers to adaptation in Africa. She explained that limited research capacity makes it difficult for countries to be innovative in adaptation and/or be aware of adaptation techniques in other sectors. Limited links across the science-policy-decision-maker spectrum result in the existence of different communities of information about climate change and possibilities for adaptation. Dr. Niang also described cultural and sociological barriers to adaptation, citing, as an example, the resistance of local communities to accept rapid change in climate (e.g., the shock caused by floods during dry times – it was not supposed to rain!). Lastly, Dr. Niang described problems at the institutional level – namely, the tendency of Ministries in Africa tend to take up climate change issues and then fail to share information or collaborate with other institutions and organizations. She stressed that this practice often results in different, and repeatedly uncoordinated, approaches to integrating climate change with development.

Dr. Niang also discussed three strengths – or what she preferred to call “opportunities” – for adaptation in Africa. First, she encouraged integrating adaptation with development in Africa – sustainable development where appropriate. Second, she stressed that Africa has the option to do things differently. For example, as countries work to develop economic areas, they can do so in different ways than countries in Europe. Dr. Niang then described the strength and opportunity found in Africa's ‘flexibility’; its limited dependency on technology leaves more space to introduce new technologies and new ways of doing things. As Dr. Niang concluded her comments, Session Chair Dr. Anthony Nyong, interjected a reiterative question, “Should Africa go the same way that others have gone?”

The Panel's final member, Dr. Paul Desanker, elected to begin by posing his own questions to the group: *What is the problem with adaptation? What is new about climate change? Is adaptation equal to development? How do we incorporate climate change as a new stressor among other stressors (e.g., HIV, poverty)?* With particular reference to adaptation at the local level, Dr. Desanker asked, *Are we talking to the right people?* He emphasized that we communicate with climate change research and science, but asked, *Where are the development scientists?*

Dr. Desanker's contributions to the panel's list of adaptation barriers included a lack of support for research in Africa and limited access to the state of knowledge. He stressed that access to scholarly publications is still not good and that as such, young scientists are “not ready” (e.g., for competitive proposal review). He cited identification of appropriate adaptation responses as an additional barrier to adaptation in Africa. Highlighting a recognized progression from impact assessments to vulnerability, he urged the group to

consider how to best move toward adaptation. He also emphasized the need for relevant decision support. Dr. Desanker continued by discussing financial barriers to adaptation. In discussing financial barriers to adaptation, Dr. Desanker referenced the billions of dollars needed to fund adaptation and climate change work in developing countries. He acknowledged that small funds are available but argued that limited abilities to absorb even small funds prevents the monies from being utilized heavily.

Referring back to his initial questions, Dr. Desanker reiterated that if adaptation is equal to development, there is a need to integrate all factors at the national level for an integrated plan for development. He acknowledged that adaptation science is young and that many approaches are developing throughout the globe. Recognizing that Africa is not a single unit, he emphasized the need to build up the knowledge base, to build up a critical mass of scientists, and for every country to develop its own expertise and capacity.

Dr. Desanker closed by identifying a list of strengths for adaptation in Africa, including: high biodiversity, which affords a wider coping range and toolkit for adaptation; the ability and willingness to absorb new knowledge; and the multidisciplinary, cross-cutting nature of adaptation science, which is exaggerated in Africa where small groups of scientists tend to work across common disciplinary boundaries. Dr. Desanker noted that barriers to adaptation overwhelm such strengths, however, and underscored the huge challenge ahead. He added that an additional long-term obstacle for adaptation is the lack of substantial global mitigation commitments. He emphasized that mitigation must go hand-in-hand with adaptation.

Participant discussions during the panel session investigated best approaches to identifying and implementing adaptation strategies in the face of the numerous barriers that plague Africa whilst also building upon its many strengths. Several participants emphasized the importance of remembering historical changes and using those lessons to address future change. Participants referenced the factors that influence vulnerability to climate change and questioned the state of resilience and how that resilience can be mobilized so as to overcome barriers and adapt. The discussion recognized the importance of indigenous knowledge but also recognized that adaptation cannot rely on indigenous knowledge alone – that the knowledge offered by modern technologies and science as well as present-day community experts should also be captured and incorporated into adaptation decision-making. Discussion also briefly investigated the potential for government and government policies to obstruct and/or support adaptation science and strategies.

Workshop participants agreed that it is not sufficient for knowledge and technologies to be available; they must also be useful, relevant, timely, and applicable for the decision-making that they are meant to inform. The group's range of perspectives as to priorities and best approaches for integrating such knowledge and technologies into adaptation planning and activities showcased the complexity of the “huge challenge” at hand. As Dr. Niang concluded towards the end of the session, no one person or discipline or perspective has the key. There is a great need for multi-disciplinarity. Adaptation will be a dream of people and society, not just of scientists.

5.2 Panel 2: Integration of Climate Change into Graduate and Undergraduate Education in Africa

Panel 2, chaired by Prof. Shem Wandiga, was comprised of the following individuals:

- Peter McGrath, *The Academy of Sciences for the Developing World, Italy*
- Emma Archer, *University of Witwatersrand, South Africa*
- Chris Gordon, *University of Ghana, Ghana*
- Bruce Hewitson, *University of Cape Town, South Africa*

Peter McGrath spoke in favor of integrating climate change issues into existing curricula for graduate and undergraduate education. Students are being trained in the concepts, methods, tools and knowledge that are relevant to careers working on problems of agriculture, horticulture, forestry, water management, environmental chemistry, development, social policy and other fields. Climate change touches on and is important to all these fields, and it is important for their practitioners to be aware of climate change issues and knowledgeable about how climate change enters into their sphere of work. Integration with existing curricula is relatively straightforward, but it requires university vice chancellors to be convinced that it is important and necessary.

Emma Archer stated that countries do not all have the same needs, opportunities and constraints. While integration of climate change into existing university courses may be the most appropriate model for some, in other cases stand-alone climate change courses that are offered within a Masters of Science program may be feasible and appropriate. Integration with existing courses and new stand-alone courses need not be mutually exclusive models and sometimes it will be appropriate to implement both. What is important is that a clear understanding be developed with respect to country needs, that areas of core competencies that are needed by scientists working on issues of climate change be identified, and that curricula be designed and implemented that builds the core competencies for different types of scientists in a logical, coherent progression that brings an interdisciplinary understanding of the issues.

Chris Gordon's advice was to start slow and grow programs gently. He expressed an opinion that it is easier to add new content to existing courses than to add new courses. At the University of Ghana, for instance, it can take eight years to go from a concept for a new course to implementation of the course! Prof. Gordon encouraged participants to ask the question, *'Why do students do graduate work?'* The drivers and motivations vary, but employment prospects as well as enthusiasm for what they study are prominent. Students need role models of established scientists who work on climate change, have progressed in their careers, and are successful. He encouraged those who have taken this path and been successful to make noise about their work and be more visible so as to attract more students to the field.

Bruce Hewitson questioned whether the charges to the panel assume that climate change is a subject or a discipline in its own right. He suggested that climate change is not a discipline but rather a problem, the study of which can serve as a means to integrate types of knowledge and ways of knowing – a study that can be used as a vehicle for developing new approaches to multidisciplinary science. Prof. Hewitson recognized that the topic of climate change is already present in many courses but asked, *Is it properly connected to the subject of the course in which it is inserted? Is it serving as an integrator across disciplines that can yield deeper understanding of concepts such as uncertainty, complex adaptive systems, resilience, vulnerability, and nested time and spatial scales?* Hewitson proposed that climate change be integrated into curricula at all levels so that we produce citizens and scientists who are

climate change aware. He cautioned, however, that integration should be done in a way that connects knowledge across disciplines and leads to new cross-disciplinary approaches.

Discussions during the session indicated general agreement that it is important to address climate change issues in education generally, not just in graduate and undergraduate programs, but at lower levels as well and in extension work with farmers and rural communities. Both the integration of climate change issues into existing courses and the development of new courses were accepted as valid models that can be implemented – the balance should be tailored to country needs and institutional contexts. There was also agreement that climate change should be used as an integrator, as a mechanism for learning how to apply approaches and knowledge from multiple disciplines to better understand and manage complex systems.

Better engagement of scientists and senior educators was seen as an important challenge, one that may prove more difficult than engaging students with the issues. The proportion of scientists and educators who are knowledgeable about and experienced in climate change analysis is still relatively small. Scientists and educators mainly work within the confines of their disciplines and may not have the experience on which to draw and to take multi- and interdisciplinary approaches to study and teaching related to complex issues such as climate change. There was general consensus amongst workshop participants of the need to consider how to educate the educators, possibly using some of the Program's fellowships to expose senior educators to cross-disciplinary approaches to climate change.

5.3 Panel 3: Networking for Greater Impact

Panel 3, chaired by Dr. Isabelle Niang, was comprised of the following individuals:

- Dr. Ramadjita Tabo, *ICRISAT, Niger*
- Prof. Eric Odada, *AfricanNESS, Kenya*
- Mr. Khumbo Kamanga, *CURE, Malawi*

Dr. Ramadjita Tabo described ICRISAT's Challenge Program (CP) on climate change and its potential to bring together the best agro-climate researchers in the world. He welcomed the opportunity for the CP to host Program Fellows. He recommended Desert Margin as another relevant program to investigate. Being developed by a consortium of five CGIAR centers, its activities are expected to include joint workshops and joint supervision of graduate students. ACMAD, AGRIMET, ASARECA, FARA, FAO and WMO are also preparing a program that may be of interest to potential Fellows.

Prof. Eric Odada recognized the national level networks that exist where many institutions collaborate to develop research agenda. Similar regional and international arrangements also exist. Prof. Odada suggested that a common reason for failure in research and development network arrangements is the lack of ownership by network members. He encouraged consideration of member ownership and rights, the mentoring potential of senior network members, and best practices for building capacities in members' weaker areas of expertise.

Prof. Odada proposed several ideas for networking. He recommended that twinning arrangements (e.g., the Great Lakes study in the USA), which are not practiced in Africa, should be studied and adopted by African networks. Positions (e.g., chairmanships) could be created for local and western philanthropists that are willing to support programs within

African institutions. If not positions, other innovative approaches could be taken to harness these resources. Centers of Excellence could also be created at existing institutions (e.g., University of Cape Town) to recognize and build upon emerging strengths and areas of expertise. Prof. Odada claimed that prerequisites for the success of such networking include increased funding for networks, the development and strengthening of institutional architecture for network governance, and sustainable capacity building programs for network members.

Mr. Khumbo Kamanga proposed that effective NGO networking is achieved by maintaining regular contact with people for effective interaction and communication, collaboratively defining purpose and future plans, and maintaining efforts effectively and according to plan. Mr. Kamanga's organization, CURE (The Co-ordination Unit for the Rehabilitation of the Environment) formed a network of CBOs, NGOs and IGOs in Malawi on climate change adaptation. The network maximized on skill sharing through training and information exchange. He recommended that networks be sustained via mechanisms like regular meetings, dinners, seminars, etc. for their members; regular newsletters; and/or a shared website for information exchange. Mr. Kamanga offered CURE's network as a means through which to identify other partner institutions that could contribute positively to Program implementation.

Discussion following the panel members' remarks highlighted the importance of supporting and facilitating knowledge transfer and exchange. Participants emphasized the need for creating forums for exchanging ideas and the need for funding to facilitate such exchange. Participants' concerns included recognition that networks tend to be active in their initial stages of development but then often begin to collapse without an effective moderator to maintain momentum in innovative ways. Networks also tend to be dependent on external funding and often collapse after funding ends. Participants recommended that network membership should aim for cross-sectoral multi-disciplinarity; should be limited in number for efficient functioning; and would benefit from clear rules of engagement and champions willing to lead initiatives in their own institutions. It was recognized that the architecture of a network is critical in promoting participation and contribution from small members.

Participants recommended several activities that would support networking for greater impact of the Fellowship Program. Proposed ideas included forming an Alumni Network with regional chapters (e.g., Eastern, West, North and Southern Africa) for Fellows, identifying other mechanisms to link grantees electronically to facilitate contact after the projects, and creating opportunities for Fellows to meet and carry out joint field activities that address a shared capacity challenge.

6 Capacity Building Forum and Poster Session

During the workshop's first day of proceedings, a Capacity Building Forum and Poster Session offered participants the opportunity to showcase their institutions' current capacity building activities and initiatives that promote climate change adaptation in Africa. Posters were voluntary, and all participants were invited to participate. A maximum of twenty poster slots were available on a first-come, first-serve basis.

6.1 Forum Keynote

Dr. Paul Desanker, Team Leader of the LDC and Capacity Building and Outreach Units for the UNFCCC, was invited to provide a keynote address to open the Forum. His presentation, entitled “Capacity Building for Adaptation: Global Perspectives,” provided an introduction to the Framework convention and its Kyoto Protocol (till 2012). Dr. Desanker also gave insight on the current negotiations in progress to define a new instrument for a post-2012 regime. The negotiations involve country-driven multilateral processes to address sets of global to country level commitments (mainly funding related and national commitments for example policies and measures to address climate change).

Regarding capacity building, Dr. Desanker started by elaborating the difference between Capacity-building and Capacity development. He explained that capacity building is done where it doesn't exist and there are new needs. Capacity-development involves mobilizing existing capacity, enhancing it. He added that capacity building needs do differ from country to country and therefore in dealing with these issues it is very important to be sure of what kind of semantic (capacity building/development) is to be used with regard to the required needs.

“Capacity-building under the FCCC has the following

- a. Priority setting to guide programme development by multilateral and bilateral agencies
- b. Guidance on funding to GEF for CB related activities:
 - i. Capacity Development Initiative supports Parties to assess needs, implement CB;
 - ii. Enabling countries participate in the intergovernmental process of the FCCC (meetings, reporting, national assessment and reporting)
 - iii. CB support through GEF projects
- c. Monitoring and evaluation to assess progress, effectiveness and gaps

Dr. Desanker also gave a description of Capacity building for adaptation in the Framework Convention on Climate Change and what it entails. Capacity building process involves support for Impact, Vulnerability and Adaptation assessment, as part of National Communications. It also involves Science and technical advice on Adaptation he gave an example of the Nairobi Work Programme. He also added that the capacity building process in the FCCC also addresses special needs of LDCs through the NAPA programme and this is mainly for urgent and immediate needs in coping with climate change.

According to Dr. Desanker, the big picture to all these is the multiple levels and scales of the process of adaptation capacity, that different needs and roles – bottoms up or top down -- are not mutually exclusive. To understand the big picture, there is a need to have answers to a number of questions that Dr. Desanker raised. With the critical mass: 1) how much capacity should be built? 2) How distribute between local to national, regional and global levels? 3) How to address the pipeline of capacity development: continuous process? 4) How target interventions can be done across the multiple levels, scales? Lastly, Dr Desankers closed his talk by giving the lesson to be learned as follows;

1. Advance the field – go beyond the obvious and known (no more proof needed for vulnerability of Africa! Or that Climate Change is real)

2. Choose a system, recognize boundaries and work within it – if you studying local coping, don't make pronouncements about global/national policy issues
3. Science plan/framework useful to guide efforts
4. Develop a model of capacity development that transcends scales and levels – critical mass needed

6.2 Poster Session

Following Dr. Desanker's address, the Forum's 10 poster presenters briefly introduced their posters and highlighted activities to the plenary. Introductions were limited to two minutes in length and included one PowerPoint slide. Presenters were advised to use the two-minute time limit to:

- Introduce themselves and the organization / institution that they represented,
- Provide a brief overview of their organization's capacity building activities, and
- Offer 2-3 reasons why other participants should visit their poster.

All workshop participants then moved to an outdoor terrace where posters were displayed. Light refreshments were provided as participants traveled between posters, speaking with presenters about their ongoing capacity building initiatives.

The following individuals, listed alphabetically and with their institutional affiliations, presented posters:

- Andrew AKO, The Hydrological Research Centre Yaounde (Cameroon) – *Assessment of the Vulnerability of Water Resources to Environmental Change in Africa*
- Tom ANENI, Nigerian Environmental Study/Action Team – NEST (Nigeria) – *NEST Capacity Building: Promoting Climate Change Adaptation in Nigeria*
- Dr. Iba KONE, The African Academy of Sciences (Kenya) – *The African Academy of Sciences: "Driving Scientific and Technological Development in Africa"*
- Mansur Bako MATAZU, Center for Climate Change and Fresh Water Resources, Federal University of Technology, Minna (Nigeria) – *"On Adaptation Measures to Reduce Vulnerability to Climate Change": Eco-climatic Atlas and Farmers' Guide Projects in Nigeria*
- Dr. Isabelle NIANG, ENDA TM / Energy, Environment and Development team (Senegal) - *Capacity Building in Africa to Address Climate Change*
- Dr. Johnson NKEM, CIFOR (Indonesia, West and Central Africa) – *Developing African Capacity for Climate Change Adaptation with Forest Ecosystem Services*
- Dr. Jouni PAAVOLA (with Dr. Andrew DOUGILL - not present), Sustainability Research Institute, University of Leeds (UK) – *Needs and Opportunities for the African Climate Change Fellowship Program*
- Dr. Lisa SCHIPPER, SEI-Asia Centre (Thailand) – *Building long term capacity for managing and adapting to climate change in Asia and Africa: Scoping phase*

- Dr. Fanuel SHECHAMBO and Colleagues, Institute of Resource Assessment, University of Dar es Salaam (Tanzania) – 1) *University of Dar es Salaam – Institute of Resource Assessment*; 2) *Impact of Climate Change on Vegetation in the Uluguru Watersheds*; 3) *Eastern Africa Environmental Impact Assessment (EIA) Expertise Database*
- Prof. Mohammed YACOUBI KHEBIZA, Université Cadi Ayyad (Morocco) - *Vulnérabilité et Stratégie Adaptative face aux Changements Climatiques au Maroc : Exemple d'action menées par l'UCAM*

7 Working Group Reports

A substantial portion of the workshop program was allocated to time spent in break-out working groups. The general objective of the working groups was to generate recommendations to guide the design and implementation of the Fellowship Program. Initially, three working groups were formed to explore capacity needs and opportunities for different categories of organizations: 1) Community-based organizations and municipal government; 2) National government and regional organizations; and 3) Research and education organizations. Ultimately, overwhelming interest to participate in the third working group warranted the creation of a second Research and Education group – Group 3B (for a total of four working groups).

Working groups were reminded that the workshop's white papers addressed capacity building issues from the perspectives of the different types of organizations and in doing so proposed ideas and recommendations intended to help stimulate discussion. Each working group was given the following charges:

- Identify and prioritize capacity needs for climate change adaptation;
- Develop examples of high value Fellowship projects/activities to meet priority capacity needs;
- Identify examples of centers of excellence for hosting Fellows;
- Identify potential barriers to participation of host and home institutions and recommend incentives to induce their participation on a recurrent basis;
- Recommend mechanisms for matching Fellows with host institutions;
- Recommend criteria for evaluation and selection of Fellowship applications;
- Recommend criteria and performance measures for monitoring and evaluating the Fellowship program; and
- Explore mechanisms for building capacity beyond Fellowships and identify key institutions and individuals for involvement in future capacity building initiatives and activities.

The following sub-sections outline each working group's report and recommendations. Working group reports were presented to the plenary on the last morning of the workshop.

7.1 Working Group I: Community Based Organizations and Municipal Government

Co-Chairs: Linda Phalatse and Isabelle Niang

Rapporteur: Lisa Schipper

Lisa Schipper, rapporteur for Working Group I, presented a summary of the group's discussions and recommendations. Schipper reported that, during their time together, the group focused its discussion on the conceptual and practical issues related to how policy fellowships could be accessed by individuals based in community-based organizations (CBOs), nongovernmental organizations (NGOs), and municipal governments (MGs), using the questions and charges provided to them in the Workshop Information Sheet as a guide. The importance of giving opportunities to CBOs, NGOs, and MGs was underscored in the context that fellowships normally would only be awarded to academics.

7.1.1 Priorities for capacity building

Working Group I identified and then ranked a list of capacity building priorities for CBOs, NGOs, and MGs. The highest ranked priorities were:

1. Identification of best practices (best for communities) to include, where possible, local best practices and indigenous knowledge;
2. Enhanced scientific knowledge among CBOs;
3. Improved communication and networking between researchers and policymakers;
4. Resource mobilisation skills (including proposal writing);
5. Increased partnership and cooperation between CBOs and research institutions; and
6. Developing tools for climate change issues (e.g., regional climate models)

7.1.2 Examples of fellowships

The group brainstormed examples of existing and/or past fellowships that have had positive impacts and could serve as models for the Fellowship Program to follow. Examples included CODESRIA training, proposal writing for resource mobilization; "Engineers without shoes", a programme of training of trainers in India; CLACC fellowships; Earthwatch fellowships; and LEAD-Africa fellowships. Group members raised questions about how the fellowship examples that they identified would fill the needs of MGs, as most pertained to CBOs, NGOs and scholars. They noted that existing exchanges for MGs are usually linked to making business or related connections, rather than building capacity.

7.1.3 Examples of Centres of Excellence

The group also brainstormed a list of African and Africa-based centers of excellence that have experience with experiential learning - not just academic learning - and that could be potential host institutions and/or institutions that would have an interest in the skills developed by CBO, NGO, and MG Fellows. The group's list included:

- Institute for Local Government (Ghana)
- Institut d'applications et de vulgarisation en sciences (BK)
- Institute for Resource Assessment, University of Dar es salaam
- ENDA (Senegal)
- Regional institute for population Studies, University of Ghana
- Red Cross (regional)
- Sokoine University of Agriculture (Tanzania)
- Institute of Rural Economy (Mali)
- Chancellor College (Malawi)
- OSS (Tunisia)
- IHE UNESCO (non-African)
- UNU (non-African)
- Oxfam
- IUCN
- WWF
- Action Aid
- Practical Action
- Large foundations (e.g., Ford Foundation, HP Foundation, Gates Foundation, Clinton Foundation, Shell Foundation)
- West African regional organisations
- Government agencies

7.1.4 Potential barriers and incentives for Home and Host Institutions

Group members agreed on several points when discussing potential barriers to participation of host and home institutions, incentives for participation, and mechanisms for matching fellows with hosts. The group concluded that a clear MOU was necessary from the outset that outlined the roles, responsibilities, expectations, and priorities of the Home and Host institutions and the Fellows. The group recommended that MOUs be signed by the organization and the Host institution, rather than with the individual (see e.g., the Ford Foundation fellowships for Africa). Institutional overhead costs, the potential burden of mentorship, and the large diversity observed between Home and Host institutions were identified as a possible obstacles for the Program. Language constraints and the need for additional time at non-native speaking institutions were identified as potential barriers. The group suggested that Fellows might benefit from visiting several institutions to get what they are seeking.

7.1.5 Recommended criteria for fellowship applications

In their consideration of criteria for fellowship applications, the group's discussion repeatedly returned to the question, "Will we ask the Fellows to find their own institution?" The group urged the Program to include criteria with respect to applicants' age, proposing an upper limit of 40 years; relevant experience and needs; clarity of vision with respect to the proposed activity; reputation and commitment of the Home institution; gender; experience with marginalized groups; and minimum level of education.

7.1.6 Recommended criteria for monitoring and evaluation

The group highlighted the need for reporting from both Fellows and Hosts, sustained communication between Hosts and Fellows for future collaboration, and monitoring of follow-on impacts on the Fellows' Home Institutions.

7.1.7 Proposed mechanisms for developing capacity beyond fellowships

Working Group I recommended a number of ways in which Fellows could extend their experiences past the term of their Fellowships. These included working with other institutions to reinforce learned/enhanced skills, working with other institutions to promote

incorporation of climate change into their projects and activities, and developing future projects. Networking, the development of project databases, and an emphasis on more climate change literature in Africa were also recommended. Awareness raising was encouraged, particularly via translation of major climate change work into local languages. The group urged the Program to begin identifying additional institutions and individuals for integral involvement in future capacity building initiatives and activities.

