AIACC

Building Scientific Capacity.

1st AIACC Africa Region (Including Indian Ocean Islands)
Open Meeting and Workshop
10-13 March 2003

Workshop Report

The Africa Region Open Meeting and Workshop of the project Assessments of Impacts and Adaptations to Climate Change (AIACC) were hosted by CSIR on 10-13 March 2003 at the Mount Amanzi Lodge in Hartebeespoortdam, South Africa. These meetings were attended by 52 investigators from AIACC regional studies in Africa and Seychelles/Comoros and 20 guests from the region and farther a field. The guests included persons with interests in climate change science and policy from government agencies, non-governmental organizations, and national focal points of the Global Environment Facility and UN Framework Convention on Climate Change (UNFCCC).

The first day was an Open Meeting that provided an opportunity for guests to learn about the AIACC project and the ongoing AIACC regional studies in Africa. Guests and AIACC investigators engaged in discussions of how AIACC activities can contribute to and benefit from other regional research, capacity building, and assessment activities, including preparation of National Communications under the UNFCCC.

The meeting was opened by Dr. Robert Scholes of CSIR, South Africa, who put recent research directions in the context of the evolving science of climate change, from an initial focus on the climate system and responses to greenhouse gas forcing, to the potential impacts of climate change, and more recently on adaptation responses to manage the risks. Dr. Scholes was followed by Dr Simbarashe Chidzambwa from the FAO/SADC Remote Sensing Project and Dr Richard Muyungi of the Environment Division, Tanzania, who highlighted the human consequences of recent climate stresses in southern Africa and the vulnerability of Africans to future climate change respectively. These talks set the stage for presentations from each of the 12 AIACC regional studies in Africa and Seychelles/Comoros as well as panel discussions on information and capacity needs related to vulnerabilities and of adaptation opportunities, barriers and strategies.

The Open Meeting was followed by the three day Workshop for a more in-depth look at the AIACC regional studies. During the workshop, AIACC investigators presented the fruits of their first year's research, discussed the problems they have encountered, and considered strategies for overcoming some of the encountered problems. The workshop was structured in a number of parallel sessions:

A. Data, trends and scenarios
B. Climate sensitivities and impacts
C. Vulnerability and adaptive capacity
D. Adaptation strategies and evaluation
E. Policy, synthesis and AIACC future

In sessions A through D, investigators from the AIACC regional studies gave presentations on their research progress to date in relation to each session topic. The sessions also allowed for lengthy discussion of research methods, problems encountered and potential solutions to these problems. In Session E on the last day, participants discussed topics that were introduced on the first day in "Carousels" (rotating brainstorming exercises) and developed recommendations. The topics of Session E and the Carousels included integrating AIACC with policy planning and national communications, synthesizing the work of the 24 AIACC regional studies around the world, and building upon the work begun by AIACC to further enhance scientific capacity and knowledge.

Rapporteur reports from the Open Meeting and the sessions of the Workshop follow. Most of the presentations made at the Open Meeting and Workshop will be posted on the AIACC website (www.aiaccproject.org/meetings/meetings.html)

Rapporteur Reports

AIACC Open Meeting
10 March 2003

PANEL 1: KEY VULNERABILITIES, INFORMATION NEEDS AND CAPACITY NEEDS

Panelists gave brief presentations of their perspectives of key vulnerabilities in the region, information needs for addressing vulnerabilities, current efforts to address information needs, and scientific and technical capacity needs and approaches for meeting them.

Chair: Opha Pauline Dube, University of Botswana
Rapporteur: Emma Archer, Climate Systems Analysis Research Group, University of Cape Town

Panel members:
- Mohamed Ali, Environment Research, Maldives.
- Coleen Vogel, University of Witwatersrand, Chair Scientific Committee of IHDP
- Hilary Dandaula, Project Manager Climate Change Enabling Activity in Malawi and University of Malawi
- Richard Muyungi, Vice President's Office, Tanzania

Remarks of Mohamed Ali, Environment Reseearch, Maldives

Vulnerabilities are different for different parts of the world. For example, in Maldives: mean T difference of no more than 5 degrees; thus a 1 degree change would be significant; and because of this, corals might be severely affected. Other regions have more margin for such changes, SIDs rather less flexible. Need to understand in the context of your setting, what are the key vulnerabilities and what adaptation and response measures are required

SLR in context of the Maldives – their highest point is 4 meters, so extremely vulnerable to a rise of even 1 cm. To understand adaptation, need to really understand how systems are going to respond to natural changes.

Maldives: sand on beaches moves seasonally, also in med term (40 years) islands are shifting – with interference such as a sea wall, can be very troublesome (e.g. in Maldives adverse effects of harbours). Subtle change in water T can affect tuna migrations; affects Maldives fishing industry.

So to understand all these issues, must come back to the local-level and think of V & A in that perspective. So far have a series of reports trying to understand SLR in context of the small islands states; often written by people from the northern hemisphere, often have no local knowledge – often end up with piles of useless reports

Maldives may not have too many PhDs, but it is really important that more of the local knowledge be taken into account for adaptation
Also, have to try and increase the human capacity for development in SIDS → problem of a brain drain to Australia, New Zealand, UK, US etc

These are the kinds of scenarios that small islands are facing. Thus, SIDS have to get into the system and find out, with the help of local knowledge, what are the critical affecting factors, in order to respond to them. Often just need basic information to be collected to understand these relationships. Many information gaps that need to be filled to improve understanding of V & A in SIDS

Remarks of Hilary Dandaula, Project Manager Climate Change Enabling Activity in Malawi, and University of Malawi

Malawi is vulnerable to many of the negative effects of climate stress, particularly increased frequency & intensity of extreme events;
For example, problems with recent extreme rainfall events in Malawi leading to flooding, landslides. With intense rainfall, part of the mountainous areas are prone to landsliding – 2 slides from January this year – major landslides. Also, landslides in 1995 in southern Malawi resulted in 500 people lost. No warning system exists for landslides ~ yet extremely negative effects

Another vulnerability:

- due to development
- inappropriate building standards for new housing in rural areas
- interior of house not well insulated – affected by extreme heat and cold and affects health

Information needs to address vulnerability

- rural communities have a different perspective
- when information produced by large science bodies is taken to rural communities, importance of taking into account local/indigenous knowledge becomes very important
- have to be sensitive to local knowledge systems
- need to target the way in which local people understand climate change