7.1.8 Discussion

Prof. Chris Gordon asked the group if they had considered the role, impacts, and actions of faith-based organizations. Schipper noted that the group had not but fully acknowledged the importance of such institutions and cited the contribution of organizations like Tearfund and Catholic Relief Services in disaster risk reduction.

Several participants questioned whether the priority areas of the Fellowship Program match the needs and priorities of institutions like CBOs, NGOs, and MGs. Discussion emphasized the importance of looking at the program from their perspective which most likely differs from that with academic priorities. There was general consensus that, for bigger impact (particularly for CBOs, NGOs, and MGs), the programs should focus on skills that can be transferred and disseminated and more training.

Jackie Olang asked about the role of government and its contributions to the sustainability of the Fellowship Program and others like it. Working Group Co-Chair, Dr. Isabelle Niang, responded that the answer to this question at least partly depends on the willingness of governments to contribute to such programs, which differs from country to country. She recommended that if the Program wants to expand beyond the scientific approach, this sort of partnership would be needed. She emphasized that the Program does not need the added bureaucracy that such contribution could involve and highlighted her choice of the word “partnership”, noting that a partnership and related support does not necessarily require a direct role of the government in the Fellowship Program.

Prof. Bruce Hewitson encouraged all of the working groups to consider strategies that would make the program and its activities attractive to potential Hosts. Neil Leary acknowledged the importance of identifying incentives for Hosts and encouraged workshop participants to write down their ideas and recommendations for the program partners.

Differences in opinion with respect to the most appropriate age criterion for Fellows led to the recommendation that individuals’ eligibility be based on experience in some instances, and not necessarily age. Representatives from Working Group I recommended two years of experience and an age limit of up to 40 years; they stressed that applicants from CBOs, NGOs, and MGs may be older but new to their positions. Other workshop participants emphasized the importance of targeting young Fellows and investing in the next generation.

Mr. Maurice Muchinda reiterated the importance of the working group’s recommendation to translate work into local languages, citing the extensive climate change adaptation work that is done at the local level. Muchinda suggested that Fellowship Program is positioned well to engage with initiatives and activities for disseminating such information. Schipper noted the importance of this and similar mechanisms to support the sustainability of the project.

7.2 Working Group II: National Government and Regional Organizations

Co-Chairs: Johnson Nkem and Jane Nimpamya

Rapporteur: Adriaan Tas

Adriaan Tas, rapporteur for Working Group II, presented a summary of his group's thoughts and recommendations for the African Climate Change Fellowship Program. He reported that as the group approached the question of capacity needs, they structured their discussion by positioning national government within the broader context of climate change activities. That is, they investigated the roles, responsibilities, and needs of national governments within the broader context of global and regional as well as community needs and activities. The group then asked itself, *'Who has what role and responsibility?'* and *'What skills are needed to effectively carry out such roles?'* They discussed not only **what** kind of skills and capacity are needed but also **where** the capacity should be built. They began to investigate what institution(s) should actually have the mandate and responsibility to develop and implement climate change policies at the national and regional level.

7.2.1 Priorities for capacity building

The working group identified climate change-related roles of national governments (in both international and national arenas) and the skills needed to fulfill those roles. General needs included impact assessments to better understand the problems, adaptation policies and mainstreaming of adaptation, funding, awareness raising, and enhanced disaster preparedness and response.

For their roles in international arenas, the group identified the need for national governments to develop the skills of their representatives to better understand and engage in the issues and debates discussed at the international level. It was noted that countries in Africa often ill-prepared for the UNFCCC COP and other relevant negotiating platforms, lack a clear and outspoken position in many of the debates, and exhibit the need to develop the technical capacities for reporting to the Convention. The group observed that good technical reporting requires technical skills to develop good monitoring systems and sampling techniques. Indigenous knowledge should also be taken into consideration to complement what is not known from science.

The role of national government at the national level is to develop sound policies based on the best information available with respect to the threats and risks climate change is posing to the welfare and well-being of its citizens. Skills needed to fulfill this role vary from the ability to identify and understand the problem to finding adequate funds to implement policies. It was observed that many national governments are currently not using or integrating/mainstreaming information about climate change and its impacts because there is a general lack of skills as to how to translate such data and information into specific policy measures. The group asked, *'Who should be responsible for such translation? Should government departments build such skills in-house or should the responsibilities be delegated to meteorological services and/or universities? How can interaction and communication between data/information providers and data/information users be stimulated and enhanced?'*

It was noted that people working in national government need to enhance their managerial and proposal writing skills in order to enable better access to funding and assist them in the implementation of adaptation projects and programs. National governments also have a role in developing early warning systems and disseminating information. Here again, reference

was made to the lack of properly functioning observation stations; developing such a system of observation stations, even though not covered by this Fellowship Program, is a *sine qua non* for generating appropriate data and information.

In investigating the roles and needs of regional organizations, the group determined that regional capacity needs are quite similar to those at the national level. As such, the group focused most of its attention on the national level with the understanding that many regional needs could be covered in the same discussions.

Working Group II suggested that the Program cluster identified skills and needs into long-term, medium-term, and short-term needs and then prioritize certain needs and skills for its first stage of Fellowships.

7.2.2 Examples of fellowships

The group enumerated a lengthy list of what its members believed to be high value fellowships. They agreed on the importance of identifying thematic priority areas for the Fellowship Program and provided a list of five themes that they believed to be specifically relevant in the African context – Agriculture and Food Security, Water, Health, Disaster Management, and Climate Science.

7.2.3 Examples of Centres of Excellence

The group suggested that Fellowships be coordinated from regional centers of excellence rather than having Fellows travel to numerous institutions spread over different countries. They believed that targeting regional centers for coordination would have several advantages, including the opportunity for comparative studies via climate change “focal points” in different countries and regular interactions between Fellows that might stimulate crossbreeding and multi-disciplinary work. The group noted that the likelihood of finding institutions that specialize in *all* the fields and disciplines related to climate change was low. They proposed that this obstacle could be overcome by placing Fellows in different institutions but in the same city or country. Citing the relatively small size of the program, the group urged the Program to emphasize to consider the importance of this recommendation.

The group opted not to provide a specific list of potential host institutions, but decided, instead, that it is more valuable for the Program to define the criteria and requirements that appropriate Host Institutions must meet. Brainstorming proposed six initial criteria:

1. Climate change should be included in the Host’s strategic and/or management plan
2. The Host should have an *operational* climate change unit
3. The Host should be part of a network so as to make it possible for the fellow to draw from further expertise
4. The Host should have sufficient human capital in order to ensure sufficient guidance and supervision for the fellow
5. The Host should have adequate research infrastructure
6. The Host should have a policy for accepting Fellows and trainees

7.2.4 Potential barriers and incentives for Home and Host Institutions

Reflecting on the group’s discussion with respect to potential barriers and incentives for Host institutions, Tas confirmed the group’s agreement that Host incentives are crucial. The group

seriously considered the question of whether Hosts should be paid a fee. Members cited arguments for (e.g., compensation for time, effort, services, and materials) and against (e.g., Fellow generates benefits via contribution to Host activities) institutional fees. Some participants argued that Fellowship awards were intended for the Fellow and not for overhead costs; others argued that some overhead costs were unavoidable. The group suggested that this question might have to be negotiated on a case-by-case basis. Potential barriers for Hosts included restrictive policies that might limit Fellows' access to and use of data, facilities, and information; funding concerns, including funding differentials between mentors and Fellows; and potential burdens of mentorship. Possible incentives in addition to institutional / bench fees included Host recognition and/or awards for participation and assured relevance and contribution of the Fellows' work to Host activities.

The group also provided a list of potential barriers and incentives for the participation of Home institutions and their Fellows. Barriers included loss of work power in Fellows' absence; internal competition for Program experience; lack of existing training policy; weak proposal writing skills; and lack of awareness of the Program. The group noted that enhanced job delivery upon the Fellows' return is an incentive for Home institutions to participate in the Program.

7.2.5 Proposed Mechanisms for Matching Fellows with Hosts

The group outlined several ideas and mechanisms for matching Fellows with potential Hosts. There was general consensus that the institutional database¹ alone was not a sufficient mechanism for connecting Fellowship applicants and potential host institutions. The group proposed two additional/alternative options for matching applicants with Hosts:

1. *Build a selection committee whose responsibilities would include matching applicants to suitable Host institutions.* Applicants could be asked to prepare a brief pre-proposal; the committee would short-list a number of applicants; those applicants would be invited to prepare a more detailed proposal; and the committee would perform a second review and recommend Fellows and relevant Host Institutions to the Program.
2. *Identify key host institutions (i.e., target Hosts) and then give them the mandate to lead the matching process.* Fellows could apply to the Program via the Host institution; the Host would select a group of Fellows; and the Fellowship Program would have final approval to award funds.

The group recognized the importance of sound selection procedures – for Host Institutions and Fellows – and the need to minimize bureaucracy. For good matching, they also encouraged putting sufficient effort into distributing information about the program and recommended communication with national climate change focal points, fliers for distribution at workshops and conferences, and use of relevant mailing lists (e.g., Climate-L, LCA, etc.).

¹ A first step in assessing needs and opportunities for the African Climate Change Fellowship Program was an institutional survey that aimed to identify organizations that were interested in participating as Host or Home institutions, their capacity needs relevant to climate change adaptation, and the types of Fellowship activities that would benefit them. The survey was distributed widely via email and was posted on the PASS website. More than 250 institutions from 43 countries in and outside of Africa responded to the survey. On online database of survey responses, created to facilitate connections between Hosts, Home Institutions, and interested Fellows, may be accessed at <http://survey.pass-africa.org>.

7.2.6 Recommended criteria for fellowship applications

Working Group II offered the following as suggested criteria for evaluation and selection of Fellowship applicants:

- Relevant work experience (min. 5 years)
- Clear career plan
- Currently employed in a key/strategic organization
- Clear indication of how built-up skills and capacity will be used upon returning to Home Institution
- Endorsement letter from home institution
- Educational qualification (e.g., minimum first degree in relevant field)
- Geographical balance across the five main regions in Africa

7.2.7 Recommended criteria for monitoring and evaluation

The group recommended tracking Fellows as a means of monitoring and evaluating their personal success and that of the Program. Fellows' personal goals and targets could be delineated and monitored via a Personal Development Plan to be created at the beginning of the Fellowship experience. The return rate of Fellows to their Home Institutions and the Fellows' perceived impact (e.g., on policy, priorities, etc.) in Host and Home Institutions following the experience could also be monitored.

7.2.8 Proposed mechanisms for developing capacity beyond fellowships

The group recommended establishing a network of Fellows during the program, noting that such an objective could be achieved more easily were groups of fellows co-located in the same city or country. They cautioned that web-based platforms often don't work the way people would like them to work for networking purposes – internet access is restricted in Africa and there is often lack of incentive to contribute to such a web-based platform. Networks and links between the Fellows could be enhanced to facilitate collaboration on common assignments, potential as part of the Fellowship experience. Example activities include joint authorship of scientific and/or policy articles, collaborative proposal writing, and collaborative organization of a workshop or UNFCCC COP side event. Such networking and collaboration would also stimulate multi-disciplinary work.

The group also suggested development of mechanisms to facilitate communication between the Program, Fellows' projects, and national climate change Focal Points. Continued collaboration between a Fellow's Home institution and Host institution following the completion of Fellowships was seen as beneficial, particularly with respect to opportunities for future reciprocal exchanges (e.g., Home Institution becomes a Host for Fellows).

Working Group II encouraged START, AAS, and IRA to look for funding now that would enable the Fellowship Program to continue.

7.2.9 Concerns

In concluding his report, Tas described three additional concerns that the working group wished to express. First, the group identified several risks related to program implementation. They believed that the Program was being implemented on too short of a timeframe, they

shared concern over brain drain/transfer, and they identified a current lack of required commitment from Home institutions to take back Fellows after their study. Second, the group urged the Program and workshop participants to seriously consider how to approach and decide upon composition of a Fellowship selection committee. Third, the group stressed the importance of considering synergies with other relevant initiatives currently developed and taking place in Africa.

7.2.10 Discussion

Given the responsibilities and requirements asked of Host institutions and the limited timeframe of fellowships, Dr. Peter Tarfa recommended that the Program consider targeting a smaller number of institutions for its first round(s) of Fellowships. If the Program proves to be sustainable, it could continue forward from there. Dr. Sami Moussa suggested that targeted institutions could be grouped by skills and priorities, which would facilitate matching Fellows to Hosts, help the Program to better connect with “on the ground” as well as academic adaptation needs, and be beneficial for harmonizing Host and Home institutions geographically (e.g., for language, translation, follow-up activities). Repeated expressions of agreement with the idea of targeting Host Institutions illustrated strong support for this recommendation to the Program. Some participants also suggested targeting Home Institutions to send multiple Fellows to Hosts located elsewhere.

Staff experience was identified as an additional criterion for the selection of appropriate Host Institutions. Gender, not yet included in discussions, was highlighted as an important criterion for applicant evaluation. The latter recommendation instigated a brief discussion about how some people consider the inclusion of particular groups of people (i.e., women) to bring down the quality of a program. Other workshop participants argued adamantly against this belief. Discussion concluded that gender would be considered in the selection of Fellows.

General discussion explored the question of whether a Fellow would benefit from visiting multiple institutions with the motivation that his or her multiple capacity needs could be best served by different institutions with proven strengths. Neil Leary explained that the Program is currently too small for a Fellow to visit multiple institutions but that there are other creative alternatives to address the concept behind this idea (e.g., online seminars for Fellows to build capacity across key concepts). Johnson Nkem reiterated that gaps in Hosts’ capacities could also be addressed by including the suggested criterion requiring Hosts to have networks whose members could also provide training for Fellows.

7.3 Working Group III-A: Research and Education Organizations

Chairs: *Emma Archer and Pius Yanda*

Rapporteur: *Richard Kangalawe*

Richard Kangalawe, rapporteur for Working Group III-A, presented a summary of his group’s discussions and recommendations.

7.3.1 Priorities for capacity building

Working Group III-A brainstormed priority themes for the Fellowship Program. Their list included the following:

- Climate modeling and science (including data management and meteorological networking);
- Adaptation modeling (as influenced by different factors and using outputs from regional as opposed to downscaled global models);
- Building capacity to work with model outputs (broad data input and analysis);
- GIS and remote sensing (for prediction and forecasting and mapping);
- Vulnerability mapping;
- Policy analysis;
- Natural resources management;
- Ecosystem goods and services;
- Renewable energy as adaptation

7.3.2 Examples of fellowships

The group proposed many types of fellowship projects and activities that they believed would add value to the Program and Fellows' experiences, including:

- Development, use, and analysis of high resolution climate change scenarios for (smaller) sub-regions of Africa;
- Economics of climate change (e.g., costs of adaptation, cost-benefit analyses; quantification of adaptation benefits);
- Climate change and the Millennium Development Goals (MDGs);
- Biofuels, including links to adaptation gains, poverty reduction, mitigation;
- Participatory action research; and
- Communication of climate information, including information packaging and dissemination.

Specific attention was given to the need to design and develop relevant curricula (at undergraduate, postgraduate, and schools levels) to build capacity in prioritized areas of need. START International is currently involved in developing and integrating global change education into secondary schools in the USA. During their time together, the working group discussed this and other curriculum development programs in the US and the possibility of expanding those models to countries in Africa.

Kangalawe also voiced the group's perspective that there is a need for advocacy training, particularly in the private sector.

7.3.3 Examples of Centres of Excellence

The group initially proposed to divide the African continent into sub-regions from which centers involved with climate change related issues could be identified. After a brief period of brainstorming, they decided that a "stocktaking" of institutions was difficult at the workshop because not all countries are represented.

The group did identify several criteria for evaluating Centres of Excellence as potential Host Institutions. They recommended that institutions have a minimum number of potential mentors/faculty per Fellow and illustrated expertise in a minimum number of core areas. Visiting Fellows should have access to library, internet, equipment, and technologies. It would also be beneficial for Host Institutions to write a proposal/plan with their Fellows to outline joint goals and expectations. Assurance from host institutions that the fellows will be attended to adequately throughout their fellowships period could be achieved via willingness

to arrange co-supervision or co-mentorship with multiple faculty members. The group also entertained the possibility of Fellows being mentored by more than one Host institution where such an arrangement [best] suits the candidate's plans.

7.3.4 Potential barriers and incentives for Home and Host Institutions

Lack of climate change expertise, imbalanced numbers of professors (few) and students (many), constraints on staff time, dilapidated facilities, and complicated or nonexistent procedures for receiving Fellows were identified as potential barriers to participation for Host Institutions. Home Institutions were expected to view the loss of manpower during a Fellow's absence and the potential to lose Fellows to other positions as barriers to participation. The group discussed ongoing debates over the stand alone versus cross-cutting nature of climate change; the lack of experience and coordination working in interdisciplinary teams; and institutional and political obstacles with respect to new issues (e.g., climate change) and related initiatives as potential barriers for Home Institutions and Hosts.

The group offered a list of potential incentives that included networking opportunities (for Fellows and faculty mentors), institutional/bench fees for Hosts, signed cooperative agreements between Host and Home Institutions, and purchase of materials and tools, where appropriate, that would remain at Host Institutions following Fellowship experiences.

7.3.5 Proposed Mechanisms for Matching Fellows with Hosts

Working Group IIIA recommended that Fellows identify potential Host Institutions using the online database and communicate with the institutions to formalize potential arrangements. Home Institutions should provide a letter committing to retention (where appropriate) with discretion. Host and Home Institutions should also develop a cooperative agreement that addresses issues such as equipment, budget, and intellectual property rights (e.g., publications, data output, etc.).

7.3.6 Recommended criteria for fellowship applications

The group proposed that different evaluation criteria be used for the different Fellowship types. In general, they recommended that Fellowship applicants must be African nationals, hold a position in an existing [Home] institution (e.g., teaching position, full-time student) and meet minimum qualifications (e.g., level of education, teaching experience, etc). They urged the Program to maintain balance in the Fellows' regional and sub-regional representation and in gender. An additional proposed criterion for applicants was that their Home Institution be willing to retain them for a duration of at least two times their Fellowship period (with discretion). The group also suggested consideration of the applicant's opportunity for promotion and advancement in their Home Institution.

7.3.7 Criteria and performance measures for monitoring and evaluation

The group offered suggestions for a number of criteria for monitoring and evaluation both Fellowships and the overall Fellowship Program. They suggested that Fellowship performance could be measured via progress reports and assessments from Fellows and Hosts; evaluation of lessons learned; number of courses/modules taught (if applicable); budget maintenance; and achievement of outputs described in cooperative agreements and joint proposals (where relevant);

The overall Fellowship Program could be evaluated according to research output (e.g., number of publications, including in-progress and submitted); number of Fellows retained in Home Institutions; number of Fellows retained on the continent; achievement of outputs described in cooperative agreements (and joint proposals, where relevant); and assessments from and of implementing institutions (e.g., Hosts, Homes, collaborating institutions).

7.3.8 Proposed mechanisms for building capacity beyond fellowships

Working group members emphasized the need to nurture a group spirit amongst Fellows. They recommended that Fellows, their Hosts, and/or Home Institutions consider developing proposals for joint activities beyond the Fellowship period that could potentially be submitted to other funding mechanisms for support. Follow-up plans (e.g., 2-year, 5-year) should address topics like how Fellowship training will be passed on to others. The group also suggested that Fellows commit to act as future mentors and reviewers.

7.4 Working Group III-B: Research and Education Organizations

Chair: *Chris Gordon*

Rapporteur: *Donald Adams*

Donald Adams, rapporteur for Working Group III-B, provided a brief summary of his group's discussions and recommendations. He stressed the group's belief that the mistakes of the past can be avoided by taking stock of lessons learned.

7.4.1 Priorities for capacity building

The group emphasized the need to identify climate change data gaps and to build capacity along the entire data value chain – collection, analysis, interpretation, communication, and dissemination). Data are available in many locations but that there is a lack of experienced people to collate these data and make them available to other institutions and countries. The data must also be communicated so that they are amenable to users; there exists a capacity building gap in this respect. There is a priority need for translating climate data into a usable format.

7.4.2 Examples of fellowships

The group identified potential for high value Fellowship projects in the following topics:

- Integrated natural resource management and climate change;
- Uncertainties (risk assessment) from scientific data gathering to societal issues;
- Biofuels and carbon sequestration by natural and plantation forests;
- Peri-urban agriculture;
- Case studies of community resilience that use replicable transferable knowledge;
- Improved energy and resource use technologies;
- Harmonization of adaptation policies;
- Economic costs and benefits of adaptation;
- Capacity building to address the greenhouse gas data gap.

7.4.3 Examples of Centres of Excellence

The group emphasized that Centres of Excellence should be evaluated according to standardized criteria. They recommended that all Hosts have existing critical mass [e.g., of faculty, students] within their institution, and non-African Hosts would need proof of existing African links. The strengths of potential Host and Home Institutions could be evaluated by assessing existing linkages and partnerships and the resources that are available for undertaking research and obtaining advanced training in a specific area. Regional distribution (and country, language, etc.) of Hosts should also be considered.

7.4.4 Potential incentives for Home and Host Institutions

In considering potential incentives to entice individuals and institutions to participate in the Program, the group suggested that START could provide funding for endowed chairs (e.g., START chair for climate modeling). Giving high visibility to institutions as Host of Program Fellows would encourage positive recognition. Another recommendation was to explore methods for raising funds to hire a replacement for Fellows during their time away. Funding could also be given to postdocs placed at Host Institutions to assist in managing the Program and visiting Fellows. The group supported the provision of bench fees (e.g., laboratory costs) to Host Institutions.

7.4.5 Proposed Mechanisms for Matching Fellows with Hosts

The group encouraged the Program to look at Home and Host institutions closely in order to find Fellowship matches that are well qualified on both ends so that Fellows have built-in capacity to bring to the table and so that the Program and its Fellowships can facilitate two-way linkages between institutions. Review of potential Hosts' publication records could support assessment of the institutions' ability to train Fellows in relevant subjects. The group also recommended that the Program's Call for Proposals be circulated in English, French, and Portuguese.

Concerns were raised with respect to disseminating the Call for Proposals "too widely", namely questioning expectations and what to do if the Program were overwhelmed with proposals.

7.4.6 Recommended criteria for fellowship applications

At least a Master's level education with work experience or interest in climate change adaptation and/or mitigation, competency in the language spoken at the Host Institution, gender equity and regional balance were listed as suggested criteria for selecting fellowship applicants. Working Group III-B recommended that application be reviewed by selection panel organized START.

7.4.7 Criteria and performance measures for monitoring and evaluation

The group emphasized the importance of separating monitoring from evaluation as monitoring will be an ongoing activity. They recommended that the Program monitor the impact/contribution of the Fellow on/to his or her Home and Host institutions; the impact of the Fellow's work at the national, regional, and community scales; and the Host Institution's ability to provide training and its impact on the Fellow. Recommended indicators for evaluation included the number of short term and long term publications (scientific and non-scientific); the return of the Fellow to his home country; papers presented at local, national and international conferences; training aspects of others at the host institution; career

progression; new contacts for Home Institution (e.g., exchange programmes); increase in grants received by Fellow; new research partnerships established; and the number of new contacts made in the Host Institution.

7.4.8 Proposed mechanisms for building capacity beyond fellowships

Discussion distinguished between mechanisms that can expand the impact and effectiveness of the Fellowships and mechanisms that can build capacity in other ways. One of the group's major recommendations was for the Program to target a smaller number of institutions so as to best use existing funding, people, and expertise. Working group participants also discussed the potential offered by e-learning, particularly for courses within the climate change framework. Looking to the future, the group recommended that a Pan-African Adaptation Network be established to promote and facilitate longer-term Program activities, to explore funding opportunities, and to establish bilateral support beyond the Program itself.

7.4.9 Discussion – Working Groups III-A and III-B

Emma Archer posed the question of what mechanisms could be adopted by the Program to prevent “brain drain” and encourage the return of the Fellow to his or her Home institution. One such proposed mechanism was the Fellows’ commitment to a mandatory period of at least one year at their Home institution following completion of their Fellowship. Another suggestion was to have mandatory one-year period on the Continent. Jane Nimpamya suggested the complementary idea of also emphasizing Home institutions’ sponsorship of their Fellow(s) with a commitment on the part of the Home institution to retain the Fellow(s) after his or her study.

Neil Leary offered his perspective on “big issues” that were developing as all of the Working Groups presented their thoughts and recommendations. He identified three major issues:

1. Incentives for host institutions
2. Substantial barriers for Home institutions that lose an important resource when their Fellow(s) leave for study elsewhere
3. How to focus / target efforts (e.g., target a small number of institutions as Hosts; place multiple Fellows in one institution; solicit bids from potential Hosts; Hosts and Fellowship Program jointly recruit Fellows; joint programs between institutions)

Leary solicited participants’ feedback on these issues that could be shared with IDRC. It was recognized that any recommendation that required changes to the Program’s original design and/or timeline would need the approval of IDRC before it could be implemented.

As the session closed, Chris Gordon stressed the need for understanding how to not only best implement but also sustain the Program. He voiced concern over the need to be proactive in identifying potential sources of funding for the Program when the current program period comes to the end.

Pius Yanda added a caveat as discussion closed. He expressed concern that in targeting a smaller number of Host institutions, the Program is assuming that the needs of Fellows can be accommodated in the limited number of institutions that are selected. Recognizing that the few institutions that are selected are likely to be overloaded in their current responsibilities, he questioned whether they would be overloaded even more with multiple Fellows. He encouraged the group to consider mechanisms for overcoming this.

8 Break-Off Group – Climate Core Competencies

During the second day of the workshop, a small group of workshop participants* broke away from the last session of Working Group discussions in order to collaboratively consider the following question:

If I am going to work on climate change issues within a given context, what conceptual understanding should I have?

The discussion surrounding this question recognized that varying levels of competency – from general to highly specialized – would characterize any individual's personal understanding of climate change issues. However, the crosscutting multidisciplinary nature of climate change demands that an individual cannot work in one relevant area, sector, or question without also recognizing its connectivity (i.e., links, impacts, etc.) to other areas and sectors. For this reason, the group argued that there is a base of conceptual knowledge of which an individual must be aware.

The purpose of the break-off meeting was to begin the process of creating a living, advisory document that outlines a common framework of core competencies for climate change research. The document would be widely circulated for review and input, likely in a Wiki format to facilitate its availability for editing and comments. The document would identify the key concepts that someone working on climate change within a given context might reasonably be expected to know. It would be a guide to those basic competencies – a reference that an individual working in climate change could read to assess his or her own familiarity with the core concepts. The document could be a guide for developing curricula pertaining to climate change, vulnerability, adaptation, and mitigation. The document could also be a shared reference point for identifying and prioritizing capacity building activities. The document would encourage a shared language that could ultimately strengthen the community.

The break-off group was clear that the document would not give strict definitions or explanations of key concepts, it would not be seen as exhaustive, and it would not be a statement to be used for accreditation of a climate scientist.

The first objective of the break-off group was to select an initial authorship team for the document. The second objective was to identify streams of climate change knowledge under which core concepts could be listed. The group identified the following general streams:

1. Physical science of climate change
2. Impacts of climate change
3. Vulnerability
4. Adaptation
5. Mitigation

Authors volunteered and/or were assigned to one of the five streams. It was decided that the document would also include a preamble that explained its history and purpose as well as a metaconcepts section that would present overarching themes that cut across the general streams. They described the metaconcepts as those issues over which anyone engaging with

* Participants in the group were Bruce Hewitson, Rob Crane, Neil Leary, Pius Yanda, Ramadjita Tabo, Kai Kim Chiang, Jouni Paavola, Anthony Nyong, and Clark Seipt.

climate change issues should be striving to have comprehensive awareness and basic conceptual understanding. During their time together, the group began brainstorming a list of potential metaconcepts.

The authors agreed that, upon returning to their respective institutions, they would work together to identify and briefly define key concepts within their respective climate change streams. It was agreed that lists would be uploaded to a Wiki site for collaborative review and comment. The document would eventually be circulated to a wider community for review.

In the short term, the core competencies document is expected to inform capacity building activities under the African Climate Change Fellowship Program. In the longer term, the living document is expected to evolve into a common frame of reference for the climate change community, a context for research activities, and a roadmap for understanding related issues at necessary and appropriate depths.

9 Closing Session: The Way Forward

Session Co-Chairs, Prof. Pius Yanda and Prof. Fred Owino, shared their perspectives on the way forward.

Prof. Yanda explained that following the workshop, the program partners will synthesize the information provided and developed through workshop proceedings. A document will be circulated for participants' comments before it was endorsed as the formal workshop report.

Prof. Yanda confirmed that the Program is moving toward a concrete plan. The institutional database, which captured Host and Home information from nearly 300 entries, can be considered as a shopping center for potential applicants and Hosts. When the Program's concrete guiding principles are in place, the Fellowships will be advertised on various websites (e.g., PASS, IRA, AAS, START) and mailing lists. The selection criteria will be clearly defined to ensure fairness in the selection process.

Yanda recommended that the START Secretariat revisit the database and identify high-rating institutions based on the criteria suggested by the workshop's Working Groups. The most competent institutions could then be selected from that list and recommended as potential Host institutions to Fellowship applicants. Once candidates are selected, endorsement would be requested from the Program Steering Committee before awards were made.

Yanda concluded that the workshop has helped to define the roadmap for how the Program will progress.

Prof. Owino reminded the workshop participants that they are invited and encouraged to feed into the program and guide its development. He assured the participants that program implementation would take on, as much as is possible, what the Working Groups recommended. He urged participants to be on standby as they traveled home to their respective institutions as they are now a part of the Program.

9.1 Closing Remarks - AAS

Dr. Iba Kone, Acting Director of AAS, recognized the importance of the coordination, cooperation, and effort between START, IRA, and AAS. He expressed gratitude to IDRC for funding the Program. Dr. Kone also thanked the workshop participants for stimulating discussion, expressing his opinion that the workshop had been a resounding success. He emphasized that although the workshop had come to a close, the effort had just begun; the workshop marked a good start to an important initiative.

Dr. Kone confirmed that AAS is fully committed to the Program as a vehicle for sharing knowledge – for providing information and knowledge to decision-makers, policy-makers, and scientists. Noting that this initial stage of the Fellowship Program was the beginning of a long-term process, Kone acknowledged that AAS has a framework that could be used to steer the Program as it evolves. He expressed a need for partners in this longer-term effort, however, and urged the current partners, IDRC, and others to put their heads together for optimal collaboration to ensure success of the Program.

9.2 Closing Remarks – IDRC

Dr. Anthony Nyong, Senior Program Specialist for IDRC, expressed his happiness in seeing this workshop, which had been planned for a long while, come to be.

Dr. Nyong described how a core component at IDRC is capacity building for development. The Advisory Board for the Climate Change Adaptation in Africa program (CCAA), for which IDRC is a partner, has mandated to explore indigenous approaches and strategies for capacity building. He explained that IDRC does not want to reinvent the wheel for capacity building. It wants to know: where can CCAA complement others and fill gaps?

As Dr. Nyong looked out over the room filled with workshop participants, he acknowledged that before him sat the best of the best in climate change in Africa – all of which were currently engaged in a partnership approach. He stressed that the end of the workshop did not mark the end of the collaboration or the partnership.

Dr. Nyong encouraged AAS to “take this on” – to keep meeting, keep talking, and keep collaborating to explore every opportunity in dealing with the threats of climate change and the opportunities that climate change brings to the continent.

9.3 Closing Remarks – IRA

Prof. Pius Yanda, Director of IRA, expressed his gratitude, on behalf of the University of Dar es Salaam, the Pan-African START Secretariat, and IRA, to everyone for their active participation. He labeled the workshop as time well spent as he referenced its outputs and recommendations for ways to achieve the Fellowship Program, needs for capacity building, and guiding principles. Prof. Yanda acknowledged that the task of START, IRA, and AAS was now to use these outputs to advance Program implementation. He emphasized that while the Program partners will facilitate that implementation, it was the role of all participants to actively participate in it. In closing, Prof. Yanda expressed his gratitude to IDRC for funding the Program.

9.4 Closing Remarks – START

Dr. Neil Leary, Acting Deputy Director of the International START Secretariat, thanked all of the participants for their active and useful contributions to the discussions. He noted that many challenges had been discussed during the workshop and assured participants but that the Program can overcome them. Dr. Leary expressed much optimism in looking forward. He noted the many mechanisms recommended during the workshop to overcome the identified barriers. He urged participants to return home feeling encouraged – encouraged that we *will* make an impact. He also urged them to think more about how to sustain that impact.

Dr. Leary expressed his gratitude to IDRC, particularly Tony Nyong's contribution to the initial conceptualization of the Fellowship Program. He expressed his gratitude for the partnership with IRA – an old friend of START and the new host of PASS – and AAS – a new friend of START. He assured AAS that this first collaboration would not be the last. Dr. Leary then re-emphasized to the workshop participants that they were now part of the partnership as well and would be called upon to contribute and to stay part of the Program's activities. He noted the many old friends seated before him and the many new faces – “a healthy sign”.

Dr. Leary closed by thanking Pius Yanda and the staff of IRA and the staff of AAS for co-hosting the workshop.

10 Workshop Recommendations and Follow-Up

The Workshop to Assess Needs and Opportunities for the African Climate Change Fellowship Program generated many valuable recommendations for Program design and implementation. The recommendations, and the follow-up actions taken to implement the recommendations, are summarized below.

Participants in the workshop were unanimous in their view that there is a priority need for programs to build capacity for climate change adaptation in Africa and enthusiastic in their expectation that the ACCFP will make an important contribution in this regard. The workshop confirmed the need and appropriateness of a fellowship program that is targeted to provide professionals, researchers, teachers and students with opportunities that will enhance their capabilities for advancing and applying knowledge for adapting to climate change and acting as effective advocates for adaptation. Participants concurred with plans to award four different types of fellowships – Policy Fellowships, Doctoral Research Fellowships, Post-Doctoral Fellowships and Teaching Fellowships – that will enable the recipients to undertake experiential learning, education, research and/or training activities. Participants also highlighted the potential for the fellowships and the program to link participating institutions in a network for adaptation knowledge sharing.

Discussions in the workshop highlighted a number of challenges for implementation of the program. A critical challenge that was discussed is the need to maximize the impact of the ACCFP, particularly during the pilot phase. The initial plans for the ACCFP would have Fellowship applicants propose an institution of their choosing to host their activities. Participants in the workshop noted that this would likely result in the placement of individual fellows scattered across a large number of institutions. This would risk diffusing the impacts of the program and would miss opportunities for synergistic benefits that could be attained by multiple Fellows being placed together at a common institution. Also, a wide scattering of

Fellows at numerous Host Institutions is potentially ill suited for establishing sustainable relationships between Host and Home Institutions, as well as with the Fellowship Program. Finally, an approach that depends on applicants proposing their own Host Institutions without guidance from the Program risks placement of some Fellows with Host Institutions that may not be suitable.

Workshop participants identified many potential impediments that could discourage prospective Host Institutions from participating in the Fellowship Program and agreed that additional incentives are needed for Hosts, possibly to include some small compensation for inputs provided by Host Institutions, as well as other incentive mechanisms described below. Time was thought to be the most constraining impediment. Effective supervision of a visiting Fellow by a Host Institution requires significant time from senior personnel who are typically overburdened with existing research, teaching, mentoring, management and service responsibilities. There are other resource costs as well for Host Institutions. It was recognized that Fellows will bring benefits to their Host Institutions, but these may not be sufficient by themselves to offset the costs of hosting a visiting Fellow. This problem is exacerbated by the time periods planned for the different types of Fellowships, which many thought to be too short to enable Fellows to provide significant benefits to their Hosts.

It was observed by several participants that a more proactive approach to screening and targeting prospective Host Institutions and matching Fellows with Host Institutions could greatly increase the value of the Fellowship experiences. The need for a Memorandum of Understanding (MoU) among the Host Institution, Home Institution, Fellow and Fellowship Program was repeatedly voiced during the workshop. Each MoU would clearly describe the roles, responsibilities and expectations of all parties. It was noted in discussions that selection of Host Institutions and negotiation of the MoUs should be given adequate time so that appropriate Hosts are selected and all parties fully understand their responsibilities, have included provisions to assure that each will derive adequate benefit, and that each is fully committed to carrying out the terms of the MoU.

It was originally planned that Fellowships would be implemented in two rounds of awards, each with a separate call for applications, review and placement process. There was a general consensus among workshop participants, however, that implementing two rounds of awards within the relatively short time period allotted for the pilot phase would impose high administrative burdens.

Discussion of these and other challenges resulted in the following recommendations from the workshop:

- The pilot phase of the Fellowship Program should target a relatively small number of institutions in Africa to host Fellows that have the necessary capabilities and commitment to provide valuable Fellowship experiences;
- Efforts should be made to place multiple Fellows with common Host Institutions;
- MoUs should be negotiated and agreed that clearly define the roles, responsibilities and expectations of all parties and that make provision for adequate benefits and incentives for the Host Institutions, as well as for the Fellows and Home Institutions;
- Consideration should be given to the placement of Post-Doctoral Fellows so as to provide a benefit and added incentive to institutions that host other types of Fellows;
- Fellowships of longer duration, financial compensation and other mechanisms to benefit and provide added incentives to Host Institutions should also be considered; and

- Fellowships should be awarded in a single round.

Implementing these changes to the Fellowship Program would yield a number of advantages. Targeting a small number of institutions with high qualifications to host multiple Fellows and providing more time to negotiate and agree MoUs would increase the impacts of the Program; provide valuable opportunities for Fellows to interact with and learn from their peers; build stronger capabilities at Host Institutions to become centers of excellence for supervising and mentoring Fellows; and establish stronger and longer lasting relationships among Host Institutions, Home Institutions and the Fellowship Program.

Strategic placement of Post-Doctoral Fellows, award of longer Fellowships, Fellows bringing their own project funds, and financial payments to Host Institutions would provide important additional incentives for prospective Host Institutions to participate in the pilot phase and increase the likelihood that they would want to participate in the Fellowship Program after the pilot phase. Placement of Post-doctoral Fellows at the same host institution as 2 to 4 other Fellows would have a number of benefits for the Host Institutions. The Post-Doctoral Fellows could assist the host institution to mentor and supervise other Fellows, thereby lowering the burden on the host institution. Post-doctoral Fellows can also benefit Host Institutions by helping with teaching and contributing to research projects.

These benefits can be increased by extending the Post-Doctoral Fellowships from 12 months to 18 months. Extending the time period of Policy and Doctoral Fellows to 6 and 12 months respectively, and placing a small number of Fellows with the same Host Institution, also increases the potential for Host Institutions to derive benefits from participation in the Program. The longer the period of time that Fellows are at Host Institutions, the greater the potential value of the Fellows to the mission of the Host Institutions. Extending the duration of the Fellowship would also increase the benefits to the Fellows. Finally, awarding Fellowships in a single round would reduce the administrative burden and facilitate the placement of multiple Fellows with common Hosts.

Following the workshop, the ACCFP Executive Committee submitted a request to IDRC to modify the Program to reflect the recommendations described herein. That request was approved and action has been taken to implement the changes. It was decided that the program would select approximately 10 to 12 institutions as Recommended Host Institutions based on the breadth and depth of their climate change adaptation related capabilities, as well as their interest and commitment to participate in the program, with the intention to place one Post-Doctoral Fellow and 2 to 4 other types of Fellows at each. Fellowship applicants may propose any host institution of their choosing, but they will be encouraged to select from the list of Recommended Host Institutions and priority will be given to qualified applicants that select from this list. Adjustments have been made to the program budget to allow for small financial compensation to be paid to the Host Institutions to cover their direct and administrative costs. It was also decided to extend the maximum duration of the fellowships from 3 to 6 months for Policy Fellows; from 6 to 12 months for Doctoral Research Fellows; from 12 to 18 months for Post-Doctoral Fellows; and from 1 to 2 months for Teaching Fellows.

In May 2008, the ACCFP Executive Committee invited 30 institutions to submit proposals to be Recommended Host Institutions. The invited institutions were identified from responses to a survey of institutional interests, missions, and capabilities that was conducted in late 2007, as well as through consultations. Eleven institutions have since been selected to be Recommended Host Institutions for the inaugural round of Fellows. Each of these institutions

has agreed, in principle, to host up to 5 Fellows, to provide appropriate supervision, and to be bound by limits on administrative and direct cost fees established by the Program. At a later stage, after selection of applicants for fellowship awards, MoUs will be agreed and signed with the participating institutions to formalize the agreements. A Call for Fellowship Applications is in preparation and will be issued in mid-summer 2008.

APPENDICES

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Appendix 2. Introductory Remarks, Opening of the Workshop, and Launching of the Pan-African START Secretariat

A.2.1 Introductory Remarks – Prof. Pius Yanda, Director of the Institute of Resource Assessment (IRA) and Director of the Pan-African START Secretariat (PASS)

Honourable Minister of State in the Vice President's Office responsible for Environment, Dr. Batilda Burian; The Vice Chancellor, University of Dar es Salaam, Professor Rwekaza Mkandala; The Deputy Vice Chancellor (Academics, Research and Consultancy), University of Dar es Salaam, Prof. Makenya Maboko; The Deputy Vice Chancellor (Planning, Finance and Administration), University of Dar es Salaam, Prof. Yunus Mgaya; The Executive Director of Third World Academy of Sciences, Mr. Peter McGrath; Acting Director of the International START Secretariat, Dr. Hassan Virji; The Executive Director of African Academy of Sciences, Prof. Iba Kone; The Regional Director of ICSU for Africa, Prof. Sospeter Muhongo; The Acting Director General, Tanzania Commission for Science and Technology Mr. J. Mafunda; Representatives of International Organizations; Invited Guests; Workshop Organizers; Ladies and Gentlemen,

First and foremost, let me take this opportunity to thank you, Honourable Guest of Honour, for accepting our invitations.

I wish to also thank all the invited guests and distinguished workshop participants for your acceptance to come to this meeting. We sincerely appreciate you availing your precious time to come and attend this workshop.

I welcome you all to this workshop.

Honourable Guest of Honour, Workshop Participants, Ladies and Gentlemen,
My role is to bring to your attention why we are here today. First, it is a workshop to brainstorm on ways in which the capacity building programme on climate change adaptation could be successfully implemented. Second, is launching of the Pan-African START Secretariat (PASS) at the Institute of Resource Assessment, University of Dar es Salaam.

Honourable Guest of Honour, Workshop Participants, Ladies and Gentlemen,
It is indeed a great pleasure today that we are gathering here to put in place mechanisms for implementing a capacity building programme on climate change adaptation in Africa. This is a step forward in addressing climate change impacts in Africa. We all recall that ten years ago, climate change was only characterised from climatological view point. It is now that climate change is seen as a complex phenomenon affecting people's livelihoods and ecosystems integrity. In this regard, therefore climate change has direct effects on different sectors, thus calling for integrated approaches in dealing with climate issues.

Honourable Guest of Honour, Workshop Participants, Ladies and Gentlemen,
One of the major limitations in addressing climate change issues has been societal limited capacity. National capacity to address such climate change issues is a pre-requisite for effective intervention. It is on this context that such a Capacity Building Programme is essential. The programme will offer the following fellowships:

- Approximately 20 early to mid-career African professionals will receive Policy Fellowships;
- Approximately 20 students in doctoral programmes related to climate change risks and adaptation at African institutions will receive Doctoral Research Fellowships;
- Approximately 10 African PhD holders will receive Post-Doctoral Research Fellowships to participate in research and teaching;
- Approximately 8 African educators at African universities will receive Teaching Fellowships that will enable them to develop and implement new courses related to climate change.

Honourable Guest of Honour, Workshop Participants, Ladies and Gentlemen,

It should be noted that this program will add on to other already on-going initiatives in the region. For example, at the University of Dar es Salaam there are already on-going climate change related programmes. Since 2003, the Institute of Resource Assessment has been running a Masters Programme in Natural Resources Assessment and Management (MSc. NARAM) in which Climate Change is one of the major courses. The demand for such a programme is higher than we can handle.

Another closely related capacity building programme is on Climate Change and Biodiversity Conservation. The programme is being implemented in collaboration with START's International Secretariat. This programme focuses more on biodiversity conservation in a changing climate with primary target of the Albertine Rift Region.

The first batch [of courses] will be run during the middle of this year (2008) at the University of Dar es Salaam. I should report that we have received more than 100 applications, and only 30 will be selected for the first course. We have also received a number of requests from some countries outside the Albertine Rift Region who want to bring a good number of their people for training on tailor made arrangement. Again, this gives an indication of the demand for such programmes in the region.

Honourable Guest of Honour, Workshop Participants, Ladies and Gentlemen,

As I have already pointed out, this occasion will also be utilised to launch the Pan-African START Secretariat (PASS) at the University of Dar Es Salaam. START is an International Organization whose mandate is Capacity Building in Global Change Research with primary focus on the Developing Countries. Each continent has a regional secretariat.

One may wish to know why START in Africa? Again, this is in realisation of a need for continued efforts in Capacity Building on Global Change Research in Africa. The role of START features well in the IPCC Fourth Assessment Report where a number of START scientific contributions have been cited, including studies that were conducted in Africa.

However, despite this knowledge base that has been generated, more research needs to be undertaken as there are still lots of unknowns on global change in Africa. It is on these grounds that capacity building will not only equip the society with a knowledge base for effective intervention but also skills to generate new knowledge.

Honourable Guest of Honour, Workshop Participants, Ladies and Gentlemen,

In April 2007, the PASS Office was relocated from Nairobi to the Institute of Resource Assessment, University of Dar Es Salaam, for the sole purpose of building institutional capacities in Africa. Positioning PASS at the Institute of Resource Assessment, University of

Dar Es Salaam is based on the premises that for a long time the institute has been heavily engaged in global change research. Moreover, the institute is unique in that it has multi-disciplinary composition of expertise thus forming solid grounds for addressing global change research in an integrated manner.

I sincerely thank PACOM [the Pan-African Committee for START] for entrusting the University of Dar es Salaam to host PASS. I also thank the University of Dar es Salaam administration for its kindness to host PASS.

Chairperson,

Allow me to also note that this meeting is attended by distinguished scientists in climate change issues, from more than thirty countries and most of whom participated in the IPCC Fourth Assessment Report as authors. I also note presence of my fellow co-authors of the Africa Chapter in the same report. I wish to congratulate them for being co-recipients of Nobel Peace Prize.

Last and not least, many thanks to IDRC and START for supporting the workshop and PASS operations, and the forthcoming African Climate Change Fellowship Programme. Also, thanks to AAS and IRA for organizing this important workshop. Thank you for listening.