Current efforts

- Malawi: definite improvement in mass media
- Local farmers and communities meet and exchange some of the information
- BUT ~ when UNDP did livelihoods project, went into climate & disaster prone areas, communities didn't mention the climate as a stressor; why ? → is it a problem with the questions?; is it a problem with the interviewer's knowledge

Scientific & technical capacity needs

- universities need to be supported
- through his project has tried to build a network with the universities
- so that is an institution within Malawi working on climate change issues; at the moment not really there
- When doing National Communication, had challenges trying to explain this to people in Malawi
- Need quite a lot of support for scientific and technical capacity
- Financial resources: nice to be here and participating and to see the projects put forward
    - Hope that the community in Malawi will respond with similar proposals

Remarks of Colleen Vogel, University of Witwatersand and Chair of Scientific Committee of IHDP

Her perspective on vulnerability informed by her work in the region

Will put a couple of things on the table – not meant as criticisms, just meant to focus the discussion

Concerned that we seem to be still stuck on impact assessments

- still looking at the system driven by climate, and impacting on the exposure unit (people, health etc), and trying to capture the downstream experiences
- But in fact, many of us are trying to flip the model around, and to look at other stresses and drivers of change (multiple causes of critical outcomes); and to look at how these are either making your unit of study more or less resilient to climate
- Some of us still seem stuck on some of the old ideas of climate impact assessment
- NB to look at work of the Resilience Alliance and the Millennium Ecosystem Assessment
- Says that earth system constantly changing, and our interventions can't be static
- How can we get a sense of memory, experience and diversity from both a biophysical and a social perspective
- We need to be thinking more laterally
- Look at Bohle's (2001) double structure of vulnerability – i.e. experiences 'external' and 'internal' side of vulnerability (external – exposure) (internal – coping)
- Concerned that we keep trying to capture change in time
- But same problems apply to the spatial scale – how do we ratchet findings at the local scale up to the regional scale and higher ?
- How do we capture feedbacks across and between scales (critical thresholds & opportunities for surprise)
- How do we couple social and ecosystem vulnerability resilience (HUGE problem)

Resilience and/or Vulnerability

- really about the ability to withstand a shock/perturbation
- NB of creeping/slow and make them fit in with the fast/sudden processes (how do we do this ?)
- Coping/adaptive capacity → one essential issue: that of social networks

Idea of Stories from the Past: learning and adaptive capacity

- we seem to be mixing up adaptation, coping, short term, long term; and we use the words adaptation inter-changeable with mitigation – causes problems with policy makers and those doing intervention
- e.g. in Tswana community traditional ways of dealing with drought (e.g. Mafisa – communal ploughing)
- people finding that these social memories and strategies seem to be eroded
- What is being put in its place ?
- How can we piggyback on the success stories ? (Sudan project encouraging)

We tend to be focused too much on a

Technical Approach
- possibly funding driven
- EWS, forecasts, genetic engineering (etc)
- Too much one sense of adaptation & mitigation

So perhaps need a

Social Approach
- recapturing social networks
- building on local capacities
- investigating impacts of diversification

Move out of a tunnel approach
Once projects finished, could we advance the science of vulnerability

In summary:
- call for a reassessment so that we don't just do impact assessment
- don't hinge too much on CC
- other factors that are important
- at the end, could projects synthesize knowledge and come up with framing or wiring diagram and say that at end of the case studies, what do we mean by mitigation, how do we distinguish it from adaptation ?, how do we capture memories ? etc

Discussion

Pauline Dube – notes that Coleen's issues essential, often hears these sorts of points when social and natural scientists get together

Open the panel to the floor:

Pius Yanda:
- *question on landslides: is there a study conducted to correlate intensity & frequency of landslides with rainfall intensity ⇐how does one exclude the human influence on landslide probability (e.g. deforestation, which can also enhance the likelihood of landslides)*

Mamadou Nije:
- *when was the UNDP survey carried out – was it after a drought or a flood ? They have seen that immediately after a disaster event, people will focus more on that sort of cause (i.e. a bias in their answers)*

Speaker from Malawi – how do they intend to accomplish community outreach with their outputs ?
Secondly, for Dr Vogel, re: genetic engineering – read that genetic engineering is destructive of local genetic resources; introd genetic engineering does not help the institutions

Comments from speakers:

Dr Vogel's response: was only stating GM as one aspect that we're being forced to focus on, and we should do precisely the questioners sort of investigation and not simply take GM as a useful tool without being critical

Dr Vogel on outreach: we need to think about how we engage with institutions on how we build capacity to work on projects after the project leaves – avoid the 'parachuting' approach of projects that come in and leave without having put in place mechanisms

Mr Dandaula:
- some studies on landslides have been conducted, but not in a satisfactory way
- there is a human influence (e.g. during last intense rain, people were attributing it to deforestation)
- desperately need good studies
- In Malawi, were instances with intense rainfall & no landslides !
- So trying to get together an interdisciplinary team to look at geology, soils, human activities plus all other aspects → will be able to look at all aspects
- Landslides happening more frequently than before

→ UNDP livelihoods projects was formulated with pilot areas, not after a disaster
- asked the communities what they felt was their greatest vulnerability
- said answers they got was masked; because felt that 'inside the people' they may have been worried about climate & weather (first thing they said was 'we have no food') – if the interviewer had spent longer with them , they would have probably found that climate is a stressor

More questions:
- principle through the three presentations seems to be good knowledge of a local system; essential to understand in V & A → a lot of examples
- favourite one: a European company developed a wave power electricity generator – looked at atlas, found island with major wave generators, took it down there, and asked for permission to put it there – then two months later, generator was taken out by the storm (then asked why there are no trees or buildings there) – must understand local dynamics of a system

Another comment:
- *how do we translate local knowledge ?*

Isabelle Niang-Diop:
- has problems going from national perspective to local implementation, and then from local perspective to national implementation
- is a big problem here
- link between these different levels is really crucial – if don't address it, adaptation strategy will be really difficult

Another question:
- sees a problem in trying to link the sciences and the social aspects
- Maybe part of the problem arose from the very nature of the design for the AIACC program from the beginning
- Doesn't mean that all is lost
- Deliberately need to enhance the socioeconomic sections in our projects, so that the outreach will have a more meaningful effect

- Currently hard science is more present in most of the projects

Pauline Dube:
- her view is that AIACC really does want researchers to move into V & A
- maybe the problem is with the researchers themselves
- herself finds social scientists difficult to deal with (e.g. don't understand the climate change scenarios)