A.2.2 Remarks – Dr. Hassan Virji, Acting Director of the International START Secretariat (START)

Honorable Minister of State, Dr. Burian; Vice Chancellor, Prof. Mukandala; and Deputy Vice Chancellor, Prof. Maboko of the University of Dar es Salaam; Mr. Mafunda, Director General of TZ/COSTECH; Distinguished representatives of the international organizations and governmental agencies; Strategic partners and friends of START; Ladies and Gentlemen,

It is a great pleasure to be here today; it is always a real pleasure to be back home, and especially to be here for START, the global change SysTem for Analysis, Research and Training.

As we've already heard from Prof. Yanda, START is a non-governmental international organization that builds capacity in developing countries on global environmental change and links science to decision/policy making for sustainable development. START has actively supported the African scientific community since its inception in 1992, and today's meeting here marks a special milestone for us for two reasons.

First, concerning adaptation to climate change: the distinguished colleagues who spoke just before me have already emphasized this challenge. It is clear that the welfare of all people, especially those in developing countries, and the sustenance of ecosystem goods and services for continued human welfare critically depends upon our ability to mitigate, and especially adapt to, climate variability and change. Indeed Honorable Minister, your presence here is a clear indication of your understanding and concern about this challenge. START has pioneered activities in Africa (and elsewhere) on assessing impacts of and adaptations to climate change and variability. This effort, in collaboration with TWAS and UNEP, (*show booklet*) is the basis for expanded and continued effort of which the launch today of the African Climate Change Fellowship program in collaboration with African Academy of Sciences (AAS) and the Institute of Resource Assessment (IRA), and supported by

IDRC/Canada, is one major facet. We are convinced that this effort that we put into operation today will substantially enhance African capabilities to adapt to climate change and variability.

Second, concerning START's operational structure: as mentioned by Prof. Yanda, START operates in all developing regions through regional committees comprising prominent regional scientists, representatives of policy community, multilateral organizations, and the private sector. Regional START Secretariats and research nodes hosted by national agencies are the critical components that foster and help coordinate regional capacity building activities and research on global environmental change. In the context of Africa, we're here today members of the Pan-African Regional Committee for START (PACOM, which will meet here immediately following the workshop) and the Director and staff of the Pan-African START Secretariat (PASS), based at IRA of the University of Dar es Salaam. I want to also acknowledge the previous Director of PASS, Prof. Odada, and chair of PACOM, Prof. Wandiga of the University of Nairobi.

PASS has the key responsibility of engaging the African scientific community in global environmental change research and capacity building. It serves all of the African countries and as such is a crucial component of our dedicated effort on research-driven capacity building. The IRA, under the very able leadership of Prof. Yanda, and with support of his very capable staff, are admirably suited to the challenges and responsibilities set by PACOM. Indeed, not just in terms of helping manage the African Climate Change Fellowship program, but in other START projects, such as global environmental change education and especially in designing and implementing graduate level training/curriculum on climate change and biodiversity conservation in Africa, IRA has already taken on substantial direct responsibility. I am therefore very pleased to acknowledge the leadership Prof. Yanda is providing.

START activities are also aimed at institutional strengthening, and I am convinced that the growing portfolio of global change research and capacity building activities will further strengthen the IRA/ University of Dar es Salaam. Of course, this would not be possible without firm and strong commitments by the senior administration of the University of Dar es Salaam and the government of Tanzania and also by the international donor community that supports START. For this commitment for the welfare of all people of Africa and for your continued support and encouragement, we are extremely grateful. This is truly in the spirit of "Hekima ni Uhuru", the motto of the University of Dar es Salaam.

I mentioned at the beginning that it is a special pleasure for me to be home here in Dar es Salaam. My formative education was gained at a high school in Dar es Salaam and at the University of Dar es Salaam when it was a just opened new university. For me personally it is a particular pleasure to be able to participate in continued collaboration with my alma mater. I have no doubt that our collaboration with the IRA will be a source of deep personal satisfaction and pride. Ahsante sana. Thank you.

A.2.3 Remarks – Prof. Rwekaza Mukandala, Vice Chancellor, University Of Dar Es Salaam

Hon. Dr. Batilda Salha Burian, Minister of State in the Vice President's Office (Environment), Chairman of this session, Agriculture Director General of the Tanzania

Commission for Science and Technology, Mr. J. Mafunda; The Deputy Vice Chancellor (Academics, Research and Consultancy), University of Dar es Salaam, Prof. Makenya Maboko; The Deputy Vice Chancellor (Planning, Finance and Administration), University of Dar es Salaam, Prof. Yunus Mgaya; The Executive Director of Third World Academy of Sciences, Professor Mohamed Hassan; Acting Director of the International START Secretariat, Dr. Hassan Virji; The Executive Director of African Academy of Sciences, Prof. Iba Kone; The Regional Director of ICSU for Africa, Prof. Sospeter Muhongo; Representatives of International Organizations; Invited Guests; Workshop Organizers;

Ladies and Gentlemen,

On behalf of the University of Dar es Salaam, and on my own behalf, I would like first of all to welcome you to this workshop. I thank you for accepting the organisers' invitation to participate in this important Workshop. Let me also extend a hand of special welcome to the representatives of international organizations who are gathered here to attend the workshop, and to all the participants coming from outside and within Tanzania. To you all, I say welcome to Tanzania and to the University of Dar es Salaam in particular.

Guest of Honour,

Some of the participants to this workshop have traveled from various parts of Africa, Europe, and the USA, and from various institutions within Tanzania. This participants' profile reflects the global significance of the workshop and of the issues to be deliberated on during this meeting. It is also an indication of a high degree of commitment, on the part of the individual participants, who have taken their time to travel the long distances to attend this meeting. This tells much about the status of this meeting, and about the issues to be discussed in the coming three days. Let me say, therefore, that we at the University of Dar es Salaam are very pleased to have been given the honour to host such an important event.

Guest of Honour,

This occasion is also being used to officially launch the Pan-African START Secretariat (PASS) at the University of Dar es Salaam. The Secretariat was relocated from Nairobi University to the University of Dar es Salaam in April 2007. The core responsibility of the Secretariat is to coordinate research on climate change in Africa and promote initiatives to enhance adaptation to climate variability. In line with this role, over the years the Secretariat has been instrumental in building and nurturing Africa's regional capacity for the scientific understanding of global climate change and regional-global linkages in the earth systems. As a result of this effort, the number of African researchers and networks engaged in global climate change research has increased notably, and the regional capacity for scientific research in this field has accordingly improved.

Again, the University of Dar es Salaam is proud to be associated with these noble tasks of the START Secretariat and the impacts it has made so far. It is our pleasure to be able to provide office space and basic facilities for the Secretariat's operations. Let me take this opportunity to assure the START International Secretariat, and the Global Change Research Community, that the University of Dar es Salaam will do all it can to provide a conducive environment for the Secretariat's proper functioning.

Guest of Honour,

This Workshop will address important issues on a new capacity building programme. The programme is being launched to offer experiential learning, education, research and training opportunities for African professionals, researchers and graduate students in matters related

to adaptation to climate change in Africa. I am glad to point out that the University of Dar es Salaam considers studies on climate change and its policy implications as key areas of knowledge. Such studies must therefore feature prominently in our core mission activities. It is therefore natural that we would welcome collaboration with sister institutions in Tanzania and beyond to build our capacity for understanding and addressing the topical phenomenon of climate change.

Guest of Honour,

Allow me to thank all the institutions and individuals who took the initiative to establish the Fellowship Programme on climate change, and to establish a Secretariat to coordinate the programme. In this connection, let me single out three institutions that have played a pivotal role in this effort, namely the Global Change SysTem for Analysis, Research and Training (START), the Institute of Resource Assessment of the University of Dar es Salaam, and the African Academy of Sciences. In the same vein, I wish to acknowledge and appreciate the role of the International Development Research Centre (IDRC) which is funding this Fellowship Programme. On behalf of the University of Dar es Salaam, I would like to express my gratitude to all these institutions for developing and supporting this important initiative.

Guest of Honour, Madam Chair, Ladies and Gentlemen,

Having made these few remarks, I thank you all, once again, for accepting our invitation and joining us at this occasion. It is now my honour and pleasure to invite you, Honourable Dr. Matilda Burian, Minister of State in the Office of the Vice President responsible for Environment, to open the workshop and officially launch the Pan-African START Secretariat (PASS) at the University of Dar es Salaam.

A.3.4 Opening of the Workshop and Launching of the Pan-African START Secretariat (PASS) at University of Dar es Salaam – Dr. Batilda S. Burian, Minister of State, Vice President’s Office (Environment)

Mr. Chairperson, The Vice Chancellor of University of Dar es Salaam, Prof. Rwekaza Mukandala, Senior Members of the University of Dar es Salaam Management Staff, Representatives of International Organisations, Invited Guests, Distinguished Participants, Friends and Colleagues, Ladies and Gentlemen,

Mr. Chairperson and Workshop Participants,

It is indeed an honour to be here with you to address this occasion at the Opening Ceremony for the Workshop on Assessing the Needs and Opportunities for the African Climate Change Fellowship Programme and the Launching of the Pan-African START Secretariat.

Let me express my sincere gratitude and special appreciation to you, Mr. Chairperson, and the Vice Chancellor of the University of Dar es Salaam, Prof. Mukandala, and the rest of the organising team for inviting me to this occasion.

Allow me, on behalf of Vice President’s Office and the Government of the United Republic of Tanzania, to extend my warm welcome to all of you to Tanzania. For those coming from outside the country, I strongly encourage you to spare a bit of your time to experience the beauty of Tanzania and the hospitality of her people.

I am informed that this workshop was supposed to take place in Nairobi, and that it had to be moved to Dar es Salaam; we welcome this move, and we will like to assure our support.

Mr. Chairperson and Workshop Participants,

I have noted, with interest, the fact that this workshop is attended by participants from about 30 countries in Africa, Europe and North America. This broad representation makes the workshop an important international forum on the current problem of climate change, even though it has a focused agenda. I hope you will take full advantage of this diversity of country backgrounds and broad variations in your disciplinary specialisations. At the very least, this meeting of minds and cultures should result in the creation of lasting networks in pursuance of your common scientific agenda.

Mr. Chairperson,

I am also pleased that at this workshop you intend to engage in a serious business of identifying capacity needs of governments and relevant institutions in Africa for ably confronting the challenges of climate change and ensuring sustainability of life and economic prosperity. This indeed is a critical and noble task and has come at a time when African countries are seriously looking at the best options and strategies to address perils of global climate change. For Tanzania like many other African countries, the capacity to formulate relevant policies and translate them into action is vital, just as much as is the scientific capacity to monitor climate change and the vulnerability of communities to the rapidly changing environment. It is unfortunate that Africa contributes least to the causes of climate change but bears the brunt of the consequences of the same; and we have to face it amidst other sustainable development challenges.

It is for this reason that I would like to applaud your effort to establish a fellowship programme whose aim is to train professionals in order to enhance their capability to facilitate adaptation to climate change. In the same vein, I commend the efforts being made by the Pan-African System for Analysis, Research and Training (START) Secretariat to initiate strategic measures against the challenges of climate change in Africa. The decision to start with the provision of opportunities for policy and research fellowships was indeed wise and timely. To strengthen my point, I would like to quote Rachel Carson, the author of *Silent Spring*, when she said, I quote: *“Now I truly believe that we in this generation must come to terms with nature, and I think we’re challenged, as mankind has never been challenged before to prove out maturity and our mastery, not of nature but of ourselves.”*

Mr. Chairperson,

It is my hope that the fellows who will be selected to participate in the programme will learn from each other in order to increase their capacity to contribute towards the management of climate change risks and enhance societal adaptation to climate change. Those who will get the privilege to join the fellowship programme should become a source of inspiration in their respective countries, especially in the effort to popularize approaches for integrating adaptation to climate change into policy-making, development planning and implementation. Participants in this fellowship programme should also become a reservoir for research skills and knowledge on climate change in Africa, and therefore a resource in the struggle to develop and deploy the requisite adaptive strategies in coping with the global challenges of climate change. *“You must be the change you wish to see in the world”* as Mahatma Gandhi, would have put it.

Mr. Chairperson,

The significance of this initiative is clear, particularly taking into account the fact that the impacts of climate change are increasingly becoming vivid, globally as well as regionally. Our overdependence on rain fed agriculture for the livelihoods of our people means that any considerable changes in climatic patterns are bound to generate undesirable impacts on the welfare of the people. Yet, it is now confirmed that Africa is the most vulnerable continent to the impacts of climate change. Evidences are vivid. In its Fourth Global Environment Outlook (GEO4), UNEP has projected that sand dunes of Sahara desert will expand from Northern to Southern Africa by 2050, and so is the snow of our Mount Kilimanjaro, which is expected to disappear by 2020 for the first time in 11,000 years.

It is now clear that climate change will constrain the ability of developing countries, particularly those in Africa, to reach their poverty reduction and sustainable development objectives under the UN Millennium Development Goals (MDGs). For instance, changes in natural ecosystems and infrastructure, resulting from climate change, will reduce the livelihood assets of the poor people, alter the path and rate of national economic growth and undermine regional food security. These trends will hinder efforts to eradicate hunger and extreme poverty, as explained in the Millennium Development Goal Number One (MDG 1). Climate change will also have a direct impact on environmental sustainability because it will cause fundamental alterations in ecosystem functions and relationships; will change the quality and quantity of natural resources (including loss of biodiversity); and will also reduce ecosystem productivity.

In view of these realities, the need to generate adequate capacity to adapt to climate change impacts in Africa cannot be overemphasized, and that's why the role that this Climate Change Fellowship Programme will play in lessening the magnitude of such impacts needs to be supported by each and every government. In the same spirit of strengthening capacity building, I am pleased to inform you that we at the Vice President's Office have started showing the way by facilitating our Assistant Director for Environment, Mr. Richard Muyungi, to pursue his PhD specialization in Climate Change. Mr. Muyungi has a Masters degree on Climate Change and is currently a member of the Climate Change Adaptation Fund Board.

Mr. Chairperson,

The adverse effects of climate change may particularly be felt by the poor communities because of their low adaptive capacity, which is associated with limited financial resources, poor infrastructure, low level of education, high dependence on natural resources and lesser access to technology. This workshop is therefore timely, as it addresses, among other things, the current key challenges in relation to climate change and focuses on building African countries' capacities to adapt to the impacts of climate change. I clearly see the relevance of this workshop and the entire project of the Pan-African START Secretariat. I view these initiatives as complementary to the efforts of the Government in implementing the National Strategy for Growth and Poverty Reduction (MKUKUTA). Since poor communities in the country almost entirely depend on natural resources for their livelihoods, any effort at improving their adaptive capabilities to climate change shall have a great impact on environmental sustainability and their economic wellbeing as a whole. In order to contain the impacts of climate change it is important to take deliberate measures to improve adaptive capacities at various levels, including local communities, civil societies and scientific institutions.

Mr. Chairperson,

As I conclude let me assure the organisers and the University of Dar es Salaam that we in the Government have keen interest in your deliberations, and we look forward to fruitful outcomes. Feel free to share your conclusions with us so that they become part and parcel of the policy options and approaches to address climate change.

Lastly, it is my hope that all the workshop participants will be good ambassadors in terms of spearheading strategies and activities to address climate change in your respective institutions.

Allow me to conclude by quoting John McConnell, the founder of the International Earth Day, when he said:

“Let every individual and institution now think and act as a responsible trustee of Earth, seeking choices in ecology, economics, science and ethics that will provide a sustainable future, eliminate pollution, poverty and violence awaken the wonder of life and foster peaceful progress in the human adventure.”

Having said this, it is now my pleasure and duty to formally announce that this Workshop on the Assessment of Needs and Opportunities for the African Climate Change Fellowship Programme is officially opened. I am also pleased to signal the official launching of the Pan-African START Secretariat at the University of Dar Es Salaam. I thank you for your kind attention.

Appendix 3. White Papers Commissioned for the Workshop to Assess Needs and Opportunities for the ACCFP

These papers are also available in electronic format in both English and French at http://www.start.org/Program/AfricanCCFP_WP.html.

Capacity building needs and opportunities in support of climate change adaptation from the perspective of community based organizations

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Introduction

Kenya is home to about 7 million pastoralists who herd their livestock in the arid and semi-arid areas of the country. The pastoralists have a long history of severe impacts from climate-related hazards, mostly droughts. “Disaster droughts” have become more frequent over the past 15-20 years. The 1997 drought was one of the worst on record, with significant losses – up to 50% of livestock (WFP, 2000). Subsequently, recurrent and widespread droughts have been experienced in 1999/2000, 2003/04 and 2005/06 with adverse effects on pastoralist communities. The exponential nature of livestock production means that pastoralists with only a few animals are unable to build up a herd size for adequate subsistence under short intervals between droughts. According to local pastoralist communities, current trends in drought frequency and intensity are a departure from the past in which 2 droughts were experienced in 10 years.

Whilst most Kenyan communities are struggling to cope with current climatic conditions and the impacts of extreme droughts and floods on livelihoods and food security, pastoralists are the most vulnerable communities to climate change. Pastoralists inhabit fragile eco-systems. At the same time, they have low adaptive capacity to climate change because they have weak community-based organizations; are poorly resourced; and remain marginalized and unrecognized by state institutions. They rarely gain the opportunity to influence effective rural policy formulation or engage in its implementation. This vulnerability has been documented in many studies (e.g. African Development Bank, 2006; World Bank, 2005).

Years of marginalization of pastoralists by state institutions have provided opportunities for the civil society sector, including local NGOs and community-based organizations (CBOs) to fill the vacuum left by the government in the provision of basic and essential services including water, health, relief, marketing, range resource management, animal health services, peace building and conflict resolution. There are over 3000 CBOs in northern pastoralist districts of Kenya. The CBOs range from a set of small organizations such as water point committees, peace committees, animal health committees, relief committee, women groups and beekeeping groups to federations of CBOs such as water associations, pastoralists associations and peace networks. Some of the CBOs have made positive contributions to natural resource management (NRM), disaster risk reduction and dissemination of information and knowledge among pastoralist

communities and are therefore an important sector for supporting adaptation of pastoralists to climate change.

This paper discusses capacity building of CBOs within the context of organizational needs but not individual persons' capacity building as such. Although it is true that people run organizations, and their capacity in term of skills, attitudes and approaches is essential to organizational development.

Capacity building needs of CBOs in supporting climate change adaptation

Several reasons exist for establishment and formation of CBOs in pastoralist areas. In some cases, CBOs emerge as an aspect of "self-help" among communities in addressing their own felt needs where the desire to help oneself overwhelms the contrasting expectation that someone else (usually the government) should help. In other cases, NGOs and government institutions establish CBOs as an effective means of resolving conflicts over natural resources or dealing with NRM issues such as water and vegetation resource management. Peace committees and water point committees are examples of NRM CBOs. Whereas these are valid and useful reasons for starting CBOs, their performance is constrained by the following key weaknesses:

1. *Lack of programming skills* – Most CBOs are keen to undertake activities on a short-term basis but lack the discipline to think through the long-term planning that will make their work more effective. In addition, they hardly think through the outcomes of activities and how the activities contribute to solving a problem such as vulnerability of pastoralists to climate change.
2. *Inadequate monitoring and evaluation* – Most CBOs are keen on activities but not enthusiastic in monitoring the impact of their work. They lack competencies in developing and implementing a monitoring and evaluation plan for impact measurement and lesson learning from their activities and projects.
3. *Inadequate skills in communicating technical information* – For example, downscaling of climate forecasts and communicating them to pastoralists in ways that have relevance to their needs.
4. *Lack of effective networking and experience sharing skills with partners – other CBOs, local and international NGOs in genuine effort to enhancing adaptation and reducing vulnerability to climate change* – Despite the wealth of experiences available and the initiatives being taken by the various CBOs, effective adaptation, aimed at protecting vulnerable households and livelihoods among pastoralists, is constrained by the limited exchange of information between and within the civil society organizations.
5. *Lack of skills to collect and disseminate information*
6. *Inadequate leadership, governance and management competencies* – Most CBOs suffer from undefined roles of members and lack of skills in bookkeeping and accountability.
7. *Inadequate capacities to raise adequate resources, mobilize local resources, manage finances and effectively report to donors*

To address these weaknesses among CBOs, the African Climate Change Fellowships can support capacity building interventions at two levels:

- Support NGOs to improve their skills in areas of the weaknesses identified above so that, in turn, such NGOs build capacities of CBOs in addressing their weaknesses. This approach requires that the Fellowships Programme enter into partnerships with NGOs that are willing, able and committed to support CBOs in addressing the identified weaknesses. NGO-CBO climate change adaptation support initiatives might be a more sustainable approach to addressing CBO capacity needs. However, it might be challenging to identify NGOs that will

have resources, willingness and commitment to Fellowships objectives. Alternatively, this might entail funding partner NGOs to help CBOs address the weaknesses, in which case the proposed fellowship grant sizes might be too small for NGOs to effectively engage in helping CBOs address the weaknesses.

- Support NGO professionals or consultants to mentor CBOs. This will require supporting professionals to work beside identified CBOs until they address the weaknesses and grasp the abilities to continue on their own. The challenge is that CBO weaknesses are diverse and they require a multiplicity of skills that mentors might take a long time to acquire.

NGO-CBO Climate Change Adaptation Support Initiative

The NGO-CBO Climate Change Adaptation Support Initiative (NCCASI) will seek to demonstrate that Fellowships investments in the capacity building of CBOs to enable self-initiative, planning and implementing of climate change adaptation measures which are controlled by the affected people themselves.

Targets of capacity building

The NGO-CBO Climate Change Adaptation Support Initiative seeks to build partnerships between NGOs and CBOs. A particularly important set of CBOs will be federations of CBOs that involve more people than small communities. Key target CBO will be Water Associations and Pastoralist Associations operating in areas where NGOs such as Practical Action have on-going projects. The Water Associations and Pastoralist Associations will be host institutions of the NGO professionals. The NGO will be the “home institution” and the CBO (Water Associations or Pastoralist Associations) will be the “host institution”. Although, NGO professionals that will be hosted by Water Associations will need to strengthen their skills by working part time beside other adaptation projects and undertaking intensive training on climate change before they begin to support CBOs. The NGO professionals and CBOs will work towards realizing the following objectives.

Purpose

The purpose of the Initiative is to enhance the organizational and programming capacity of CBOs among pastoralist communities for more effective adaptation to climate change.

Objectives

1. To improve organizational capacity, including performance skills, of a group of identified CBOs in delivering climate change adaptation measures among pastoralist communities of northern Kenya.
2. To improve skills of NGO professionals for addressing organizational and performance constraints of CBOs in efficiently delivering effective climate change adaptation measures.

Activities

1. *Identify potential CBOs* – This will involve making initial and follow up contacts with potential CBOs during which intervention issues and selection criteria will be discussed between facilitating NGO and potential CBO.
2. *Carryout capacity assessment of potential CBOs* – This will involve assisting a potential CBO to carryout a process of self-diagnosis, by identifying strengths, weaknesses and areas where

improvements can be made for effective contribution to climate change adaptation, reflecting on the CBOs past and future visioning, and identifying key area for interventions and partnerships.