Panellists comments:

- Mohamed Ali:
    - Science language hard for politicians to understand, and vice versa
    - Has tried to say, what this means for your pockets (be explicit in terms of cost and benefit)
    - Bridging scales – same approach – need to make it explicit to the individual & to the policymaker

Mr Dandaula:
- when countries do economic forecasting, not often that climate change is brought into the discussion
- liked the EDRC presentation: on making costs and benefits of adaptation explicit
- Economists tend not to converse with scientists much
- Policymakers often put off by jargon

Dr Vogel:
- many of us struggling with engaging social and physical scientists for a long time
- in HD Program, we still aren't really there
- can we make rules of engagement clear from the beginning in projects so that physical and social scientists can work together
- e.g. Earth System Science Partnership in Global Change – starting to work across programs
- It's a long process

Working across different scales
- really the million dollar questions
- some trials (e.g. aggregate across transects)
- Coleen's concern: how do we bring all of these findings together - how do we find ways to answer some of the questions, so that the next round of AIACC is about pushing forward on very specific boundaries
- We really need to pull the local studies in

Pauline Dube:
- so lets take all the chances to talk that we have !
- the topic we're discussing is right at the cutting point of the workshop

PANEL 2: ADAPTATION OPPORTUNITIES, BARRIERS AND STRATEGIES

Panelists gave brief presentations of their perceptions of adaptation opportunities and barriers, strategies and requirements for effective adaptation, and integration of adaptation into development planning.

Chair: Isabelle Niang-Diopp
Rapporteur: Gina Ziervogel, Stockholm Environment Institute
Panel Members:

- Stephen Mwakifwamba, Center for Energy, Environment, Science and Technology, Tanzania
- Anthony Nyong, University of Jos, Nigeria
- Balgis M.E. Osman, HCENR, Sudan

Remarks of Stephen Mwakifwamba, Center for Energy, Environment, Science and Technology, Tanzania

Possible regional opportunities
Water resources

- international basins
- coastal resources – sea-level rise
- Miombo network
    - Land use of forest
    - Look at what model suggests

Barriers
Capacity of individuals, groups and societies

- their resources
- identify policy areas and specific interventions
- socio-economic conditions of a country
- data availability
- model performance and availability
    - require large amounts of data
    - not working or available
- limited expertise
- institutional framework
    - National action plan took 2 years to get signature

Adaptation strategies

- national sustainable development goals
- poverty reduction programmes
- develop guidelines for adaptation in national and sectoral planning
- portfolio of strategies
- most countries may have :
    - already identified strategies
    - need to be augmented with further understanding of weather and climate at local level
- stakeholder involvement strategy is important and need to determine HOW.

Remarks of Balgis Osman, HCENR, Sudan

Vulnerability to change needs to be understood. Adapting to current risks are often consistent with adapting to future changes

Macro-scale opportunities
UNFCCC – national communications and enabling activities
NAPA – developed to assist least developed countries to identify urgent adaptation needs.
Integration of adaptation with other multilateral agreements, eg. UNFCCD CBD
Governments – under increasing frequency of climate threats

Micro-scale opportunities
Community-based coping strategy documentation
Support community initiatives

Barriers
Macro-scale barriers
Challenges include uncertainties in climate change science
Ascertaining necessary timeframes
Relief dependency
Lack of broad powerful integrated strategies
Divergence between local and global priorities

Micro-scale barriers
Complounding problems of poor/worsening conditions
Lack of community resources
Lack of local institutional capacity and resources

Examples of strategies for macro-scale actions
Link to specific community development objectives
Maintain synergies between international conventions

Examples of micro-scale action
Understand local communities priorities first
Share lessons from successful communities
Channel national resources to local organizations
Explore means for harmonizing adaptation at community level with national policies

Remarks of Anthony Nyong, University of Jos, Nigeria

Will focus on adaptation of the social system – human beings
Research should focus on preparing better intervention rather than on building models and so requires a focus on social aspects.

Adaptive capacity
Africa is like a basket – basket case. We have not bothered to look at adaptive capacity of people we are dealing with.
Can look at two levels:
- individuals' capability – to adjust to changes in climate related events through modification of behavior of individuals

- generic or specific adaptive capacity – eg. Income, land
    - the question is how are those resources used
- therefore how to we assess what is done with resources

Given this, what are the barriers to adaptation?
Resources
Access to resources – social context within which we relate is important, eg. Patrilineal, and so if husband dies wife cannot access resources
Understand social systems – eg. Cattle development and movement – might create conflict so not adaptation but to others they want to respond to climate and so is adaptation.
Therefore need to understand cultural systems.

Example: Nigeria – effort to create adaptive capacity
Position education stations along migration route of pastoralists

Need policies and good governance for adaptation
Government measures success by different measures – eg. Use money to build houses to win votes whereas adaptation might be longer term and so not as immediately visible as beneficial as doesn't always fit political goals.
How do you get local stakeholders to be involved in adaptation decision making?

It is people's behaviour that needs to change for them to adapt – that requires them to understand and want to change.
Example: how to use birth control – communication is not always obvious as can be misinterpreted.

Discussion

Q: Synergies between conventions: how can we really see results?
SM: climate change studies going on but addressed by separate sectors that don't communicate and integrate
BO: Common objectives between plans but no coordination. So synergy could be developed by trying to integrate plans to achieve common objectives.

Q: Coleen Vogel - Is another barrier one of institutional fit? Current conventions don't necessarily dress problems appropriately
AN: 12 institutions that are involved in drought so difficult to coordinate.

Q: Molly Helmuth – UNFCC and NAPAs – they only provide for incremental cost of adaptation with uncertainties considered. Implementation more limited.
Stephen Mwakifwamba: Adaptation funding from GEF maybe?
Philip Weech – NAPAs associated with significant release of funds. But prject cycle needed to be completed before more resources could be channeled towards NAPA projects. First one – Samoa and African county.
IN: Impossible to measure incremental in adaptation. Also remember there is other funding.

Q: Bob Scholes – Do we stereotype who constitutes a stakeholder. Eg. Policy makers vs grassroots people. Who are we leaving out? I work with middle-level government planning

officials who make many decisions. Or those who are now in urban areas but have impact on rural areas. How do we go about understanding who the key stakeholders are?
Balgis Osman: We focused on grassroots because they are most vulnerable, but yes, others are important.
Stephen Mwakifwamba: Yes – include technical and policy. So during conceptual phase must involve technical and then when results include other people to get feedback
Anthony Nyong: southern Africa is different because large proportion in rural areas – so agricultural communities are important. We need to consider urban and rural vulnerability as separate. Urban development is often to the detriment of rural areas.