3. *Draw up a capacity building plan* – The capacity building plan will include clarified list of suggested interventions and budget costs. The capacity building plan will be signed by both the potential CBO and supporting NGO.
4. *Provide capacity building interventions* – The supporting/facilitating NGO will facilitate CBO growth activities through a variety of activities including training, exchange visits, and grants for the CBO to implement small community projects.
5. *Monitor progress* – The facilitating NGO will engage the CBO in reporting progress made against the capacity building plan. The NGO professionals and CBO officials will jointly review progress every three months to identify issues, problems encountered and lessons learnt.
6. *Support an NGO (“home institution”) to develop Fellowship project document for CBO support in climate change adaptation* – The document will identify weaknesses of potential CBOs and provide capacity assessment of the NGO.
7. *Support the NGO professional(s) to acquire skills relevant to addressing the identified CBO weaknesses* – This might involve working part time beside another agency’s project, which is successfully implementing climate change adaptation; and part of time going to an institution that offers short, intense courses on community based organizations and programming for climate change adaptation.
8. *Support host CBO to implement activities outlined under objective 1.*

Expected outcomes

- CBOs participating and engaging in processes of self-diagnosis by identifying their own weaknesses, strengths and areas that need improvement for effective contribution to climate change adaptation.
- CBOs work closely with NGO professionals in addressing identified organizational and programming weaknesses.
- Pastoralist communities are active participants in the development of climate change adaptation plans.
- NGO-CBO partnerships established to spearhead climate change adaptation issues among pastoralist communities.
- CBOs prioritizing climate change adaptation interventions among their local communities.
- NGO professionals address identified CBO weaknesses
- NGO professionals and CBO officials monitor and review progress against capacity building plans of CBOs.
- CBOs developing long-term plans
- CBOs mobilizing and fundraising adequate resources for climate change adaptation from local and international donors.

Performance indicators

1. Number of CBOs supported by the Fellowship project
2. Number of CBOs prioritizing climate change adaptation interventions
3. Number of community-based adaptation interventions supported by CBOs.
4. Number of NGO professionals supporting CBO capacity building processes
5. Number of CBO capacity building plans
6. Resource mobilization plans by CBOs
7. Levels of funding to CBOs for climate change adaptation interventions.

8. Number of NGO professionals supported by the Fellowship project
9. Number of NGOs supporting capacity building processes of CBOs to effectively implement climate change adaptation interventions.

Other mechanism for building capacity in community based organizations

The World Bank funded Arid Lands Resource Management Programme (ALRMP) supports training workshops for Water Associations and Water Point Committees on group leadership and management. They also support training workshops on maintenance of boreholes.

NGOs such as Oxfam and Action Aid also provide training support to water committees, particularly on maintenance.

The African Climate Change Fellowship Program Needs Assessment: Community Based Organization's Perspective

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Introduction

The current climate change problem is very different from the climate change problem we started to address two and a half decades ago. At that time the efforts were primarily focused on trying to prevent dangerous climate change impacts by reducing emission through mitigation alone. Despite the efforts made so far, this has been a failure. For many ecosystems and communities (mainly the poor and vulnerable), there will now be inevitable dangerous climate change impacts within the next one or two decades. Many of the climate hazards that are familiar in many parts of the globe will become more intense as well as more frequent (e.g. hurricanes, floods and droughts). This required adaptation to be added to mitigation as twin strategies to combat the climate change problem. Thus the current situation is one in which we will have to redouble mitigation efforts to prevent catastrophic, global impacts that will affect the entire globe, while also adapting to the inevitable impacts that will occur in the near term and to help those who do not have the 'capacity' to adapt on their own.

The developing countries themselves need to become more aware about the problem and take steps to adapt and so far the level of such awareness is quite low amongst the Least Developed Countries (LDCs). It is important to note that while it is a good general rule to be local partner/community-driven in identifying development needs, it will not do to expect the local partners or the poor and vulnerable communities themselves to identify climate change as a priority for them, since they lack the awareness to do so. So it is incumbent on development partners (whether development funders, research and academic institutions or development NGOs) who are aware of the problem to bring it up in their discussions with their respective local development partners or communities and not wait for the local development partners or communities to bring it up. Partners need to be brought on board to become aware on this issue of climate change (in particular how it might affect the organisation or its partners), for example, through coalitions of development and environmental NGOs for awareness raising, training, advocacy, lobbying and other interventions. This has started in a number of LDCs. Participation in coalitions will help to develop their adaptive capacity and enhance their resilience.

The United Nations Development Programme has defined "capacity" as "the ability of individuals, institutions and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner". The terms "capacity building" or "capacity development" describe the task of developing levels of human and institutional capacity. Whatever the terminology used, capacity building remains one of the most challenging functions of development. It is a lubricant of development because one weakness of capacity in a multi-stakeholder project will often condemn the whole project to failure.

Capacity building is a very broad process and in general terms involves building, strengthening, enhancing, and improving the following:

- Institutions, including national authorities, public and private institutions, academic, technical and research institutions, non-governmental organizations (NGOs) and communities as well as regional institutions;
- Human resources, including staff and experts in public and private institutions, and the development of knowledge, skills and expertise in various disciplines related to climate change;
- Methodology, including methods, approaches and practices;
- Technology and equipment, related to databases, communication, information management, analytical models, monitoring, testing, mapping and geographic information systems, including hardware, software, and know-how;
- Information and networking, including information and communication technologies, programmes and networks to effectively facilitate the flow and exchange of information, experience and resources.

Community Based Organisations

Limitations of local government units create the space frequently occupied by community-based organizations (CBOs) which themselves may be supported by regional or national non-governmental organizations (NGOs). The CBOs are based within the communities and typically possess expert understanding of the needs of local people and are best placed to create the sense of community ownership and a feedback mechanism so important to development projects, including climate change projects. They frequently interact with the local communities so much so that they very well understand the local knowledge, expertise and gaps that exist within the community to adapt to climate change problems. However, this valuable expertise cannot protect these grassroots CBOs from their own problems of incapacity to sustain themselves. They are mostly dependent on donor project finance which has a beginning and an end, are poorly equipped with relevant fundraising knowledge, and are cut off from an affluent corporate sector. This leaves these small organizations highly vulnerable. In their strategies for internal capacity, CBO managers often find themselves torn between their non-financial mission and generating earned income.

The Role of Community Based Organisations in Capacity Building

Capacity Building is an effort carried out by many stakeholders such as donors, governments, international institutions research and academic organizations, and the private sector. CBOs are an important vehicle for capacity building but are often overlooked. In order to understand how CBOs can fill in the gaps in capacity building, it is important to understand what they do. In short, CBOs serve to:

- 1) Generate, manage, and disseminate information and knowledge
- 2) Use the knowledge to build capacity, responsibilities and willingness of the community and institutions

- 3) Improve laws, policies, and institutions
- 4) Support effective use of knowledge, capacity and governance through networks of various actors (e.g., government, NGO, and research communities) and disciplines (e.g., economic, political, legal and natural sciences).

Below are some of the ways in which CBOs could contribute to capacity building in Southern Africa:

Assessing vulnerability and adaptation options

CBOs can collaborate with Governments to assess vulnerability and adaptation to climate change. They can also help to determine appropriate adaptation technologies and approaches such as integrated coastal zone management. CBOs are often a source of endogenous knowledge and information and can assist in determining how adaptation projects can be designed and implemented.

Public awareness

One of the main functions of CBOs is to facilitate greater understanding of environmental and social issues among the general public. They can play a pivotal role in the production and dissemination of materials designed to increase understanding of climate change and its impacts. CBOs also have special links to community groups and can assist in programs that target them. They can also host and facilitate local, national, regional and international forums to raise awareness and share experiences.

Development and transfer of technology

CBOs are an important conduit for the transfer of technology and know-how. They often possess information and knowledge about practices, tools and guidelines that are necessary to facilitate technology transfer. They are also a source of human and technical capacity to evaluate and assess options and potentials for technology transfer.

Identifying mitigation options

CBOs often possess some analytical capacity experience or expertise to assess potentials for technologies to be adopted and implemented. They can also provide information on the availability and emergence of technologies, and can assist in developing and implementing projects.

Capacity Needs for CBOs in Climate Change Issues

There are different capacity gaps that the CBOs face and need to be enhanced in order for them to be able to effectively participate in climate change efforts. Below are some of the highlighted areas of concern:

Vulnerability and adaptation assessment/Identification of adaptation options

Although adaptation is a critical issue, most assessments conducted to date remain preliminary and limited in scope. This is mainly due to inadequate information and data as well as methods

and expertise for acquiring such information and data by the CBOs. This hampers efforts to move beyond assessments to the identification of adaptation options and strategies. Training CBOs in vulnerability and adaptation assessments would substantially enhance the capacity of CBOs to carry out an effective exercise.

Research and systematic observation

CBOs generally lack scientific and technical information to address climate change. Increased efforts are needed to develop endogenous capacity amongst the CBOs to generate, maintain, and disseminate information on climate change and ecosystem resiliency to climate change. At the same time, there is a need for increased cooperation and partnership with research and academic institutions to generate local information. Without efforts in both areas, it will be difficult for countries to acquire the information necessary on which to base sound policy decisions.

Public awareness

Public awareness efforts are an important tool for developing domestic political constituencies for addressing climate change at the national and local level. Most efforts are designed for the general public, but some have been directed towards specific groups such as local communities and government officials. Greater attention to programs including the production and dissemination of materials for climate change and its effects as well as specific policy, legal, technical, and technological information is noted as an overarching need.

Development and transfer of technology

There is a high level of unevenness in the degree of understanding and preparedness in technology transfer. Further efforts are therefore needed to strengthen the institutional and human resource capacity to assess needs. Capacity building to adapt and develop technologies for local needs; to design and implement policy, regulatory and institutional reforms; and to analyze other constraints and barriers should be done as a matter of urgency. Lack of access to new technologies and limited expertise with the new technologies is also a concern. Capacity building efforts should be focused on developing an inventory of available and emerging technologies and on the development and implementation technologies which incorporate the traditional technologies, expertise and knowledge.

Clean development mechanism (CDM)

Little information is available on the needs of most Southern African countries with respect to the CDM. Capacity building efforts could be designed to address the institutional and technical resources necessary to host adaptation activities and what kinds of projects would be acceptable. The above discussion indicates a host of capacity building needs. Fulfilling these needs will require a substantial and sustained effort to develop, strengthen, and enhance the institutions, human resources, technology and equipment, knowledge and information, methods and practices to implement the Convention.

Conclusion

Capacity building has long been identified as a top priority in the context of the UNFCCC. To do so, countries and especially CBOs must have a clear understanding of what they want out of capacity building efforts. Several needs, ranging from national strategies, adaptation, research and observation, public awareness, technology transfer, and the identification of mitigation options

have been identified. These can only be addressed in a comprehensive framework which should recognize the country driven nature of capacity building and the need to involve a broad range of stakeholders including CBOs.

Given the broad range of needs, countries may wish to consider how CBOs can fill in the gaps. CBOs are reservoirs of capacity and provide a number of services. If harnessed properly, CBOs could substantially enhance their ability to effectively implement the Convention and take advantage of the opportunities that arise from it.

Capacity building needs and opportunities from the perspective of municipal government

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"Too many policy-makers at national and city levels see climate change as an environmental issue or a global issue that is not their concern. Too many climate change specialists have little knowledge of development, as their approach focuses on reducing greenhouse emissions or generating funding 'for adaptation' with little understanding of what constrains effective local adaptation and how this can be addressed." Hannah Reid

Introduction

Municipalities in South Africa are a division of local government that lie one level down from provincial government and form the lowest level of democratically elected government structures in the country. Municipalities can belong to either the metropolitan, district or local category. Metropolitan municipalities are large regions with their own local government structures that encompass a city. For example, the eThekweni municipality contains the city of Durban and the Greater Johannesburg Metropolitan area and is made up of three municipalities, namely the Johannesburg metropolitan, the Ekurhuleni metropolitan and the West Rand district. There are six metropolitan municipalities in South Africa.

Municipalities carry a lot of weight when it comes to reducing emissions and preparing to adapt to the adverse impacts in increasing municipalities' resilience to climate change. While mitigation may be a national agenda driven by international agreements, adaptation requires competent implementation by local/municipal governments with a commitment to working with households and community organisations. Municipalities and their surrounding communities may directly experience impacts of climate change such as declining water supplies and damage to infrastructure, buildings and vehicles from extreme events like flooding. To make cities and communities sustainable, all government sectors need to work with each other, together with industry, non-governmental organizations, and community based organisations.

In South Africa, the municipality, as part of the three spheres of government, is expected to respond to and implement the objectives of the National Climate Change Response Strategy published by DEAT in 2004. Consequently, the three biggest municipalities – namely, the City of Johannesburg, eThekweni Municipality, and the City of Cape Town – are now involved in adaptation initiatives to increase beneficial impacts of exposure to climate change, with some notable successes. Some municipalities are beginning to mainstream climate change adaptation into local planning procedures.

This paper will identify the priority capacity needs and opportunities to advance climate change adaptation policy from the perspective of the municipal government in South Africa. It will also identify the types of Fellowship opportunities that would help to build the needed capacity; institutions with the capabilities and interests to host Fellows; and institutions to target for recruitment of applicants for Fellowships.

Municipal Cities

The Metropolitan Cities in South Africa have recognized that the impacts of climate change are the biggest threat to sustainable development and need to be factored as a priority that should be addressed as a matter of urgency. The cities will address climate change through considerations that can be integrated into policies, guidelines, programs, strategies or projects in numerous sectors at a number of different levels, including at the local and sectoral levels. At the local level, local strategies for preparing and responding to the anticipated impacts of climate change can be built into municipal planning processes and community level strategies, covering risk assessment practices, community social services, and emergency preparedness programs (AfDB et al 2002). Reducing barriers to communication through sharing information and feedback that provides positive reinforcement is an important element in consolidating networks of dependence. At the sectoral level, the impacts of climate change will be felt across a range of sectors, including human health, urban planning, agriculture, water resources, waste management, transportation and disaster risk reduction. Consideration of these impacts needs to be built into sectoral planning processes (Huq and Reid 2004), such as infrastructure design and maintenance codes and standards.

The major cities have undertaken some climate change vulnerability assessment studies to adapt to and improve their resilience to climate change impacts and to inform the city's strategic plans that will lead to the adoption of several "no-regrets" adaptation actions (see Table 1 for examples). The assessment of these impacts will provide an insight on how to situate vulnerability, disaster risk and climate change adaptation efforts within the relevant legislative and policy frameworks and sectoral perspectives and approaches, and to understand how these are relevant to these cities.

Specific challenges

The most significant challenge for the development and implementation of climate change strategies in municipal governments is a lack of precise information. Preparing for an uncertain future makes it difficult to measure adaptive capacity and develop concrete action plans. Municipal governments lack the capacity to adapt, while people living in cities lack adequate protective infrastructure such as storm drains. There is also a lack of research and information on potential impacts of climate change, performance standards, and evaluation frameworks for measuring the effectiveness of different actions as well as lack of public engagement and education.

Summary of capacity building needs to support climate change adaptation policy, planning and implementation in municipalities

Climate change impacts will be felt at local and regional levels; therefore, adaptation needs to happen at these levels. Table 1 describes projects, programmes, and activities that the three major metropolitan cities in South Africa have initiated in collaboration with institutions to address the impacts of climate change.

TABLE 1: *Climate change adaptation projects/ programmes and activities (by sector) initiated by the three major cities in South Africa*

Sector	Adaptation Activities
Urban water	Increase water recycling programme

supplies	<p>Awareness campaigns</p> <p>Water restrictions and water tariffs</p> <p>Reduction of leaks programmes</p> <p>Programs to reduce water losses from the municipal water systems</p> <p>Improved water pressure control programs</p> <p>Community educational programs about preventing sewer blockages and leaks</p>
Storm water	<p>Water harvesting during rain storms</p> <p>Ongoing monitoring and warning of impending disaster risks</p> <p>Reducing the impacts of these natural hazards through infrastructural means, such as flood detention ponds and weirs.</p> <p>Increasing the flood event return period for which sufficient structures are designed.</p>
Biodiversity	<p>Development of a Biodiversity and Greening Biodiversity Protection Programme.</p> <p>Greening of streets and road infrastructure.</p> <p>Assessment of current protected areas in terms of quality and potential to expand.</p> <p>Prioritizing alien plant management and associated fire management</p> <p>Monitoring indicator species and populations that will enable improved understanding of how species respond to climate variability and change, and identifying how species are impacted.</p> <p>Increasing public sector involvement, including supporting commercial land managers in reducing impacts.</p> <p>Removals of alien invasive plants in the municipality.</p>
Fires	<p>Increased fire fighting capabilities, including greater training and investment in capacity for fire fighting, as well as rapid and effective response to fires, for example through the use of aircraft.</p> <p>To removal of plantations, especially in areas where future climate change might make them less productive.</p> <p>Appropriate fire breaks between vegetation and residential areas.</p> <p>Erosion protection is needed to avoid loss of topsoil due to post fire rains.</p>
Air Quality	<p>Developed an Air Quality Management plan</p> <p>Develop a City's emission inventory</p> <p>Training of air quality officers and general public and networks of monitoring air quality</p>
Livelihoods	<p>An assessment of livelihoods</p> <p>Improved management and eventual elimination of informal settlements, electrification and improved public transport in urban areas will reduce local pollution levels and improve the quality of life of the poor, and will reduce their vulnerability to extreme climate events.</p> <p>Improved information and data gathering and use</p>
Health	<p>Increased awareness of how to manage heat-related stress and other climate related illnesses</p> <p>Increased support for public health facilities in dealing with diarrhea and dehydration</p> <p>Improved sanitation and basic service delivery in informal settlements</p> <p>Increased support for public health facilities in dealing with HIV/AIDS.</p>
Coastal zones (City of Cape Town and EThekweni Municipality)	<p>Development of a coastal vulnerability map using geographic information Systems (GIS), where sites are assessed according to scale of potential impacts with respect to sea-level rise</p> <p>Develop a maintenance and monitoring programme for existing coastal infrastructure</p>
Agriculture and food security	<p>Support community-farming initiatives that will help ensure local food provision</p> <p>Increased public education and further research into adaptation measures and technologies</p>

From these programmes, a number of capacity building needs have been identified. The needs are listed below in no particular order of priority.

- Need for raising local government awareness and understanding of climate change.
- Need for municipal government institutions to develop climate change action plans and consolidate priorities between departments to place climate change adaptation as a priority in their sustainable development plans.
- Need to develop tools and information (e.g. regional climate models, water balance models, coastal storm surge models, support for community vulnerability assessment projects, etc).
- Need to provide a flexible legislative and to strengthen policy framework that allows local governments to adapt.
- Need for political skills and commitment to ensure policy decisions are made in support of municipal adaptation goals and objectives.
- Need for long term funding of projects and help for organizations to consider climate change issues.
- Need to develop mechanisms by which science and communities can work together to understand what vulnerability may look like on the ground (e.g. a local clearinghouse for information sharing of similar experiences and networking on climate change)
- Need to strengthen the management and administrative institutional capacity for the collection of data for further research on local emission factors for municipal GHG inventories and implementation of adaptation strategies and plans.
- Need for technical and financial support in development of knowledge around community concerns of extreme events, inventory preparation, climate change impact assessment and adaptation, institutional strengthening, and disaster mitigation.
- Need for access to financial resources to provide the information needed by decision-makers in order to make appropriate plans (e.g. by developing climate scenarios and tools).
- Need for tool development, e.g. cost-benefit analysis to demonstrate the need for adaptation and to select appropriate interventions, and micro-level analysis to identify the costs and benefits for communities.
- Need for behavioral change on the part of the public, government, and business.
- Need to improve technical cooperation, including that related to technology transfer and know-how, towards strengthening and building local capacity.

*Potential Fellowship opportunities
that would help to build the needed capacity*

The following are possible existing opportunities for Fellowship projects in cities:

- 1) The National Business Initiative (NBI) creates opportunities to build capacity in universities and the national and provincial departments that support them; to foster strong links between universities and Fellowship programs, industry and the community; and to strengthen leadership and management. The NBI's aim is to implement 36 technical assistance and capacity building grants to academic institutions. The grants are ongoing, and 36 are offered on an annual basis. The program's key goals are:
 - Grants for a pilot partnership programme in a province, and
 - Development and delivery of an accredited partnership-training programme.
- 2) The Environment and Development of the Third World (ENDA TM) – Programme Energy, Environment has a Climate Change and Capacity Development (C3D) Fellowship scheme that could potentially help extend the knowledge and understanding of selected Fellows in the fields of identification and assessment of vulnerability and

identification and assessment of capability and planning for adaptation, with a focus on livelihoods, etc.

*Possible Fellowship projects
that would make a valuable contribution to capacity building*

Objectives:

- 1) Collaborate and build capacity at the local level so that vulnerable people in communities have a stronger voice in developing, strengthening and implementing adaptation strategies at the local and national level.
- 2) Raise awareness about the effects of climate change on vulnerable municipalities, in general, and on the local communities, in particular, to empower people to respond to climate change.
- 3) Increase understanding of adaptation needs and solutions, and take practical measures on adaptation by:
 - Developing community-driven comparative and integrated research on the socio-economic and natural conditions that shape vulnerability and capacity to adapt to climate change.
 - Undertaking practical, on-the-ground projects on adaptation in poor communities.
 - Delivering targeted products to meet demands for information and tools to assist people in addressing climate change issues.
 - Identifying and promoting mechanisms by which national government and international donors can provide funds and resources to address the climate change adaptation needs of communities in municipal areas.

Table 2 describes activities and expected outcomes and performance indicators that could support these objectives. Examples of potentially relevant institutions within the three municipalities also accompany each objective.

TABLE 2: *Possible projects objectives, activities, expected outcomes and performance indicators that would contribute to capacity building*

Objective	Activities	Expected outcomes and performance indicators
Collaborate and build capacity at local level <i>(CoJ Departments and Utilities: Environmental Management, City of Cape Town, EThekweni Environmental Management Department)</i>	Track the implementation of national commitments on climate change adaptation down to the local level. Analyze institutional arrangements for public participation and develop means for making improvements. Produce report on best practices on adaptation. Meet with stakeholders and experts (including business, research institutions/universities, insurance industry, civil engineers, infrastructure designers, town planners, e.t.c) and conduct field tours.	Strengthen human, institutional and adaptive capacity and networking. Stakeholders and experts will be engaged on local climatic research, analysis and interpretation of impacts of climate change and variability at this level. Supporting training of new highly qualified personnel in the field of climate change impacts and adaptation. Develop and support analytic skills and promote indigenous knowledge. Assess what it takes to mainstream adaptation at local level.

	Look at work that has been done by other cities to address mainstreaming of adaptation.	
Raise awareness about the effects of climate change on vulnerable municipalities <i>(City Parks, Pikitup, housing, Infrastructure services (ISD), University of Witwatersrand and Johannesburg)</i>	Develop and implement a local climate change adaptation and communications strategy. Investing in youth development. Empowering marginalized groups. Empowering ward councilors as community leaders	Learning by doing activities, Raising awareness of community-based adaptation, and educational and knowledge sharing programs will be promoted through partnering with Non-Governmental Organizations (NGOs).
Increase understanding of adaptation needs and solutions, and take practical measures on adaptation <i>(CoJ Departments and Utilities: Environmental Management, City of Cape Town Departments, University of Cape Town, University of Witwatersrand and Johannesburg, University of KwaZulu-Natal)</i>	Conduct scoping exercises in the communities to identify the drivers of change (exposures and sensitivities) that people see as important (climate change in relation to other stressors, opportunities and constraints). Develop a set of comparative examples for demonstration purposes. Organize exchanges of people such as students, interns, people working in municipal organizations (e.g. the Clinton Climate Initiative has an exchange representative working at the City of Johannesburg). Undertake specific projects to meet demands for accessible information, toolkits, manuals and training.	Use climate change as an opportunity to scale up risk reduction initiatives. Assessing vulnerability and options for adaptation.

Institutions with the capabilities and interests to host Fellows

Institutions that can be better hosts for Fellows are those that have the capability and resources and are currently in the process of addressing the impacts of climate change challenges. Table 3 identifies key institutions in South Africa's three largest municipalities. All universities listed in this Table 3 as well as the CSIR and the DBSA have experience of hosting fellows, The cities' departments and their utilities have the potential to host.

TABLE 3: Institutions with potential capabilities and interests to host Fellows in three Municipalities: City of Johannesburg, EThekweni Municipality and the City of Cape Town

City of Johannesburg (CoJ)	City of Cape Town	EThekweni Municipality
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<ul style="list-style-type: none"> • CoJ Departments and Utilities: Environmental Management • City Parks, Pikitup, housing, Infrastructure services (ISD) • University of Witwatersrand and Johannesburg • Council for Scientific and Industrial Research (CSIR) • EcoCity • Development Bank of South Africa (DBSA) • Bioregional South Africa • GDACE 	<ul style="list-style-type: none"> • City of Cape Town Departments • University of Cape Town and Stellenbosch • SANBI • Council for Scientific and Industrial Research (CSIR) • Development Bank of South Africa (DBSA) 	<ul style="list-style-type: none"> • EThekweni Water and Sanitation (EWS) Department • EThekweni Environmental Management Department • University of KwaZulu-Natal • The Parks, Leisure, and Cemeteries Department • Working for Water • Council for Scientific and Industrial Research (CSIR) • Development Bank of South Africa (DBSA)
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Other potentially relevant institutions general to all three municipalities include:

- Hotels and industry associations
- Engineers and contractors
- Manufacturing associations
- Insurance companies
- Farmers' associations and cooperatives
- Banks and other financial institutions
- National government, NGOs and community associations
- ESKOM and city power
- National Cleaner Production Center
- National Business Initiative
- Earthlife Africa
- South African Weather Service
- Disaster management entities

Some of these institutions have existing partnerships with Universities in order to supervise Fellows. For example, the South African Weather Service has a partnership with the University of Pretoria, Kwa-Zulu Natal and Cape Town.

Recommendations for future research to complement a Fellowship program

The urgent challenge in capacity building for developing countries concerns strengthening the social, economic and technical resilience of the poorest and most vulnerable against extreme climate events (Najam et al., 2004). Capacities that need to be supported and strengthened are those that promote adaptation to climate change at the local levels where vulnerabilities are most prominent. Working with civil society and community-based organizations to strengthen the social, economic and technical resilience of vulnerable local communities not only promotes adaptation to climate change but also sustainable development. Therefore, by funding a Fellowship program that caters to the adaptation needs at a local level – since it is the level of implementation – will enhance the scientific capacity of local communities to assess climate change vulnerabilities and adaptations. Future research on impacts and adaptation must move beyond vulnerability to address the process of integrating science into policy. Localizing scenario development is as equally important as the economic costing of climate change adaptation. Therefore, both issues should be regarded as matter of urgency. Further research should also consider the following:

- Impacts of extreme climate events in all sectors of municipal government.
- Modification of existing measures designed to cope with climatic variability.
- Testing and evaluation of adaptation measures and identification of "no regrets" adaptation.
- Mainstreaming adaptation concerns into sustainable development planning and practices to ensure that adaptation planning is well reflected in national and sectoral planning to create synergies, e.g. adaptation measures contributing to economic growth.
- Mechanisms to support climate change adaptation through scientific capacity, knowledge and inquiry.
- Economic analysis of the potential risks and costs of climate change.

Complimentary mechanisms that could be used include, for example, The Clinton Climate Change Initiative (CCCI), placing representatives in cities that could work closely with visiting Fellows. The Clinton Foundation provides funds to the City of Johannesburg to hire a programme consultant who will develop and implement high-level climate change programmes. The consultant will create an understanding of climate vulnerability, develop and implement mitigation and adaptation strategies, and integrate climate change with planning to ensure the city is climate resistant. This initiative can be linked with the African Climate Change Fellowship Program by hosting Fellows at the City of Johannesburg through the our partner, the University of Witwatersrand.

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Capacity Building Needs and Opportunities for Policy Integration of Climate Change Adaptation

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Introduction

The 2007 Intergovernmental Panel on Climate Change (IPCC) Synthesis Report acknowledges that societies have a long record of managing impacts of weather and climate-related events. It notes that additional adaptation measures will be required to reduce the adverse impacts of projected climate change and variability (Bernstein et al 2007).

The United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol (KP) require that climate change be tackled within the wider context of sustainable development (Huq et al 2006). The Intergovernmental Panel on Climate Change (IPCC) acknowledges that development is critical to the success of adaptation strategies (Huq et al 2006). Adaptation policies can only be effective if they are built into the wider development and poverty reduction agenda at international, regional, national and local levels.

This paper assesses the existing needs and opportunities for integrating climate change adaptation into policy and evaluates the potential contribution of fellowships in this regard. Descriptions of a recommended fellowship project as well as other suitable mechanisms for capacity building in policy integration are also provided.

Key terms:

- *Climate change adaptation*: adjustments in response to actual or expected climate change or expected climate stimuli or their effects in order to moderate harm or make use of beneficial opportunities.
- *Capacity building*: efforts aimed to develop human skills or societal infrastructures within a community or organization in order to reduce the level of risk.
- *Policy*: a course or principle of action adopted, especially one based on some declared or respected principle.
- *Integration*: combine to form a whole; incorporate one thing into another; bring different elements into equal participation in an institution or social group.

Capacity Needs for Policy Integration

The Working Group II Fourth Assessment Report to the Intergovernmental Panel on Climate Change (IPCC) identifies policy as one of the potential adaptive responses to climate change. It also acknowledges the existence of significant gaps in adaptation knowledge, as well as impediments to flows of knowledge and information relevant for adaptation decisions (Parry et al (eds) 2007). It is important to conduct research geared towards generating and improving knowledge to fill the gaps. Appropriate and timely flow of information among stakeholders is also important for adaptation.

Critical capacity needs for integration of climate change adaptation into policy include:

- *Greater and appropriate awareness creation, sensitization and targeted capacity building on climate change adaptation* - This is required for all sectors of society, especially among political leaders and the corporate sector. Parliamentary committees on environment, that draw membership across various sectors, are common in Africa. These should be targeted for sensitization on adaptation with a view to influencing key government ministries such as finance, planning and agriculture. Capacity building of relevant officers within these committees could also promote integration of adaptation into other policies, as well as increased budgetary allocations for adaptation programmes. Sensitization of the corporate sector could also promote local generation of additional funds for adaptation and active engagement in activities that support adaptation within the corporate social responsibility framework. Targeted capacity building among relevant stakeholders at regional, national, district and local levels is needed to enhance understanding and prioritization of adaptation for development (LEAD et al 2007).
- *Improvement of research and generation of knowledge and information on climate change as well as adaptation costs and benefits* - Research and generation of knowledge and information on climate change impacts has improved over the years. However, insufficient information on adaptation costs and benefits causes limited understanding of, and limits support for, adaptation among policy makers (Parry et al (eds) 2007). Research consortia consisting of members from local universities, policy and research institutions, and relevant government ministries and departments, together with selected Non-Governmental Organizations, could bring together their expertise and knowledge to conduct research on economic costs and benefits of adaptation. Research results should then be shared with stakeholders, especially policy and decision makers, as well as local communities.
- *Effective communication among stakeholders* - Currently, there are no organized mechanisms of collecting, collating, appropriately packaging, and distributing information on adaptation to decision makers, especially from the grassroots. There is need to regularly collect and document grassroots data and to survey indigenous knowledge on coping with impacts of climate variability with a view to integrate this knowledge into relevant sectoral policies and programmes, track international debates on adaptation, participate in national, regional, and international forums, and learn from other countries' experiences (Kituyi 2006). Results from climate change adaptation action research need to be packaged and communicated to policy and other decision makers appropriately and regularly.
- *Strengthening of national scientific, policy and institutional capabilities to support development programmes, particularly those linked to adaptation* - Every nation should develop and/or strengthen a science and technology strategy that reflects local priorities and allows the country to achieve local competence in selected areas of national priority. In addition, there is need to develop alternative, innovative institutional arrangements in which local scientific institutions play a stronger role in informing policy. This would enable lessons from adaptation projects to be fed into national policies (Kituyi 2006). Strengthening of institutional capacity and engagement is also important in that it would ensure competence and sustainability of adaptation interventions.
- *Effective networking* - Local communities, the commercial sector, governmental and non-governmental organizations, and research institutions are not sufficiently networked to explore and harness synergies, share knowledge, and amalgamate existing human,

technological and material resources. Consequently, the wealth of knowledge on adaptation among community-based organizations and non-governmental organizations, among others, has not been effectively tapped for national policy and decision-making. Scientists need to network with local communities and political leaders in an effort to improve understanding and elevate the level of climate change adaptation considerations in the political agenda (Kituyi 2006). Networking would also enable researchers to tailor their research to respond to community needs, national development priorities as well as regional and international policy processes.

- *Coordination of multi-sectoral strategies and policies in addressing adaptation* - Currently, many recommended interventions for climate change adaptation operate in a stand-alone manner within specific sectors. In many instances, planning for climate change often resides within the Ministry of Environment's portfolio (LEAD et al 2007). This is in spite of climate change impacts affecting other sectors including agriculture, health, and transport, among others. Common perspectives need to be arrived at. This can be done by strengthening inter-ministerial committees on environment and development, which could ensure proper coordination and integration of adaptation activities across sectors. These committees could also play an instrumental role in facilitating integration of adaptation into relevant policies. There is need for effective coordination of activities between government departments, local authorities, civil society and donor agencies.
- *Active engagement in local, regional and international knowledge networks* - This could help countries to obtain more reliable climate data, optimize outputs from the available human resources, and in turn, improve the quality of information presented to policy makers on weather and climate predictions, potential impacts, and what could be done to ameliorate the effects of climate change. Engagement in such networks could also help address problems of technology transfer, intellectual property rights, and data sharing. Establishment of virtual and distributed centers of excellence on climate change across developing countries could concentrate the limited knowledge, skills and resources for adaptation and enable easy access to relevant information (LEAD et al 2007). Such knowledge networks could also be instrumental in informing and influencing the integration of climate change adaptation into regional policies, since in most cases, they are closely linked with regional development bodies.

Apart from National Communications to the UNFCCC, National Adaptation Plans of Action and National Adaptation Policy Frameworks, several other opportunities for integration of climate change adaptation into policy exist. These include integration of adaptation into poverty reduction strategies, economic recovery plans, national environmental action plans, national development plans and national disaster reduction policies. In addition, climate change adaptation could be integrated into guidelines, regulations and standards under environmental and sustainable development policies in various sectors, as well as economic plans. Multilateral Environmental Agreements, particularly the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and United Nations Convention to Combat Desertification should share information, collaborate, and facilitate integration of adaptation into relevant policies at national and regional levels.

Incorporation of climate change adaptation into the formal education system, especially in institutions of higher learning to start with, would equip students and graduates with the knowledge and skills that would enable them to integrate adaptation into their organizational/institutional policies and plans. It would also enable their

organizations/institutions to consistently inform and potentially influence other stakeholders such as the corporate sector and government to integrate adaptation into policy.

Role of Fellowships in Capacity Building

Based on the identified critical capacity needs, there is strong potential for fellowships to bridge the gaps and enhance integration of climate change adaptation into policy. Given that policy integration is necessary across sectors, fellowships conducted in an inter-disciplinary, multi-institutional research framework would be instrumental in creating awareness and sensitization on the importance of climate change adaptation in germane sectors. In addition, an action-oriented research approach would enable fellows to gain and apply knowledge and skills in policy integration, which they would impart to their colleagues and thereby build organizational capacities, improve the quality of their outputs, and add value to the work done by their home and host institutions.

Fellowships would also improve understanding of factors that optimize synergies between adaptive capacity and sustainable development and of how policies to enhance adaptive capacity can reinforce sustainable development and vice versa (Parry et al (eds) 2007). This could strengthen linkages between scientists and other stakeholders and contribute positively to adaptation policy formulation and integration within existing strategies, including subsequent National Communications and National Adaptation Plans of Action.

Research Fellowships could be conducted to assess economic costs and benefits of adaptation and provide policy makers with such information. This would enable them to consider optimal strategies for adaptation policies (Parry et al (eds) 2007). In addition, results of such work would provide a sound basis for management of climate risks and integration of climate change adaptation into national and regional policies and practice.

Fellowships have the potential to strengthen institutional and national scientific and policy capabilities in climate change adaptation. This is through providing hands-on training that could lead to the development of adaptation tools and methodologies suitable for developing countries' contexts. In addition, the use and application of existing and new innovative, analytical tools, methods, and models for climate change assessment, risk management, and adaptation policy integration and evaluation would be fostered.

Fellowships could provide training in leadership in adaptation and effective communication of climate change. This would enable the articulation and inclusion of communities' priorities for adaptation in national policy formulation and review. It would also enhance proper translation, appropriate packaging, and dissemination of climate change research results for policy makers and other stakeholders. Through fellowship programmes, leadership in climate change could be promoted. Climate leaders could be instrumental in steering adaptation forward by championing for support and appropriate action by all stakeholders from international to local levels. This would ensure proper formulation and articulation of national and regional positions on climate change to the international community.

Efficient and effective information sharing and coordination of research activities could be attained through fellowships. This is mainly through engagement of fellows in knowledge networks, where debate and dialogue could be fostered and pertinent needs across sectors and institutions collectively identified. This would minimize and possibly avert duplication of efforts, hence ensuring that available skills, expertise and resources are optimally utilized for the benefit

of all. It would also enable broader dissemination of research results and strengthen collective action on adaptation (e.g., a stronger voice in lobbying and advocacy for adaptation based on reliable information generated through research).

Fellowship Project on Policy Integration of Climate Change Adaptation

In lieu of the need to integrate climate change adaptation into development policies and the critical capacity needs identified, this paper recommends that a fellowship project be designed to build the requisite capacity.

The fellowship project should adopt an inter-disciplinary and participatory research approach. It should integrate knowledge and information generated by all stakeholders including key local community representatives, researchers from the biological and social sciences, climate scientists, corporate sector representatives, civil society, as well as policy and decision makers from relevant sectors.

Fellows should be equipped with skills that will enable them to effectively conduct and train others on:

- Awareness creation, sensitization on climate change adaptation in sustainable development among various stakeholders.
- Effective networking, engagement, coordination and communication of climate change research results to various stakeholders, especially policy makers.
- Formulation of a strategy for integration of climate change adaptation into policies from institutional, local, national, regional to international levels.
- Leadership in climate change adaptation policy.

Key objectives of such a project could include:

- Increase awareness and sensitization on climate change adaptation and its contribution towards sustainable development among country stakeholders, particularly policy makers.
- Inform national, regional and international sustainable development policies on climate change adaptation and engage with them to promote policy influence and integration.
- Enhance capacity in research and leadership in climate change adaptation.

Activities under the fellowship project may include:

- A review of relevant policies and an assessment of policy and information needs. This would enable fellows to identify the extent to which climate change adaptation has been incorporated in policy and to identify gaps and the types of information needed to fill the gaps. The fellows would also engage with other stakeholders, including local community representatives, researchers, and corporate sector representatives, to identify their priority development needs, assess the extent to which these have been addressed in existing policies, and examine the extent to which these could be tied in with adaptation.
- Based on identified needs, engage in participatory development and formulation of a strategy for collection, collation and packaging of information and communication and outreach targeted at various stakeholders, especially policy and decision makers.
- Together with relevant stakeholders, engage in the formulation of a strategy for integration and coordination of climate change adaptation into relevant sustainable development policies at various levels.
- Document and share lessons learned from the process, practice, initial outcomes, areas for follow up, and further work among various target groups including knowledge networks.

The Fellowship programme should be targeted at early and mid-career level personnel working in government departments, agencies and ministries that house environmental, sustainable development, agriculture, national planning, and finance and economics portfolios. In addition, persons working in civil society organizations that conduct environmental policy research, advocacy and lobbying, as well as those in academia, should be targeted. A training of trainers approach should be adopted, with a view to spreading the capacity built broadly for sustainability and a stronger and broader impact.

Some of the institutions that could host such a fellowship include those already involved in environmental programmes, policy research and influence. Examples include, but are not limited to: the National Environment Management Authorities; relevant United Nations Agencies such as the United Nations Environment Programme and the United Nations Development Programme; African Centre for Technology Studies; Universities that have faculties and departments of environmental and development studies; institutes within the Consultative Group for International Agricultural Research; Climate Network Africa; African Academy of Sciences; The Academy of Sciences for the Developing World; East African Community; New Partnership for African Development; African Union; African Development Bank; Southern African Development Cooperation, and IGAD (Osbahe et al 2006). Others include the global change SysTem for Analysis, Research and Training (START); The Stockholm Environment Institute; International Institute for Environment and Development; the European Capacity Building Initiative Centre for Policy Studies; Kenya Institute for Public Policy Research and Analysis; and the World Bank.

Expected outcomes of the fellowship project would include:

- Effective leadership and improved research on climate change adaptation.
- Enhanced capacity for effectively increasing awareness, sensitization and support for climate change adaptation among all stakeholders.
- Enhanced capacity for integration of climate change adaptation into more national, regional and international sustainable development policies in the medium to long term.
- Strengthened knowledge networks that actively engage with stakeholders on climate change adaptation.

Performance indicators could include: the number of new climate change leaders from developing countries and the types and number of national, regional and international policies informed and influenced by them to incorporate climate change adaptation in the short, medium and long term; the annual number of policy makers and other stakeholders who have newly gained awareness and sensitization about climate change adaptation and are well versed with current international debates on the subject; the number of local, national, and international policies revised and/or formulated that have integrated adaptation; the number of additional persons who have been trained on climate change adaptation and policy integration and the organizational/institutional policies and plans subsequently influenced by them; and the number of active, stronger and larger knowledge networks and the quality and quantity of information and research outputs generated by them.

Additional Mechanisms for Capacity Building in Policy Integration

Short, targeted, training courses on relevant topics and themes could augment capacity building for integration of climate change adaptation in policy. Topics and themes could include: 'policy research methodology'; 'translation of research into policy'; 'adaptation leadership, policy

engagement, and influence'; as well as 'effective communication and coordination of information'. Such courses would have an added advantage of creating a live forum for dialogue and information sharing, thereby providing an avenue for myriad stakeholders to explore possibilities of formulating a shared vision for policy. They would also promote broad networking and discussions (for example through virtual universities, on-line (email) discussion groups, face to face meetings among others) across different sectors and institutions.

As mentioned earlier, the academic sector offers a very good avenue for capacity building in policy integration. University courses on development studies and environment and other multi- and inter-disciplinary courses could provide knowledge on climate change adaptation and conduct research projects that would generate new knowledge and information. They would, as well, build the much needed capacity for information and policy influence. Institutions of higher learning also have a strong potential to engage actively in, and steer knowledge networks on, advancing adaptation.

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Developing Doctoral and Postdoctoral Research Fellowships in Support of Climate Change Adaptation in Africa

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Introduction

For a number of years, capacity building amongst climate change professionals has, justifiably, been cited as a critical priority. Throughout Africa, for example, the community of climate change scientists has remained small, with well known contacts and focal points in each country. This gives rise, on occasion, to the sense that climate change meetings that draw on the African community, or regions thereof, consistently show the same faces, with, perhaps, less turnover than might be wished.

Needs and opportunities

There is a particular shortage of climate change professionals in Africa trained at the PhD and postdoctoral level. 'Climate change professionals', admittedly a loose term, is here taken to refer to scientists and staff grounded and trained in climate change topics, whether modeling and prediction, impacts, adaptation, mitigation or combinations thereof. The need in this regard is particularly critical, and has been raised repeatedly at continental, regional and country level meetings.

PhD and postdoctoral level trained climate change professionals are able to fill particular gaps, that those only trained, for example, at the honours and MSc level, may not be able to.

For example, and this has been clear for some years, only a climate change scientist with a PhD may supervise a doctoral student. The shortage of those qualified in this regard has produced a situation where only a small group of potential supervisors is available for students wishing to undertake PhD studies in climate change in Africa. This results in a) supervisors becoming overburdened; b) lower quality of supervision than might otherwise occur; and c) students seeking to pursue PhD and postdoctoral studies outside of Africa.

Secondly, *postdoctoral* scientists are at a level where they may lead their own independent climate change project (whether sought out on their own, or commissioned by another agency); and may provide mentorship to less highly qualified climate change staff and students. For example, postdoctoral scientists usually have some level of project management experience (or this should be a critical component of their training – this will be further mentioned below). They are also able to mentor less experienced staff in writing, both for academic sources and in technical reports. Such is the shortage of postdoctoral level scientists that projects requiring such qualified scientists in Africa frequently struggle to supply their needs. This results in existing postdoctoral level scientists working on multiple projects, not always an ideal situation.

We are, however, finally at a point where opportunities for doctoral and postdoctoral fellowships in climate change are becoming more frequent – the programme of which this position paper

forms a part comprises a critical opportunity in itself, but others exist. In South Africa, for example, the Department of Science and Technology and the National Research Foundation (NRF) have, for some time, planned to place substantial resources behind capacity building in the area of climate change. Climate change scientists in South Africa have been asked for their input regarding such capacity building programmes. Professor Yanda's postgraduate programmes at the University of Dar Es Salaam comprise another opportunity in this regard (one student, for example, will be registering to investigate the effects of sea level rise on Tanzania's coastal communities; while continuing as a climate change professional).

Appropriate objectives, types of activities, supervision needs and performances indicators

Any programme that serves to provide doctoral and postdoctoral research fellowships should first, then, build on initiatives such as those described above. Fellowship programmes should be designed to:

- Provide a solid grounding in one or a combination of the subjects below (these are not exhaustive, and should be further debated in Nairobi in January 2008)
 - modeling and prediction, impacts, adaptation and mitigation (in each country, this *must* be linked to the research gaps outlined by the relevant NAPA and subsequent processes);
- Teach the student to manage their own research topic (at the doctoral level); and teach the postdoctoral fellow to manage their own project, including a budget and logistics;
- Place a particular emphasis on communication (academic writing, communication of complex scientific topics to diverse stakeholders);
- Build mentorship skills in the case of the postdoctoral fellow.

Types of activities to be undertaken include peer review and workshopping of research topics (the START community is an ideal place for such a discussion); advice and training on research and project management (this is not just the place of the supervisor, but should also be enabled through broader peer review and support); training in academic writing and communication (again, this is not just the role of the academic supervisor, but should be provided through the types of workshops that have been presented at Trieste, for example; as well as in Cape Town in October 2007); and, lastly, provide training on mentorship, in the case of the postdoctoral fellow.

The CG centres, for example, have written substantively on the inputs required to teach a young scientist to themselves act as a mentor (see, for example, the *CGLAR Program for Mentoring Young Scientists*; found at <http://www.genderdiversity.cgiar.org/resource/Mentoringbrochure.pdf>). Good climate change scientists are, frankly, not always good mentors; and those who are may always improve.

Supervision needs are substantial. As mentioned above, the pool of potential supervisors for doctoral or postdoctoral level climate change professionals is fairly small. While this programme itself will begin to address this problem, institutions in the meantime need to be better equipped to allow their staff to be free to supervise more students. One option might be to provide some support to institutions to allow climate change scientists to increase their postgraduate and

postdoctoral supervision workload in return for undertaking less administration and undergraduate teaching. This would obviously have to be negotiated with each institution.

Performance indicators for the programmes should address a number of areas. Firstly, numbers of students graduated at the PhD and postdoctoral level provides a first-cut indicator; and is already routinely measured at some institutions. Secondly, the number of doctoral and postdoctoral fellows who have been able to enter full time secure employment in the climate change field in Africa (and, it might be argued, elsewhere – this is a topic of much debate) is a valuable performance indicator. Lastly, doctoral and postdoctoral fellows who have subsequently a) been able to secure their own funding and b) been able to begin their own role of formal supervising and mentoring is a critical indicator of success.