Q: Tom Downing – Bring out the tension between science-driven vs adaptive capacity agenda on climate change. Role of data. What data reduces the uncertainty in strategic planning? Also a problem in the UK – eg. Privatization of water industry – gave up data for offices
Balgis Osman: Availability and uncertainty is a problem. Different levels can address this problem. International/national can research certain aspects to provide evidence for policy makers.
Stephen Mwakifwamba: Data – when good results of vulnerability then we think we can have good idea of adaptation but are these the results? Yes – reliable data is a problem.
Anthony Nyong: CC is only one factor in vulnerability. We are addressing stressors which determine different levels in vulnerability which can feed into understanding adaptive capacity.

Pauline Dube: Drought relief as quick fix. Certain changes are really strong. Eg. Borehole drilling changes distribution of cattle. But not sure how we can go backwards to look at past successful cases so how do we proceed? Change is OK but we still need to be sensitive when we deal with local knowledge.

AIACC REGIONAL STUDIES IN SOUTHERN AND EASTERN AFRICA

Chair: Shem Wandiga, Kenya Academy of Sciences
Rapporteur: Patrick Mushove

- Bob Scholes (AF04), Adaptation of biodiversity to climate change in southern Africa
- Bruce Hewitson (AF07), Climate scenarios for sub-Saharan Africa.
- Patrick Mushove (AF38), Integrated assessment of the Miombo region.
- Opha Pauline Dube (AF42), Climate Change, Vulnerability and Adaptation Capacity In the Limpopo Basin part of Botswana.
- Jabavu Nkomo (AF47), Evaluation of adaptation measures: benefit-cost analysis.
- Shem Wandiga (AF91)Climate change, malaria and cholera in Lake Victoria region.

Bob Scholes (AF04), Adaptation of biodiverstity to climate change in

- A key question is: just what can be done to protect biodiversity from the likely effects of climate change? Three of the broad approaches that may be used to understand the status of biodiversity at given points in time:
  - Species distribution
  - Biome analysis
  - Species richness analysis

- Project Objectives:
  - Advance the state of the science
  - Quantify adaptation options
  - Develop tools for wider use in adaptation
  - Develop regional capacity and awareness

- Two methodological approaches being applied:
  - Climate impact studies
  - Conservation biology

- Three case study sites:
  - Cape floral kingdom (island geography principle)
  - Succulent karoo (dispersal models)
  - NE lowveld (ecosystem construction models)

Bruce Hewitson (AF07), Climate scenarios for sub-Saharan Africa.

- The spatial resolution scale of most GCMs is too coarse in relation to the normal temporal resolutions used
- African projects need to focus on sensitivity studies, an emphasis most projects have been ignoring up to now
- The project now has at hand sufficient GCM data for downscaling exercises to be tried
- The project has also decided to incorporate changes in vegetation into climate change simulation
- Immediate Future Question:

- Can we put some confidence levels and uncertainty on regional scenarios?

Patrick Mushove (AF38), Integrated assessment of the Miombo region.

- Three broad objectives:
  - Regional capacity building for integrated assessment
  - Case studies on droughts and floods
  - Adaptation strategies

- Progress report:
  - 3 case studies on droughts (Zambia and Zimbabwe, done)
  - Data on droughts and floods in the region, collated
  - Production of NAPA primer at advanced stage
  - National stakeholders' consultative meeting held Jan 2003 (proceedings in press)
  - Established links with National Climate Committees in the 4 AF38 countries

Opha Pauline Dube (AF42), Climate change, vulnerability and adaptation capacity in the Limpopo basin part of Botswana

- Why Limpopo basin? Because most of the main urban center concentrations are in this basin
- Objectives:
  - Assist decision makers and international efforts to address climate change
  - Determine impacts of climate change
  - Establish levels of vulnerability
  - Determine indigenous adaptation capacity
- Three different projects sites along a rainfall gradient
- There exists a general problem of lack of historical data because in a number of sectors data are destroyed after three or four years (lack of storage capacity; no computerization)
- Commercialisation of phane worms can be considered as an adaptation strategy in times of crop failure; but what happens under changed climate since the trees (hosts of the phane caterpillars) will also be affected by climate change?
- A major constraint includes inadequate IT and internet services.

Jabavu Nkomo (AF47), Evaluation of adaptation measures: benefit-cost analysis

There are no rapporteur notes for this presentation. The presentation itself is available on the AIACC website.

Shem Wandiga (AF91), Climate change, malaria and cholerain Lake Victoria region

- In each of the participating countries (Kenya, Tanzania, Uganda) two sites (one upland, and one lowland) were chosen
- With rise in temperature, incidences of malaria are increasing on the uplands
- The temperature of Lake Victoria is now 5^{o} warmer than it was forty years ago

- Besides being a much younger lake (in geological terms), Lake Victoria is so rich in fish species, boasting of more than 500 fish species
- How is climate change going to affect all these characteristics of the Lake, and the people's livelihoods in general?
- It is difficult to factor in the adaptation/resistance capacity of the malaria vectors because insects, generally, become resistant after a short period of time: this will distort an analysis conducted over long temporal horizons.

AIACC REGIONAL STUDIES IN NORTHERN AND WESTERN AFRICA

Chair: Ayman Abou Hadid, Central Laboratory for Agricultural Climate, Egypt
Rapporteur: Anthony Nyong, University of Jos, Nigeria

- Nagmeldin Goutbi and Balgis Osman (AF14), Environmental Strategies for Increasing Human Resilience in Sudan: lessons for Climate Change Adaptation in Northern and Eastern Africa.
- Anthony Nyong (AF92), Rural households and drought in the Sahel: adaptation and effective mitigation strategies
- James O. Adejuwon (AF23), Food security and climate change in sub-Saharan Africa: early findings
- Amadou Gaye (AF20) Assessing global and regional climate change for West Africa
- Rolph Payet (SIS90), The use of indicators in linking science to policy in the context of climate change impacts: perspectives from Seychelles and Comoros
- Ayman Abou Hadid (AF90), Assessment of impact, adaptation and vulnerability in Egypt, Tunisia and Morocco

Nagmeldin Goutbi and Balgis Osman (AF14): Environmental Strategies for Increasing Human Resilience in Sudan: lessons for Climate Change Adaptation in Northern and Eastern Africa.

This is a collaborative effort between Higher Council for Environment and Natural resources, Sudan, and Stockholm Environment Institute, Boston. The goal of the project is to contribute to global efforts to build the resilience of vulnerable communities to climate change. Main objectives include:

- Capacity building to respond to climate change,
- Provide decision makers with current information on sustainable livelihood,
- share lessons for promoting climate change adaptation; and
- contribute to adaptation planning under the UNFCC.

The project has tried to engage stakeholders in the scoping and project preparation phases. It reported that it did not experience major problems in engaging stakeholders. It however admitted that the level of stakeholder engagement was not satisfactory and it has submitted a proposal to AIACC for supplementary funding on an enlarged stakeholder involvement in the project.

Progress so far:
Scoping is completed and project preparation phase is near completed and the case studies are expected to be completed by mid year, 2003

Outstanding work:
Synthesis and publication (to be completed late 2003), and dissemination and communication of research results (1st half of 2004).

The project seeks to contribute to decision making and provide results that may guide decision makers in negotiating Sudan's position on climate change. The project is hosted by HCENR, which is the GEF focal point in Sudan.

James Adejuwon (AF23). Food Security and Climate Change in Sub-Saharan Africa

The focus of the research is to address food security in West Africa in the context of its social, cultural and economic development. Results presented mainly focused on Nigeria where it was found that there exists a high climate variability in the country. There was a general tendency towards aridity in most of the stations studied,

particularly toward the northern parts of Nigeria. In addition, there was also a high inter-annual climate variability in the study region.

The project relied extensively on EPIC crop model for climate impact analysis, and the operational limitations of the model were listed. The major limitation was the non-transferability of the model. There is the need to calibrate the model parameters each time it was to be used in a different location.

The study found that:

1. There is no significant relationship between yield and seasonal weather forecast categories based on total rainfall.
2. Chronic food vulnerability was not determined by climate, but by factors such as pests, diseases and socio-economic problems.
3. That the relationship between climate change and crop production is not linear.

However, the presentation generated a lot of controversy as many people disagreed with the conclusions of the presentation. An issue was raised on the lack of visibility of researchers from Niger, considering that it was a regional project between Nigeria and Niger.

Amadou Gaye (AF20). Assessing Global and Regional Climate Change in West Africa

The presentation began by reminding the audience that West Africa has been experiencing climate change over the last three decades and that the magnitude and pattern of these changes remain uncertain. The main aim of the project is to use outputs of GCMs to derive regional climate models for West Africa as well as build capacity in climate modeling, analysis and processing. The project seeks to develop climate scenarios using climate models, determine whether the changes captured in the scenarios are realistic, provide model outputs to assess potential impacts at regional and national scales.

For the methodology, they first used Magicc-Scengen, inputing socioeconomic and station data and applying regression. They then started running GCM simulations to evaluate mean, and model variability and future changes.

Achievements so far:
The project has carried out capacity building, established linkages with other AIACC projects as well as contribute to National Communications. Work continues on RCM assessments.

Rolph Payet (SIS90). The Use of Indicators in Linking Science to Policy in the Context of Climate Change Impacts: Perspectives from Seychelles and Comoros

The focus of the project is on climate change and tourism on small island states. The project is to be accomplished in phases. The first phase involves project scoping and data gathering. He talked about the relevance of indicators in climate change research and that for indicators to be meaningful, they must be anchored within a generic framework.

A framework CCLIVIA) developed by the project was presented, which incorporates climate change, livelihood, vulnerability, impact, and adaptation. The presentation stressed the relevance of studying the impacts of climate change on tourism. Some of these are that climate change can affect the resources that climate change depend on,

as well as affect the quality of the beaches in these islands. In response, policy needs to implement certain adaptation policies.

The project has already carried out a GIS analysis of the impact of coastal erosion on tourism resources as well as organized a workshop and training session within the project. It was reported that other outputs of the project would be presented by other members of the team in the course of the workshop.

Ayman Abou Hadid (AF90). Assessment of Impact, Adaptation and Vulnerability in Egypt, Tunisia, Morocco and Spain.

The project commenced a few months ago and the report only details what has been done in Egypt and Tunisia. The Morocco program is yet to start. Three case study sites were selected, one per country. Morocco – Settat Province, Tunisia – Central Region, and Egypt – the Nile Delta. Spain acts as a technical collaborator. A socioeconomic outlook of the different countries involved in the project was presented showing the disparities that exist between them.

Regarding the methodology, the project adopts a framework that identifies the driving forces of vulnerability, cycling through current food security, crop production, climate impacts, identification of adaptation options, to evaluation options and future food security.

The models to be used in the project include: Crop models such as DSSAT, irrigation model such as CROPWAT, and GIS for model integration.

Policy issues presented include the need to integrate technology and resource management adaptation. Initial results show a strong correlation between yield and predicted rainfall.

Anthony Nyong (AF92). Rural Households and Drought in the Sahel: Vulnerability and Effective Mitigation Measures.

The project, which is a collaboration between the University of Jos, Nigeria and the Institute of Rural Economy in Mali, which was approved late last year got on a slow start because of logistics problems between Nigeria and Mali. The project aims at examining vulnerable groups in the Sahel and identifying what drives their vulnerability in the face of climate change. It also seeks to develop an impact and adaptation model using a sustainable livelihoods approach.

The presentation tried to justify the need to use a sustainable livelihoods approach, which is a shift from a discipline driven vulnerability assessment to a people-driven vulnerability assessment.

So far, work has started on the Mali and Nigerian ends of the project. The project team has been established and project scoping done. There have been rapid rural reconnaissance surveys where study areas have been identified. Potential stakeholders have also been identified and visited. Reviews of relevant policy documents have been done. Two major participatory rural appraisal workshops will be held in Nigeria and Mali within the month to streamline the themes of the project with stakeholders and begin intensive data collection.

There was an observation regarding the title of the project, whether we should be talking about mitigation measures or adaptation measures. It was agreed that adaptation might be a better formulation.