Problems and solutions for host institutions

As mentioned earlier, potential host institutions have a critical shortage of scientists equipped to supervise doctoral and postdoctoral fellows. This results in overburden and less than ideal supervision and mentoring. In addition, in many countries, scientists who are able to supervise are not in the type of tenure-track or secure positions that allow them to spend less time chasing soft funding to support their own positions, and more time supervising, mentoring and passing on skills. Most tertiary institutions, for example, will not allow a climate change scientist who is not a full time, permanently employed member of staff to supervise doctoral and/or postdoctoral level students.

Solutions comprise, but are not limited to the following. They should be brainstormed, workshopped and independently developed sensitive to each countries' unique research and tertiary educational context.

1. Improved long term funding to secure senior scientist positions in climate change.
 - a. More time may then be spent on supervision and mentoring, and less on seeking funding opportunities in the short term;
2. Tertiary institutions to allow such scientists at, for example, NGOs, parastatals and science councils to act as primary supervisors;
3. Revised undergraduate and administrative workloads for climate change supervisors in exchange for an increased doctoral and postdoctoral workload.

It is important to note that several initiatives in support of such solutions, if not necessarily targeted specifically at climate change, are underway at the institutional, national and international level. Efforts addressing (1), (ii) and (iii) above should thus be coordinated with such activities.

Improved benefits in fellowship participation

Efforts described in previous sections should be crafted so as to provide benefits to both home and host institutions beyond the field of climate change itself. Such benefits will ensure that home and host institutions are more supportive of the programme.

Specific attention should, for example, be paid to linking staff participation at the home institution to broader goals around staff capacity building, teaching and learning and postgraduate supervision.

Home institutions may, for example, be able to show how participation in the programme enables them to improve their postgraduate enrollment and academic programme development. Likewise, host institutions may show how involvement improves their postgraduate enrollment and, for example, further develops their climate change research agenda, and participation in national science priorities. These examples are selected, and are certainly not exhaustive.

Conclusions

The need for doctoral and postdoctoral capacity building in the field of climate change is clear, and (hopefully) concrete examples to ensure how such a programme might operate effectively, adding value to existing initiatives, have been provided here. In closing, it should be re-emphasized that no programme for doctoral and postdoctoral research fellowships should be developed independently of unique country climate change research needs, such as those identified in the NAPA, and in processes subsequent to this. Such an effort will ensure that research undertaken, in addition to other benefits described above, will advance the field in the most significant and needed ways.

Fellowships in Support of Climate Change Adaptation with Focus on Regional Development Organizations and Natural Resource Management

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Introduction

Climate Change is increasingly emerging as a serious threat to sustained economic growth, social well-being, quality of life, and political stability in the 21st century world wide. In the last two years, two major reports – the 2007 Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) and the Stern Review - entered the public domain and simulated professional discussions to be reflected on development strategies and thinking. These two reports provide compelling evidence, analytical explanations of observed trends, and simulation model projections drawing stronger cause-and-effect linkages between human socio-economic activities and greenhouse gas (GHG) emissions, and between the latter and climate change. Some of the effects and impacts of climate change include: severe droughts; accelerating desertification; drying up of wetlands, shrinking lake basins, and changing ecosystems; extreme fluctuations of river flow regimes between flash floods and extremely low levels; reduced crop yields; expanding zones of tropical vector diseases; and rising sea level and coastal flooding.

Climate change is already affecting people across Africa and there is a wide consensus that it will undermine efforts to tackle poverty unless urgent action is taken. To establish a "climate-proof" model of development, leaders from the 2005 G8 Meeting committed themselves to strengthen international cooperation on improving the availability and use of global climate observations, particularly to predict natural disasters including floods and droughts. There is urgent need to expand access to reliable energy supplies, particularly for the world's poor; to promote investment in clean energy and low-carbon approaches to economic development; and to support developing countries in undertaking concrete measures to adapt to climate change and strengthen their capacities to manage increasing climate variability and extreme weather events.

Challenges Facing Africa

Climate change has emerged as one of the most alarming challenges to African development efforts. While the natural resource sector is the development engine in Africa, it is also the most climate-sensitive sector. The impact of climate change and variability in Africa is directly reflected on development efforts due to their heavy reliance on rain-fed agriculture, fisheries, livestock, forest, water stress, and tourism. It is needless to say that such impact would be reflected on social and economic sectors as well.

Considering poverty in Africa and limited funds for development needs, it is not expected that climate change would take priority in development unless climate awareness is strengthened through capacity building. Climate change awareness would ensure understanding of climate risk and its relationship with sustainability of the development efforts and investment. Capacity building on climate change would be reflected by African experts and leaders on adaptation of the climate-proof model of development and would increase the effectiveness of investment for

development. With such understanding, capacity building and climate change awareness would be the key issue for sustainable development.

Critical Capacities Needed

In assessment of the critical capacities within the natural resource sector, there is a need to fully understand the climate impacts in order to re-orient development investment to adopt climate change and variability within development finance inquiries and development strategies without significant change in the development prioritization of the African countries. The following are the major areas that need capacity building through fellowship mechanisms:

- (1) Policy formulation and climate change metrological database:
 - a) Climate change effects and impact assessment on climate-sensitive sectors and sector prioritization in specific countries;
 - b) Climate change database collection, exchange and dissemination;
 - c) Climate change data and statistical analysis and prediction;
 - d) Climate change, risk management and community participation;
- (2) Plant breeding and research and ecological changes:
 - a) Statistical modeling for impact of climate change on plant varieties for main African traditional crops;
 - b) Suitability of present crop varieties to ecological changes;
 - c) Ecological impact on wildlife and eco-tourism;
- (3) Soil, forest and water conservation:
 - a) Watershed management and soil conservation;
 - b) Hydrological data, rain data prediction and irrigation investment decision;
 - c) Forest conservation, forest economics and investment and impact on carbon emission; and
- (4) Clean energy and reduction of carbon emission:
 - a) Small-scale biogas community investment;
 - b) Small-scale solar community investment;
 - c) National oil prices, subsidy and pricing policy.

Contribution of Fellowship Mechanism

In order to achieve the necessary understanding and to consider climate change in the development agenda, there is a need for good access to knowledge at the national and regional levels in addition to donors and private sector investment. Knowledge and climate information is needed for a) assessment of present and future risk; b) informed decision-making on development strategies, c) effective investment in the different sectors with efficient prioritization and d) robust and sustainable development.

The fellowships described below would focus on natural resource management in Africa in the context of climate change. The four proposed areas are interrelated and constitute the basic critical capacity building needs. It is expected that such training program will create back-stopping for decision-making in relation to development investment and prioritization.

- (1) Policy formulation and climate change metrological database:

Available metrological data at the national and regional level are not digital and thus cannot be analyzed nor exchanged with neighboring countries for regional integration and cooperation. Further, such data format does not cover long periods and therefore cannot be used for predictions or decision-making. In addition, it might be easily lost.

Such training / fellowship on policy formulation and metrological database will create clear understanding of the value of knowledge and data collection. It is important to train relevant staff on data manipulation, modeling and prediction. Climate change projection will create strong awareness of expected impacts and effects of climate change and variability in order to determine the climate-sensitive sectors in relation to development planning and prioritization for decision-making purposes and investment negotiations with donors during the preparation of country strategy paper by different donors. Such awareness at the decision-making level will sustain development through country participation in investment prioritization and minimization of climate risk.

Data dissemination to communities will, in the medium term, create better agriculture practices, minimize forgone benefits, and save resources and efforts that might be lost because of uncertainty and climate risk. Prediction of drought and/or floods would save lives as well as agricultural inputs.

(2) Plant breeding and research and ecological changes:

Data collection, analysis and modeling will create a statistical database that could be used to determine the most vulnerable crops to severe effects of climate viability and climate change. This training on plant breeding, research and ecological changes will create strong seasonal climate predictive skills for modeling the climate impacts on plant varieties of major African traditional crops and the degree of suitability of present crop varieties to ecological changes. Such information and predictive knowledge could be reflected in the type and subjects of agriculture / plant research programs with clear objective and targets.

Furthermore, training with a focus on ecological change would benefit investment planning for wildlife and eco-tourism in terms of development decision-making and tourism programming and investment. Prediction of climate change in the short-term will create trust and reduce tourism risk, and thus, returns would increase due to safety and possibly due to risk insurance.

(3) Soil, forest and water conservation:

Food production and poverty are directly related to seasonal quality which is affected by climate change and variability. Within rain-feed agriculture, watershed management and soil conservation are the major factors for sustainable development. Investment in irrigation would not be effective in the absence of information about expected rain and hydrological data. Investment might be fully lost with serious climate change. Soil conservation as well is not achievable without sufficient information on quantity and density of rain in a specific area.

On the other hand, effective and sustainable forestry management will depend heavily on the expected rain volume and density. The economic feasibility of a forest investment decision is highly sensitive to climate change and variability. Carbon emission and the cost of carbon reduction is an economic decision that cannot be informative without enough information and data on climate change. In this regard, training on forest economics must consider the cost of carbon emission reduction as well as the feasibility of different technologies with respect to deforestation and desertification.

(4) Clean energy and reduction of carbon emission:

Small-scale biogas investment is reflected in quality of life and poverty reduction. Biogas reduce carbon emission at low cost and contribute to women's quality of life. Biogas technology at the small-scale level is proven to be financially and economically effective. There is a need to ensure its social feasibility and acceptability. Training relevant staff on biogas economics and technology would contribute positively to global warming.

Solar energy, among clean energy technologies, is applicable at the community level and contributes to carbon emission reduction and quality of life of the poor farmers. The private sector is a major player in such investment at the community level, which could reduce the burden on the relevant government. Training on clean energy will contribute in the medium-term to community awareness and global warming as well.

It is important to also consider that the success of merging clean energies will depend on national oil prices, subsidies, and pricing policies. Training on the economics of oil pricing will provide decision-makers with necessary information in this regard and will therefore be reflected in the investment strategies of both relevant countries and donors.

Possible Fellowship Project

This paper recommends a Fellowship project on "Integrated Water Resource Management for major African Water Basin Organizations" as one tool of the capacity building mechanism. This paper discusses the justification for this Fellowship project; its objectives, activities, and target beneficiaries; the type of institutions that should host the proposed trainees; and its expected outcomes and performance indicators.

Fellowship Justification:

One of the paradoxes of climate change is to show, in a single region, an increase in both droughts and floods. Given these climate effect observations, some regions could suffer a double whammy of water shortage coupled with heavy rainfall, which could cause soil erosion and mud slides, sweep away crops and topsoils, and damage buildings. It is difficult to predict in detail the effects of climate change on rainfall patterns without database and capacity building on data analysis. Further, while rising incomes from farming have cut poverty in many countries, growing demand for food is likely to put increased strains on the global water supply. According to the World Bank, irrigation agriculture is thought to provide almost 60% of the additional food that will be required over the next 25 years.

Furthermore, the focus on biofuels such as ethanol has led to an expansion in the amount of land devoted to sugar cane cultivation, for example. Hence the drive to cut water consumption runs up against the need to find sustainable energy. Lack of water pricing results in water inefficiencies.

Thus, it is increasingly important to make the case for water conservation and water basin management. One may think that there is fair allocation, however, because of climate change, the total availability of water may suddenly drop. In consequence, water basin authorities should understand the complex inter-relationship between climate change, water footprints, and the risks and future availability of water.

The Goal and Objective:

The goal of the Fellowship project is to build the strategic adaptive capacity of African water basin organizations in managing the impacts of climate change on major African water resources

The objective of the Fellowship project is to enable the staff of African water basin organizations to identify climate change aspects and effects; to qualify and to quantify the risks associated with these aspects; to plan appropriate mitigation measures and adaptation approaches; and to implement them in order to guarantee the sustainability of their development interventions.

Fellowship Activities:

Following an academic and practical training for basin authorities' staff in selected African countries, it is proposed that the Fellowship project include the following activities to ensure full achievement of the objective of building the capacity of basin authority staff:

- Coalition Building: emphasis will be placed on building a shared vision among the water basin organizations for the integration of climate risk management perspectives into water basin management
- Knowledge Management: efforts will concentrate on the generation and dissemination of knowledge and tools aimed at guiding the identification of climate risk and adaptation measures.
- Water Basin Investments: the focus will be placed on “climate proofing” water basin programs and project activities (e.g., rice cultivation, irrigation schemes) through the application of available guidance on risk and vulnerability assessment and identification of adaptation measures.

Specifically, these actions will be undertaken:

1. Promotion of knowledge exchange and management (e.g. about climate data)
2. Scoping of basins' most significant environmental, social and economic impacts of climate change.
3. Value added analysis and assessment of a joint pilot project involving experts from selected African research organizations, each selected for its expertise in one of the adaptation tools (e.g. agriculture rice research, coastal modeling, desertification, etc.).
4. Development of screening tools to recognize climate change impacts on water basins.

In order to achieve the project objective, it is important to undertake specific case studies (i.e., case by case basin adaptation interventions) to overcome climate change impacts.

Target Beneficiaries:

The Fellowship project's target beneficiaries would be staff in charge of integrated water resources management in the (1) Nile River, (2) the Congo Basin, (3) the Mid Zambesi, (4) the Gambia, (5) Lake Chad, (6) the Niger Delta, (7) the Upper Volta, (8) Lake Albert, (9) Lake Tanganyika, and (10) Lake Volta. As a target, each basin will be requested to provide relevant data for analysis such as water balance and water inflow (e.g., rainfall, underground aquifers, surface water, and automatic recharging) for case studies during and after the academic training.

Type of Institutions:

It is recommended that involvement of some famous academic universities be followed by short term training for practical experience in one of the environmental services institutions.

Possible academic universities include: (1) The International Research Institute for Climate Prediction (IRI), Columbia University; (2) The Department of Agricultural Economics and the Department of Natural Resources, University of Arizona, Tucson, USA; and (3) Departments of Agricultural Economics and Departments of Geological Sciences, etc.

Environmental Services Institutions include: (1) Climate Prediction Center, National Centers for Environmental Predictions, Washington DC; (2) South Africa Weather Services, Pretoria, South Africa; (3) American Association for the Advancement of Science on African Environmental and Development Issues, Washington DC; and (4) The Earth Institute, Columbia University, USA; etc.

Expected Outcomes:

The program will lead to: better understanding of climate change issues and its environmental, social and economic impacts; better planning for mitigation and adaptation options; support for comprehensive stock taking and baseline definition; and security of future funds to undertake adaptation options and projects.

Performance Indicators:

The Fellowship objective stated above will be measured by the following performance indicators:

- (1) Historical data on climate change and variability digitalized and new climate change data collected, manipulated, analyzed and disseminated to all basin authorities in member countries within the first year following the end of the training project;
- (2) One case study completed on each basin by its trained staff and discussed among basin member countries and results approved with one clear vision of water resource agreement;
- (3) Results of modeling climate change data and its forecasting including risk identification shared and discussed among members of the basin authority countries and a shared vision reached within 18 months following the end of the training project;
- (4) Mitigation and adaptation measures determined, agreed upon, and reflected on in basin plans for water resource management and in investment decisions within two years following the end of the training project; and
- (5) Joint pilot development projects identified, presented, and approved by donors for financing and implementation within 2-3 years following the end of the Fellowship project.

Other Mechanisms

Fellowships and training of relevant staff will not be sufficient for capacity building without provision of necessary equipment for measuring climate change and variability for data collection and analysis. Thus, there is a need to survey the relevant institutions in the selected African basin authorities to determine shortages and needs for upgrading equipment according to the nature and mandate of each institution. This mechanism for providing necessary equipment will assist the target beneficiaries to collect, store, manipulate and forecast climate changes.

Another beneficial mechanism would be to develop a Global Earth Observation System – a network of satellites to be built in relevant countries and regions with the aim of providing information for Integrated Water Resources Management and allowing countries to better understand rainfall, water flow, underground aquifers, and sea level rise.

Capacity building needs and opportunities from the perspective of environmental management agencies in the context of climate change

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Introduction

The term “capacity-building” is widely defined as the process of creating or enhancing capacities within an institution or a country to perform specific tasks on an on-going basis in order to attain a given developmental objective. The following three aspects are generally stressed:

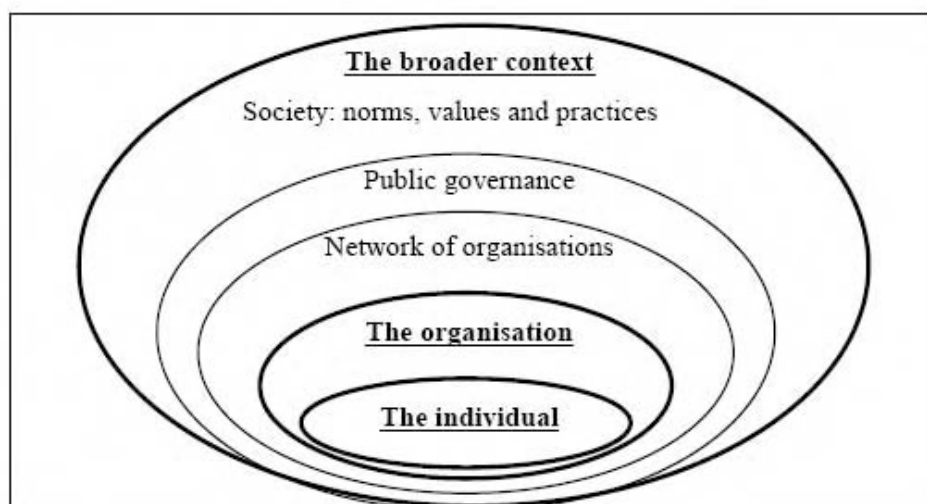
- Human resource development (e.g. training and education)
- Institutional strengthening (e.g. improved organizational methods and procedures); and
- Creation of a receptive environment, sometimes called systemic capacity (e.g. increased public awareness, enactment of rules and regulations conducive to development).

Broadly, however, the concept of institutional capacity as a whole recognizes the fact that institutions such as environmental agencies, are not only discrete organizations, but also, more generally, include sets of rules, processes or practices that prescribe behavioral roles for actors, constrain activity, and shape expectations. Institutional capacity often implies a broader focus of empowerment, social capital, and an enabling environment, as well as the culture, values and power relations that influence us and the institutions.

Institutions are durable; they are sources of authority (formal or informal) that structure repeated interactions of individuals, companies, agencies, civil society groups, governments and other entities. Thus, institutional capacity represents a broader “enabling environment” which forms the basis upon which individuals, agencies and organisations interact. In this context, training individuals and strengthening organisations can only succeed in the long term if it is consistent with existing institutions, or if it helps transform these institutions, so that actions are based on rules, processes and practices that can be sustained through time.

More recently, multilateral and bilateral co-operation development agencies have developed capacity assessment frameworks that take into account this broader notion of capacity. These frameworks usually distinguish between three levels of institutional capacity: a micro level, i.e. the individual; a meso level, i.e. the organisation; a macro level, i.e. the broad institutional context. The broad institutional context itself includes three distinct levels. This means that there are five distinct levels of capacity, as shown in Figure 1 below.

Figure 1: Five levels of capacity



Source: adapted from Segnestam & al., 2002

This institutional dimension is somehow illustrated with the case of national communications on climate change. All country parties to the convention on climate change can, through their own resources or foreign assistance, hire and/or train experts to prepare a national communication. However, a successful completion of this project does not guarantee that the country has the institutional capacity to prepare national communications -or inventories- on a regular basis. Meeting such regular, periodic responsibilities requires a well-established system with a network of stable institutions and a clear set of rules. This goes down to the agency level.

The aim of this paper is to explore capacity building needs and opportunities of country-level institutions and environmental agencies in the context of climate change related actions. Environmental management agencies are institutions within countries that are, among others, supposed to take up the issues of climate change as a current and future challenge for even attaining their own objectives. The paper thus looks at a generic assessment of environmental agencies or institutional capacity, with the aim of helping to develop a common understanding of what institutional capacity actually is and what are the institutional capacity needs for various forms of actions on climate change. It is however important to emphasize at the outset that country-level institutional capacity assessments and needs are essentially country-specific and need to be undertaken in a national context. It is also important to note that, as it is clearly emerging now, climate change is typically one of such complex horizontal issues, which resemble other sustainable development issues. These issues require new capacities, such as the ability to set long-term and sustained strategies, to create strong policy coherence and integration, as well as to enter into partnerships between governments and civil society. Such capacities are needed at country level (even at regional level) but have far reaching implications at institutional/agency level.

Capacity Building Provisions within the Climate Change Convention and its Kyoto Protocol

The context within which capacity building is addressed within institutions and environmental agencies is the provisions of the United Framework Convention on Climate Change of 1992 and its Kyoto Protocol of 1997. While the Convention lacks a general provision on capacity-building, it mentions it in three separate articles: Article 4.5 which states the end need to develop

and enhance ‘endogenous capacities’ in the context of technology transfer”; Article 5 (c) which provides for cooperation to improve endogenous capacities relating to research and systemic observation; and Article 9.2 (d) which requires the Subsidiary Body on Scientific and Technological Advice (SBSTA), in the context of scientific programmes and international research, to provide advice on ‘ways and means of supporting endogenous capacity-building in developing countries’.

The Convention’s provisions are imported into the Protocol as a result of Articles 10, 11 and 15. Like the Convention, the Protocol lacks a general provision on capacity-building. However, article 10 (c), which requires all Parties to cooperate to promote technology transfer and know-how, contains an implicit reference to firms and agencies to developing technology-related capacity. Article 10(d) of the Protocol simply re-affirms Article 5 (c) of the Convention requiring Parties to strengthen and develop endogenous capacities and capabilities to participate in international research and networks on research and systematic observations. Article 10 (e), which requires all Parties to cooperate in strengthening national capacity-building, in particular human and institutional capacities, relating to the issues of education, training and public awareness, placed a significant new emphasis on capacity-building which led UNFCCC COP-8 to adopt a programme of work in this area.

The final reference in the Protocol to capacity-building is Article 10 (b) (ii). This requires non-Annex I Parties to report on capacity-building measures they believe are contributing to addressing climate change in their national communications. While this reporting requirement is a new commitment as it is not included in the Convention, it aims at helping non-Annex I Parties communicate their circumstances and capacity needs better to the COP and had, in any case, already been agreed by developing countries, albeit in a non-legally binding form of Decision 10/CP.2.

These are key provisions of the Convention and Protocol from which environmental agencies and institutions can make reference while seeking support to address capacity building needs in the context of the Convention and the Protocol. However these articles of the convention and the Protocol need to be translated into actionable decisions adopted by the Conferences of the Parties. Thus the negotiations capacity of developing country parties, so as to ensure that such provisions are translated into decisions that can favor their institutional needs development, becomes paramount. Such capacity need to be built within national institutions and environmental agencies.

The cross-cutting nature of capacity-building has so far prompted the adoption of more than twenty COP decisions directly on or related to capacity-building and/or enabling activities and funding by the GEF. Two broad phases of addressing capacity building are evident. The first, from COP-1 to COP-4, saw capacity-building issues being dealt with in a discrete manner under other relevant agenda items. This approach had merits in linking capacity-building clearly to specific Convention commitments, such as timely submission of initial national communications, capacity-building for which was supported by the Consultative Group of Experts on National Communications (CGE). The drawbacks were fragmentation of capacity-building efforts with a consequent lack of coherence, coordination and prioritization in their funding and implementation. The second phase, initiated by COP-5, has seen capacity-building being addressed as a cross-cutting, foundational issue meriting its own agenda item. This approach led to the adoption at COP –7 of two frameworks for capacity-building, one for developing countries and the other for Parties with economies in transition, with each framework defining the scope, purpose, principles and respective roles different agencies should play in capacity-building as part of the Marrakech Accords.