AIACC Africa Region Workshop
11-13 March 2003

PLENARY SESSION I: OPENING OF THE WORKSHOP

Chair: Bob Scholes

Rapporteur: Jenny Cooper

Neil Leary, Science Director, AIACC. Objectives of the Workshop

- Identify problems & their remedies
- Develop cross-project collaborations
- Share information about research and research methods
- Obtain feedback from colleagues and stakeholders
- Encourage publication of papers
- Lay groundwork for summary and synthesis

Ana Iglesias. AIACC Data, Methods and Synthesis (DMS) activity

Objectives of DMS:

- To produce a toolkit on the website that is used to inform other AIACC participants about methods and data used by different projects and to avoid similar problems.
- Synthesise and communicate information to other researchers and stakeholders.
- Serves as an aid to National Communications.

Sources of information for DMS include:

- Survey sent out in to AIACC participants in November 2002
- CIESIN's catalogue of data sets

It is important to meet frequently with AIACC participants in order to:

- Ensure that each AIACC project is correctly represented;
- Update information;
- Incorporate comments.

Each project will be classified according to the following:

- Country
- Region
- Sectors (like climate, agriculture and ecosystems)
- Groups (like women, commercial farmers, subsistence farmers, etc)

In addition, the approach, models (software tools) and references will be captured and incorporated into this system.

Next steps:
1) Update DMS website:

- Test with AIACC participants
- Facilitate feedbacks/updates
- Improve website (accessibility)

2) Archive Project Data
3) Synthesise Activities.

Question: Will the DMS be linked to other sites?

Answer: Yes, it is in the process of being linked to other sites that may be important in terms of each of the AIACC Projects

Question: Will this be an open website?
Answer: Yes, anyone can access this database. It is also desirable to post primary and secondary data on the website. Each project is strongly encouraged to share information and experiences with others on this website.

Question: What is the anticipated lifespan of this project?
Answer: Until the end of the AIACC Projects and beyond this.

Bruce Hewitson (UCT). CDs of Africa Weather Station Data and GCM Projections

There are two CD's:

- The first includes GCM and a range of other models (e.g. HADCM3); and
- The second station data for Africa.

These CDs are particularly useful to those countries that have limited or no access to internet and/ or lack access to observational data (on climate) in their country.

CD 1: Range of Models
The following information is captured on CD1:

- Data in support of scenario development:
- DDC derived data for Africa
- Basic support documentation
- IPCC Guidelines documentation on use of scenarios.

It is not sufficient to use only GCMs, but rather it is necessary to use multiple models and examine the size of the envelopes. In addition, it is beneficial to obtain observational data from stations to check the realism of the GCM. It should be noted that different models can lead to very different scenarios and answers and hence, it is important when selecting an appropriate model to evaluate which models are outliers and which ones have some consensus (i.e. what is the discrepancy and credibility associated with each).

Models available for use on the CD have the following characteristics:

- They go through to the end of the century;
- Monthly data is recorded in each (from DDC);
- Can access raw data
- Include variables like Surface maximum temperature, precipitation and sea surface temperature, which are useful to examine when evaluating different models

It is necessary to accentuate that local factors affect local climate and thus, it is essential to undertake a sensitivity analysis (e.g. certain areas may be sensitive to desiccation of soil moisture).

CD 2: Station observational data for Africa

- Stations are distributed according to population density;
- Data is available from 1979-2000, however, not all stations have readings for these different periods; and
- Data such as Daily maximum temperature, minimum temperature and precipitation are recorded at these stations.

Note: This CD does not include any high-resolution data sets.

CAROUSEL 1: LINKING AIACC TO POLICY AND STAKEHOLDERS

Chair: Rolph Payet
Facilitators: Tim Downs and Bob Scholes

Following are ideas generated during brainstorming exercise that addressed 3 questions:

1. What should be AIACC's objectives in linking the research to policy and stakeholders?
2. What groups should AIACC link with at international and regional levels?
3. What strategies should be used to establish links?

Carousel Q 1 Rapporteur - Tim Downs

Q 1 What should be AIACC's objectives in linking the research work to policy and stakeholders?

1. Create active and sustainable interaction/communication bridges between policy makers (local, state, federal, regional) and AIACC Researchers.
2. Researchers should understand existing policy frameworks – in different sectors and across sectors - and what factors influence them, so that they can operate within them and contribute constructively to them (e.g. by identifying viable adaptation strategies, priority sources of vulnerability).
3. Researchers should be encouraged strongly to view climate-derived vulnerability as one of many potential sources of vulnerability (ecological, socio-political, economic), and seek to prioritize those sources where possible so that interventions can be cost-effective.
4. Actively tie AIACC research work in to relevant national policies like Economic Development Plans, Strategic Action Plans, NAPAs, National Communication Plans.
5. Create tools/forums for appropriate and intelligent stakeholder consultation and participation that recognize different techniques/forums are needed for different cultural contexts, different themes, and different stages in Vulnerability/Adaptation projects.
6. Identify policy objectives and policy-relevant research questions that can guide the science in a strategic way (e.g. by understanding the information needs of policy makers).
7. Translate AIACC results into formats that can be understood and acted upon by policy makers (e.g. in the form of GIS maps showing disease patterns)
8. Strengthen the linkage (conceptual and operational) between V/A project stages: i) analysis of vulnerabilities (focus of AIACC Phase I); ii) planning and analysis of adaptation strategies/interventions; iii) implementation of interventions; iv) performance monitoring and adaptive response to new information and changing conditions.
9. Promote AIACC at top levels of government in different sectors (health, environment, agriculture, energy etc.) and identify government supporters/champions.
10. Give policy makers decision tools and guidance documentation that will enhance their application of, and interpretation of, AIACC results. This may include capacity strengthening activities such as workshops and on-line tutorials.
11. Highlight the benefits of AIACC work for policy makers, being mindful of realistic expectations and needs. Be able to say: "AIACC result 'X' satisfies your policy priority 'Y' in this way".
12. Exploit opportunities to raise awareness of policy makers.

13. Exploit economies of scale between sites, communities, adaptation strategies that will make the expansion of policies beyond the pilot scale attractive and strategic.
14. Identify the data needs and information gaps of policy makers.
15. Actively listen to policy makers concerns and priorities, and respond to them in a meaningful way during the AIACC Research Project.
16. Understand fully the capacity strengthening needs of different stakeholders – especially vulnerable people and policy makers – that will support and sustain interventions that reduce vulnerability (either by mitigating risks and/or increasing adaptation).

Carousel Q 2 Rapporteur - Tim Downs
2. What groups should AIACC link with at international and regional levels?