Capacity Building Decision adopted at COP-7 establishes “a framework” to address capacity-building needs relevant both to the implementation of the Convention and of the effective participation of Parties in the Kyoto Protocol process. In terms of intent, the capacity-building needs of developing countries are more extensive, must be met within the broader context of development, and must take into account that a disproportionate amount of their capacities will be needed to cope with the adverse impacts of climate change for which financial support available under the Convention shall be needed through GEF. In terms of its cross-cutting nature, the principles and approaches outlined in the Decision stress that capacity-building should:

- Be country-driven and tailored to meet the specific needs and circumstances of each country rather than being guided by a ‘one size fits all’ approach;
- Recognise that capacity-building is an ongoing iterative process, i.e not something that starts and stops with particular projects;
- Be undertaken in an “effective, efficient, integrated and programmatic manner” and maximize synergies between the climate regime and other MEAs;
- Be led, wherever possible, by existing national bodies, in particular national coordinating mechanisms, institutions and focal points. This contributes to long-term sustainability and enhances integration and awareness of initiatives at the national level; and
- Involve “learning by doing” and utilize “demonstration projects” to identify capacities in need of further development.

All these principles and approaches are relevant for building substantive capacity at institutional/agency levels within the governments.

Climate Change Capacity Needs

A pragmatic approach for climate change actions might include a step by step approach, whereby institutions in each step assess their existing capacities and select future actions that are consistent with the capacity level it can reasonably reach within a given time frame taking into account the challenging nature of climate change. While each new step is likely to involve some capacity development, capacity requirements should not be too large at each of these steps. If the gap between existing capacity and capacity that is required is too large for a particular action, it could become virtually impossible for an environmental agency to abide by what it has committed to do. In this framework, the level of existing capacities in an environmental agency is likely to define the kind of next step that the institution can take to address climate change. However, it is also hoped that with each step, capacity will grow, so as to allow for a progressive strengthening of actions on climate change adaptation and mitigation over time.

Capacity is systemic, so, in some sense, all dimensions of institutional capacity deserve attention. Increasing the level of human resources or strengthening organisations, while it may be necessary, may not be sufficient to increase capacity. The way individuals and institutions interact may be more relevant to the overall level of capacity. This is particularly true for climate change institutional capacity building. As a cross-cutting issue, it requires co-operation among a large number of individuals and institutions. Capacity is also required in all other areas within an institution: for instance, a strong monitoring, reporting and review system is needed to enhance the effectiveness of a climate change strategy and measures over time at institutional level.

It also important to note that climate change, as a cross-cutting, horizontal issue, means that both climate-specific and climate-relevant capacities are needed. Climate-specific capacity is a

capacity that is specifically devoted to climate change issues, for example knowing all about the Clean Development Mechanism and Carbon trade in general under the Kyoto Protocol and other climate change related regimes. Climate-relevant capacity supports the vast number of non-climate actions that may help to mitigate or adapt to climate change.

A sufficient level of climate-specific capacity is needed to get a climate policy or strategy off the ground within an institution or even across institutions and the country as a whole. This includes sufficient personnel dedicated to climate issues in the main organization responsible for climate change issues, in other relevant agencies, in key research centres (or consulting firms) and in businesses and non-governmental organisations; climate change recognition in the structure of the organizations; institutional arrangements to develop a climate strategy with the co-operation of all relevant agencies and stakeholders; leadership of an institution; and awareness among the general public.

Since climate change is a cross-cutting issue, most institutional capacity that is likely to be needed for climate actions is not climate-specific, but rather climate-relevant. This means that it will have been developed for other reasons than climate change, in many different sectors, like energy, transport, agriculture and forestry, yet it may have the most significant impact on the success of climate actions even at institutional level.

Again, these two types of capacities are needed, because they are interdependent. Developing a climate-specific capacity is therefore needed to get actions to address climate change off the ground. It is also needed to influence other policy areas, so that these other policy areas develop the ability to integrate climate objectives with their other own sectoral/institutional objectives. Conversely, climate-specific capacity may not be able to develop adequately, if it is not backed by climate-relevant capacities. For instance, sufficient climate expertise may not be able to emerge within the institution, if the staff service as a whole is inefficient. Table 1 summarizes the most important climate-specific and climate-relevant capacity needs.

From Table 1 it is clear that effective implementation of planned actions and strategies at institutional level will mostly require a strong capacity in a variety of areas with different sets of expertise and institutional arrangements, in areas outside the institution itself such as energy, transport, agriculture and forestry sectors, or general economic policies at national level. Monitoring, reporting, review and enforcement will also require strong statistical and judiciary systems.

Table 1: Climate Specific and Climate relevant capacity needs

	Climate change specific capacity	Climate change relevant capacity
Individuals	<p>Sufficient staff, experts, for undertaking assessment, the formulation of the strategy, the design and implementation of climate-specific actions and measures, as well as for monitoring, reporting and review.</p> <p>Reasonable level of climate-specific skills and training.</p> <p>Interest in climate change issues</p>	<p>Sufficient government and non-government experts developing climate-relevant policies in: energy, transport, agriculture, forestry, industry, R&D, economy, finances, education.</p> <p>General training opportunities</p> <p>Financial/non-financial incentives</p>

Organizations/ Institutions	Specific mandate on climate change Climate “unit” within an organization Higher management “championing” climate change	Compatibility of other mandates of the organization with climate objectives, overall management structure and processes, level of human and financial resources, overall ability to fulfill missions.
Network of Organizations/ Agencies/ Institutions	Procedures and financial provisions, level of co-operation on climate issues, leadership of an organization, allocation of responsibilities, stability/adaptability of the institutional framework	Underlying practices and procedures for integration and networking Policy framework for networking
Public governance	Ability to influence mainstream policymaking in taking into account the climate change issues	Political stability, ability to implement sound climate-relevant policies and to provide a sound business environment, civil service independence and ability to allocate sufficient resources on climate change adaptation and mitigation actions
Social norms, values, practices	Knowledge about climate change and positive attitude towards climate adaptation measures	Acceptance of laws; positive attitude toward environmental protection, attitude of co-operation among citizens

Influencing these other areas so that they develop climate-relevant, or even climate-friendly, capacities is perhaps the biggest challenge of climate policy and capacity needs at institutional level. In this context, environmental agencies and institutions may be first be engaged in building some specific institutional mechanisms, such as strategic planning in sustainable development, to integrate climate concerns into other policy areas.

We also need to underscore the fact that there is no simple recipe for ensuring that climate change is taken seriously at the highest political level. Also, the “political economy” of decision-making may be quite unfavorable to broad policy reforms, such as those required for climate change at institutional level. Many procedural and legislative hurdles may prevent a country to opt for an ambitious climate programme, in particular if it is to be embedded in an international agreement, thus affecting also the capacity and ability of environmental agencies to participate. Developing such a climate-relevant capacity within an environmental agency or institutions represents thus another very complex challenge and may need to be considered in the context of broad institutional reforms within a country as well as comprehensive strategy across the institutions and government departments on climate change awareness at the highest political level.

Conclusion

Assessing capacities required for implementing different climate change action does not provide by itself sufficient clues to select the most appropriate option. An assessment of current capacities is needed to determine the extent of the capacity gap between current capacity and the capacity required for specific actions. More detailed capacity assessments provide a clearer picture of the kind of future options an institution within a country can afford. This requires

capacity assessment that can only be done within the institutions themselves. Self assessments mark the beginning of a process whereby an institution would define the kind of next steps that are consistent with their capacity level, including the kind of capacity development that is needed for such next steps.

Concrete priorities for capacity development to address climate change are likely to emerge only when institutional specific capacity assessments are made. Only institutional specific assessments can identify strengths or weaknesses of that particular institution within a country. More importantly, institutional specific assessment processes allow institutions to own such needs assessments and the related strategies that such capacities are meant to realize.

I have just highlighted the generic institutional capacity needs for many environmental agencies in developing countries and the factors that may influence the capacity levels and needs within such agencies. I have considered both climate change specific and climate change relevant capacity needs. This analysis of needs to address climate change is not meant to emphasize developing countries' environmental agencies' difficulties to address this new global challenge but rather to give a better picture of the areas and the kind of actions that are needed to address capacity constraints in a broader context of the national needs to address the impacts of climate change and other relevant mitigation measures consistent with the Convention and its Protocol.

Mixing and Matching!

Education, Skills and Other Requirements for Adaptation to Climate Change

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Introduction

Adaptation to climate change and other stresses is a critical component in climate change research, practice and planning. In the science community there is now a broad consensus on the reality of climate change and the role played by humans in shaping and driving climate change (IPCC Summary for Policy Makers, 2007). Adaptation is required, together with mitigation, if we are to effectively deal with climate change.

There are several types and formats of adaptation, including planned and unplanned adaptation or autonomous and planned adaptation. Autonomous adaptation includes that which occurs without any specific planning whereas as the name implies, planned adaptation includes adaptation that occurs in anticipation of potential climate change. Adaptation activities can thus be of several types, from the technological (e.g. sea-defence construction); to the range of behavioural types of adaptation (e.g. shifts in choice of food); to managerial adaptation (e.g. changes in farming methods) to policy and institutional adaptation (such as planning regulations) (Reid and Huq, 2007). Adaptation also cuts across scales of activity or is a transversal activity (e.g. includes all sectors - water resources, agriculture, coastal zone management, disaster management). Adaptation activities and better understanding of adaptation is further complicated by the complexity of various issues (such as multiple stresses) that occurs at several levels e.g. international, regional, national and local scales.

In this brief paper some of the adaptation skills and training requirements for those seeking to work in this field (e.g. teaching fellowships) are discussed. The intention, however, in the paper is to try and 'go outside the box', and also include allied fields and activities that perhaps are not currently as well mainstreamed in our discussions on this topic (e.g. What are humanitarian organisations doing and requiring in their related activities on this topic? How and what are disaster managers and risk-management practitioners doing and hence requiring in their cohort of people required to work fully in their fields? How can we begin to work in the field of behaviour change? etc). The paper thus includes an assessment of some of the current, 'traditional' training on adaptation thinking and then attempts to widen this to possible future adaptation requirements.

Adaptation skills and training for professionals: some current activities

Some traditional approaches

The training, skills and intervention requirements for adaptation to climate change and adaptation are varied. Firstly there is the need to frame such skills training at the very highest levels as a critical endeavour and area of scholarship. In Australia, the Department of the

Environment and Water Resources of the Australian Greenhouse Office, for example, has recently investigated some of the skills required for professionals to work in the field of adaptation with one of the aims to “Integrate climate change into education and training for key professionals, including engineering, architecture, planners, reserve managers and local government” (Dept. of the Environment and Water Resources, Australian Greenhouse Office, 2007). To this end the Department commissioned the Australian Research Institute in Education for Sustainability (ARIES) to investigate the needs of professionals in this field including those requirements for architects, landscape architects, planners and engineers. The need for recognition and accreditation in the field of adaptation was a key outcome of this work. As such there is now a recognition that training and skills provisioning needs to be imbedded into current training modules etc. with a strong focus on linking or thinking seriously about current development training and how this can be aligned to adaptation work. Thus one key requirement is the *official acknowledgement and acceptance* that adaptation training and skills and research is required so that *such training can become endorsed and receive the recognition* required to make this a serious area of training and research in various training institutions.

Secondly, the various areas of expertise and enterprise needed vary with the topic under investigation. One may, for example, require specific training on health, planning and development, water resource management, disaster risk reduction depending on one's area of interest and expertise. This training will also vary across levels and will thus include broad meta-level training on climate change and adaptation (e.g. broad theoretical training and principals) and training that is required at a very specific skills level (e.g. basic training in the various disciplines e.g. health, development planning etc). Increasingly the additional roles of effective and reliable communication is also becoming key but this cannot merely be the adding on of an extra module at the end of a course or the addition of a small ‘extra’ at the end of a research project. As will be seen in the next section of this paper, the emerging additional requirements actually require a re-thinking of ways to incorporate critical areas of training and skills development, at the very outset of programmes, issues that have not always been seen to be critical in the area of climate change adaptation.

Finally, there is a growing recognition that any training or set of activities for sustained change requires an understanding of *how people learn and sustain changes in behaviour*. The inclusion of disciplines usually outside the traditional domain of climate science is thus needed e.g. psychology, anthropology and economics. There are thus a growing number of efforts to focus activities on ‘learning by doing’ activities. A very useful paper in this regard, by Gujt (2007), for example, outlines the following key areas requiring attention: understanding social change; frameworks, methods and concepts of social change; the critical roles of relationships in change including the role of donors in shaping change; the role of scales etc. Of interest to adaptation work was the observation that: “In practice, creating an appropriate assessment and learning process, requires mixing and matching and adapting a combination of frameworks, concepts and methods” (Gujt, 2007, 5). The repeated calls for flexible approaches, where one can mix and match training often, however, is constrained by the rigidity of set curricula and other bureaucratic requirements of training institutions.

The innovative design of teaching fellowships will thus be critical, with the optimum possibly being an agreement between a number of host institutions to allow for accredited course-bearing courses to be generated and gathered in some form of organised process (here again the intervention and guidance of some leading agents e.g. TWAS, ICSU and others may help in profiling this work a set of programmes. The idea would be that someone could attend and gain credit in one institution and then proceed, by virtue of a pre-determined agreement between

hosting institutions, to another institution to gain additional credits etc. Some form of external quality control to maintain standards would, however, have to be designed.

Several activities already exist with folks beginning to train folks in climate adaptation work including several ‘training of trainers’ workshops (see for example, activities of Few, Viner and Bouwer et al., ADPC/FAO, 2007; activities run in southern Africa e.g. DiMP and Wits and the wider Peri-PeriU initiative that covers several training programmes across Africa; Waternet training courses in Mozambique; CIAT, SEI, UNITAR, 2005; see also www.climateadaptation.net; www.unep.org/training/downloads/newsletter/educator; several AEO (African Environment Outlook and MESA – Mainstreaming Environment and Sustainability in African Universities Partnership – activities. Some training modules have already taken place). Several activities linked to themes of sustainability (see for example, <http://sustsci.aaas.org> and the Forum: Science and Innovation for Sustainable Development) have also been developed (for Africa see for example, UNEP) and the Centre for Sustainability, Zurich (see for example, www.unep.org/training or www.sustainability.ethz.ch) and the Youth Encounter on Sustainability Course (YES).

Most of the training workshops, however, focus on short courses and usually cover introductory course materials on adaptation with a strong focus on development climate change interactions. Very few, as can be determined by this short research activity for this paper, appear to have the ability to be added to a general curriculum with a longer-term accreditation process and most are usually once-off courses with little evidence of true –inter-disciplinary’ teaching and design (e.g. including elements of economics, psychology, law etc). Integrating such modules into existing undergraduate and post-graduate courses appears therefore to be a critical, but remains as yet, an untapped avenue and elevating such courses into the ‘mainstream’ of local graduate and undergraduate training is a frustration. Some longer courses, several with the themes of climate and society are, however, being offered at the post-graduate level but these usually are wider than the focus only on adaptation (e.g. new course offering at the University of the Witwatersrand, South Africa, IRI courses etc) and often do not have very practical skills transfer as their brief.

One of the more traditional approaches to possibly advance adaptation training for climate change into the mainstream education is to advocate for further environmental education that is better integrated into secondary and tertiary education levels. Recently calls for the inclusions of ‘better understanding of indigenous knowledge into environmental education’ have thus been made to assist those vulnerable and often, but not always, poorer areas facing risks of climate variability and change (see for example the talk by Mr Thiaw, Global Climate Change: New Challenges for Education and Training around the world, UNEP, www.weec2007.com). Here once again, some higher level activity and calls for action, however, may have to begin if environmental education is to include a detailed focus on climate change issues that are effective in training (e.g. partnerships between UNESCO and UNEP – e.g. MESA (Mainstreaming Environment and Sustainability in Africa’s Universities, www.weec2007.com). One option for better opportunities for climate change adaptation would therefore be linking such activities (e.g. environmental education and sustainable development) to some focussed themes on climate change and adaptation.

Some possible ‘additional’ approaches

Several other practitioners are, however, also becoming interested in advancing training and thinking on adaptation to climate change and may be useful allies. These trainers usually come from the humanitarian practitioner groups (e.g. CARE, OXFAM, USAID supported programmes, SCF) and the wider disaster risk reduction community (see for example,

Provention activities of the ISDR and others). Such trainers and activities usually fall outside of the 'traditional' approaches and courses on offer in secondary and tertiary institutions. Of interest and relevance here, however, is that several of these groups usually are in the field of responses to and mitigation prior to 'disasters' and other crisis in various places. Such trainers and personnel therefore usually have several novel and very practical skills training modules that have been developed. A few examples of the approaches used and training sources are illustrated below:

CARE – The CARE approach to adaptation focuses on prioritising people and community-based adaptation, particularly for those that may be most vulnerable to climate change, namely the poor and those with limited means for adaptive capacity. Through this approach CARE fosters more resilient livelihoods and in doing so CARE has developed a Climate Vulnerability and Capacity Assessment (CVCA). This tool is designed to be effective at the grassroots level. Their approach also includes the rejuvenation of appropriate traditional knowledge, the promotion of innovative agricultural practices and the diversification of income sources. To enable the approach to become operational, CARE also works with local NGO, community-based organisations and government agencies (see for example, CARE and Climate Change, www.careclimatechange.org).

USAID – USAID have also designed a guidance manual for climate change adaptation and development planning that can be used in a variety of training situations. Various methods (including screening for vulnerability and adaptation), matrices for adaptation design and criteria for analyzing adaptation options are offered and suggested. The manual is one of the first designed to assist planners and stakeholders with climate change adaptation (USAID, 2007).

TEARFUND ACTIVITIES – The strong interaction and need for disaster risk professionals to begin to work alongside those working in adaptation to climate risks is ever more pressing. Such work and activities to assist in reducing risks includes the interaction and involvement of a range of players including business folks, communities (e.g. community-based risk reduction) and train in a range of fields e.g. rights-based awareness and training in development). Here a range of additional folks and sources of training materials can also be accessed e.g. UNISDR – United Nations International Strategy for Disaster Risk Reduction, Provention Consortium, and the International Federation of Red Cross and Red Crescent Societies, (IFRC) (TEARFUND – <http://tilz.tearfund.org>).

Several additional examples, similar to those outlined above, can be traced. Of interest is the range of very practical skills training offered in such approaches that could be very usefully linked to some of the more aforementioned 'traditional' approaches.

Some lessons that are emerging from this range of activities include:

- Repeatedly several participants in other climate change and adaptation courses on offer or 'trainer of trainers' workshops have called for more practical skills transfer (see for example responses from the workshop run by CIAT, SEI, UNITAR, 2005)
- Finding ways to infuse emerging curricula with such approaches may be mutually beneficial to both more theoretical courses often taught in tertiary settings and to the developers of more practical courses.

Meeting the needs: the roles of current graduate and undergraduate programmes

The following assessment is based on the writer's experience, and thus may not be an adequate reflection of what is 'out there'. Most undergraduate and graduate courses have limited scope, it would seem, to promote specific courses on adaptation for climate change. Certain aspects of adaptation to climate change are included in some under-graduate courses but these are usually not the sole focus of such courses (e.g. www.geog.ox.ac.uk; www.glos.ac.uk; www.phree-way.org; www.climateadaptation.net). Currently it would seem that the greatest scope for inclusion of such courses is at the post-graduate level. Other courses by way of example include those being offered as part of marine programmes (e.g. University of the South Pacific) and several courses linked to climate change science in the UK (e.g. School of Environmental Sciences, University of East Anglia). Most courses are integrated into existing environmental, meteorological and geography courses.

Of interest in the brief survey undertaken for this paper are the attempts by the University of the Sunshine Coast, Australia where, although a brief modular-designed course is offered (i.e. 120 hours of training) it has been designed to form half the requirements for a graduate course (see www.usc.edu.au). The key message that emerges again is trying to find ways of 'clipping courses together' if a Masters Degree or a Teacher's qualification is being sought, so that the individual modules can be knitted together in some form of credit-bearing process. Here again partnerships between institutions will be required (in the case of the University of the Sunshine Coast a partnership between other institutions e.g. in New Zealand, seem to enable this form of mixing or matching of courses; see also the efforts by UCT, Wits/PeriPeriU initiative). However, in many cases, e.g. in South Africa, the role of state subsidy, that forms a critical part of university income, may constrain such mixing for a co-ordinated, wider post-graduate qualification. In the South African case, where each university is subsidized according to graduates that the institutions produce, the creation of a mutually agreed upon course may be complicated. If such endeavours are to be worthwhile, some careful strategic planning at the academic planning office level and higher will be required.

Enhanced adaptation to climate change training – the role of teaching fellowships

The role of teaching fellowships and exchanges, as offered by START, could be the beginning of some longer-term climate change adaptation activities. Fellows could either be encouraged to develop new courses, modules or design course materials that could be adapted into existing course materials.

Some key issues that could be a focus of such fellowships, when undertaken by new teaching fellows, could include the following:

- Survey current research and teaching practices and needs in the given host institution;
- Identify strengths and weaknesses in the current programmes, modules etc. with extensive student input and participation;
- Begin a dialogue process in the host institution, identifying possible areas of collaboration, team-teaching across disciplines (this may require a process for often teaching topics are very 'turf bound'; and folks to not initially like to move or share in topics particularly those that may seem 'faddish');
- Video-teaching and seminar sessions could be initiated. These enable active critiques and can identify areas of improvement and development;
- Begin a process whereby materials can be developed, e.g. create a small archive and also record of teaching materials and sessions.
- One key activity that could be a very useful outcome of such fellowships would be the development of useful materials or handbooks where relevant topics focussing on a

specific dimension of adaptation, drawing on local research and practitioner expertise, could be developed (e.g. drought, floods, climate negotiations, business and climate change, co-adaptive management themes and climate change; etc, see for example ADPC and FAO, 2007) that could then be shared across institutions and centres.

- Invite training folks who may not appear to be directly involved in climate change adaptation (e.g. humanitarian agencies; disaster management trainers, close to the host institution) to brainstorm and share practical skills development and training.

Such fellowship programmes, should wherever, also possibly try and develop linkages to already established fellowships (e.g. CLACC Fellowship programme, CLACC Newsletter, 2007). Experience from some of these existing activities has shown, for example, that it is important to be able to specialise in key areas of interest within the vast areas of climate change; to foster collaboration and networking with other organisations that is important for information sharing and that appropriate climate change adaptation can contribute to development.

Conclusions

A brief assessment of the education needs of professionals working in various institutions to support climate change adaptation, together with an assessment of current graduate and post-graduate offerings, have been presented in this paper. Some recommendations for better integration into existing courses have also been given. A plea to cast the net even further than the 'traditional' course offerings has also been advocated.

There are several 'trainer of trainers' or teacher-trainer courses that already exist and that are being offered by various practitioners. Teacher fellowships should therefore not only be limited to existing 'traditional' avenues of exploration, but where possible, fellows could be encouraged to spend some time 'shadowing' practitioners in the field of disaster risk reduction and other humanitarian agencies and be encouraged to really design inter- and trans-disciplinary offerings.

Course content and design, particularly finding innovative ways of ensuring the creation of a post-graduate 'degrees'/'diplomas' that are not only once-off modules, remain critical challenges. Some useful examples of success stories are emerging (e.g. from Australia) and may be worth further investigation. One way around this impediment, for example, is for institutions to possibly work in consortia, with some form of across-institution accreditation process so that after completing a number of courses or modules, a post-graduate certificate/degree can be awarded.

Finally, the need for such programmes and training are urgently required but if these are to be maintained and become sustainable then support at both individual institutional levels and at higher and wider levels will be required (e.g. possibly with the support of, for example, TWAS, START, ICSU, UNEP) for Africa.

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