International:
· Multilaterals (WMO, FAO, WB, IPCC, UNDP, GEF)
· NGOs (WWF, IUCN, Save the Children, Greenpeace)
· MEA Secretariats

Regional:
· Drought monitoring centers
· SADC
· EAC (East African Community)
· AU (African Unity)

Research Communities
· Seasonal forecasting community
· African monsoon monitoring agency
· CLIVAR

Carousel Q 3 Rapporteur – Bob Scholes
3. What strategies should be used to establish links?

Key Questions:
· What is the time frame ?
· What is the budget available?

Strategies:
· Collaborative 2-way information-sharing process
· Partnerships
· Funded activities
· Reconnaissance
· High-level personal contacts, or through governments (on a case-by-case basis)
· AIACC-Regional Institution Forum
· Invitations to regional meetings
· Special Issue on major results (disseminated to desired institutions)
· Newsletter and annual report distribution

Project stage			
Planning	**Execution**	**Reporting**	**Continuation**
Objective: Coordination	*Skills, information, attention*	*Communication, Impact,*	*Sustain and grow capacity*

Research community -direct contact -partnerships -networks -websites -coordinators	-joint working groups -secondments -studentships -conferences and meetings	-peer-reviewed papers -AIACC alumni serve on IPCC, STAP etc	-curricula -archival data -network of partners
LICY COMMUNITY -involve in planning -face-to-face meeting	-regular feedback by personal contact	-summaries for policy makers	
VIL SOCIETY -workshop -letter	-inform and educate using newsletters and forums	-media (TV, radio, print) -use NGO network -outreach forums	
NDING AGENCIES			-new proposals -commercialisation

Research community: universities, regional and national research centres (ACMAD), north and south
Policy community: key civil servants (eg UNFCCC contact point) and politicians, official delegates to UN bodies and conventions, regional bodies (NePAD, AU, SADC, OMVG etc).
Civil society: NGOs, CBOs, private sector, general public
Funding agencies: US-NSF, EU, GEF, Development Banks, national science councils

CAROUSEL 2: PLANNING FOR AIACC SUMMARY AND SYNTHESIS

Chair: Neil Leary
Facilitators: Gina Ziervogel, Sara Beresford, Patrick Mushove
Rapporteur: Gina Ziervogel

Following are ideas generated during brainstorming exercise that addressed 3 questions:

1. What common questions might each AIACC project address that could serve as a framework for synthesizing cross-project analyses?
2. What outputs should AIACC plan for to summarize and synthesize our work?
3. How do we organize ourselves and what steps should be taken to produce summary and synthesis outputs?

Q1. What common questions might each AIACC project address that could serve as a framework for synthesizing cross-project analyses?

Methods

- Comparison of climate and socioeconomic scenario methods and scenarios used by AIACC projects
  - Commonalities, differences
  - Evaluate methods
- Comparison of adaptation strategies, measures
  - Commonalities/differences across sectors, regions, spatial scales
  - Are there strategies, measures that are robust across sectors, countries, regions, time scales?
  - Factors that contribute to or detract from effectiveness, success
  - Costs, benefits of adaptation measures
  - Guidance for "best practices" for adaptation planning
  - Early warning systems – determinants of effectiveness, benefits, costs
- How determine, measure costs and benefits of adaptation?
- What approaches were used to engage stakeholders?
  - What stakeholder groups were engaged? Criteria for selecting?
  - Effectiveness? How measured?
- What are the determinants of adaptive capacity?
  - Of households, communities, institutions, social groups
  - Compare levels of adaptive capacity
  - How measure adaptive capacity?
- What methods are transferable from one region/sector/case to others?
- Were previously existing or new methods used?
  - If new, compare to previous methods, evaluate contribution to advancing research
  - If already existing, evaluate what lessons/insights gained from these new applications
- Comparison of vulnerability oriented approaches with impacts oriented approaches
  - Advantages, disadvantages
  - Differences, commonalities, synergies, conflicts
  - Role of climate scenarios

Climate input

- How sensitive are different systems/sectors to climate?
  - What other factors are important?
  - How do they interact with climate? Relative importance?

- What determines degree of sensitivity to climate?

Proxies
- To what extent is past experience coping with climate variability and extremes applicable to planning for adaptation to future climate change?
  - How evaluate the transferability of knowledge in one area to the other?
  - Under what conditions is past experience applicable to adaptation to future climate change?

Local input
- To what extent should local knowledge assist scientists? How? How validate?
- What are the determinants of vulnerability?
  - Case specific? Universal?
- Who are most vulnerable?
- What are local perceptions/classifications of climate related disasters?
  - How do they compare with those of scientists?

AIACC process
- How effective was AIACC in achieving its objectives?
  - Advancing science
  - Building capacity
    - For scientific research
    - For using science in decision making
    - Networks of researchers, stakeholders
  - Contributing to national communications
  - Engaging stakeholders
  - Communicating information to different audiences
    - Communicating uncertainties
    - Communicating what is known with "confidence"
  - What worked, what failed?
- Lessons for engaging scientists from different disciplines (meteorology, geography, agronomy, rural sociology, economics, ecology, engineering, public health, . . .)
- At what scales did AIACC projects work? Can the approaches be scaled up or down?

Q2. What outputs should AIACC plan for to summarize or synthesize our work?

Documents/reports
- Methodologies used by AIACC studies
- Engagement of stakeholders (who? Why? How? How successful?)
- Characterizing different regions
- Characterizing different sectors/systems
  - Vulnerabilities, adaptive capacities, adaptation options
- Adaptation strategies
- Document on lessons learned for bridging natural and social sciences

Refereed publications
- Special journal issues
- Synthesis journal article on AIACC process
- Book
- Peer reviewed journal articles

Network
- Network of researchers
  - National and regional

    - Link with other programs (e.g. UN disaster programme
    - Focus on education and community
- Extend AIACC community
    - Aiacc list-serve
    - DMS website
    - Newsletter
    - Participation in workshops, events
    - Distribute working papers
- Availability of material
    - Website – build upon the DMS effort
    - Powerpoint presentations – available on web
- Collaboration with similar projects in the region or internationally

Education
- Educational products, e.g. for schools
- Mass media, outreach materials – TV documentary, radio, newspapers, flyers
    - Video (or slides) to illustrate examples of vulnerability and resilience
- Training materials/curricula
    - For local community
    - For schools
    - For mid-level resource managers, technical experts
    - For researchers
- Workshop with researchers and policymakers
    - Local level
    - National, with national heads of state
- Art or drama
- Year of "climate resilience" – feed into UN mandate

Policy
- Policy guidelines for adaptation strategies (for National Communications)

Databases

Q3. How do we organize ourselves and what steps need to be taken to produce summary and synthesis outputs?

- Rank the possible outputs
    - Importance
    - Feasible with current resources; feasible with new resources
- Classify projects
    - Sectors/systems
    - Socioeconomic groups
    - Regions
    - Disciplines
    - Methods
    - How do these map into the different outputs to be produced?
- Develop synthesis plan
    - Decide what outputs to be produced
    - Time line
    - Process to assure individual projects produce and report information needed for the synthesis outputs
        - Minimum set of outputs requested of all projects?
    - Develop synthesis teams
    - Use a closed website to share draft synthesis products
        - Note: was suggested that AIACC working paper series be put on a closed website. Alt: post abstract on open website with

information to contact the author to obtain a copy and invitation to provide comment.

- Synthesis team(s)
  - Different team for each output?
    - Drawn from project investigators
    - Include some external persons?
    - Overall coordination

CAROUSEL 3: BUILDING UPON AIACC, A 2ND PHASE OF CAPACITY BUILDING

Chair: Tom Downing
Rapporteurs: Mike Rutherford and Emma Archer

Gaps and future research

Conceptual
- Development of the more conceptual frameworks for the social context of the AIACC project.

Data and methods
- Review of final outcomes of Phase I
- Databasing, new data procurement, review of tools.

Results

New research
- Review of final outcomes of Phase I including potential transfer of solutions to other similar spatial areas, especially lessons learnt regarding adaptation.
- Identify "new" vulnerable areas based on environmental stress, population characteristics, socio-economic status and adaptive capacity.
- Re-runs using Hewitson regional climate scenarios available at end of first phase of AIACC.
- Compile compendium of adaptation strategies from Phase I.
- Identify new priority sectors eg biodiversity and ecosystem services

Capacity building/ expertise development

- Funding for implementation including feedback on institutionalized funding barriers to funders and "fundees".
- Institutional collaboration (eg in information technology)
- Training in existing software and IT systems
- Evaluation measures for AIACC? How do we know if Phase I (or II) is successful? Identify specific goals to be attained.

Communication/awareness/consultation

Objective:
Internal: dialogue across disciplines (towards a common language)

External:
Communities
Stakeholders
Policy-makers ('senior management')

AIACC successes
Internal:
AIACC workshops very successful
- Opp to interact, share methods, terminology & see similar scenarios elsewhere

Communication about tools & methods
- E.g. DMS

External:
Botswana: stakeholder workshop
Sudan: successful communication on # of levels

- Worked with range of stakeholders
- Discovering indigenous adaptation strategies
- A 2-way dialogue
- Essential to build a sense of trust (e.g. with communities)

AIACC Challenges

Internet access
- Huge challenge

Local dissemination

Flow top → bottom
- (within projects & more generally)

Flexibility of implementing a particular methodology

Essential to document & communicate successes & failures of different methods

New Initiatives to support communication/awareness/ consultation

1. *Tools database*
   - Including as much detail as possible including what didn't work
   - List assumptions on which each model/method is based
2. *Inventory existing country capacity*
3. *Alternatives to the internet*
   - Newsletters, Brochures, Telephone/radio networks (e.g. RANET)
   - What can we learn from institutions with experience in regions/countries without internet access
4. *Small funds set aside specifically for stakeholder workshops (& feedback)*
5. *Support mediation/conflict resolution (where nec.)*
6. *Work with 'non-traditional' partners*
   - Can be very helpful in building trust and in local information dissemination
   - Local institutions, e.g. NGOs (Sudan), church groups, extension officers, women's craft groups, farmers associations, TAs

SESSION A1: CLIMATE DATA, TRENDS AND SCENARIOS

Chair: Bruce Hewitson
Rapporteur: Barend Erasmus

Speaker: Greg Jenkins AF20 GCM scenarios for regional studies over west africa

Presentation:
Only one GCM was used, with a view to identify and interpret model biases for the West African region. The chosen GCM enjoys strong support from NCAR, giving access to technical and management support.

Africa is highly vulnerable to climate change and understanding the potential errors in GCM predictions is important.

Global predictions show an increase for precipitation for Sahel region.
However, observed data shows a decrease.

When interpreting GCM outputs for West Africa, additional sources of climate variation such as climate zonal winds, meridional temperature gradient, African Eastern Jet wind, African Easterly waves and land use changes, need to be recognized.

The above factors constitute climate linkages between the Azores, Europe and North Africa, which, together with land use change, means that the Sahel is more likely to experience decreased precipitation than an increase, as predicted by GCMs.

In summary, 21st century warming in West Africa is uncertain due to competing factors of warm advection from Europe and land use change in West Africa.

Questions and Responses:
1. What about years in which Europe cools historically? Such trends exist, and are being investigated. There is a corresponding pattern in Sahel warming cycles, but model predictions for these events are more frequent than the observed pattern. However, observation data also has quality constraints.

2. Collaboration between groups doing similar work should be encouraged, especially in African context.

Speaker: Mark Tadross (AF07) How well do GCMs simulate present climate?
Presentation:
Results from 3 GCMs (ECHAM, CSIRO and HADCM3) presented.

Study aims to highlight the need to know of biases in GCMs

GCMs at different resolutions; this has bearing on interpretations. CSIRO 5deg, other 2 2.5 by 2.5. Also different time periods.

Various disagreements and agreements between variables for different time slices

In summary:
Any GCM data for climate change assessment should be validated over region of interest, since different biases over exist over different regions and seasons. Temporal and spatial biases should be understood and accounted for where necessary.

Single pixel values should be avoided and pixel aggregations at the skill level of the GCM used.

Questions and Reponses:
1. Meteorological variables expressed from GCMs should make sense to end users; they cannot interpret 700hPa height – they need precipitation values. Variables used in this presentation were intended as mechanisms for model comparison and have prognostic value, they were not intended for immediate use by end user.

2. If the "take home message" is: all models are rotten, but over some regions they perform well; then why not use these regions and piece the output together? Such an approach would not be methodologically sound since simulations are not done in isolation, and the climate systems involved are complex and integrated.

3. Use one GCM, understand it well and identify biases, and translate that to end users, so that end users have appreciation of the level of error propagation

4. Climate modelers should be informed as to the level of model error that is acceptable for a particular application. Whether this data is used, is an end user decision. However, the end user should be responsible for testing the sensitivity of his/her application to the variation in the climate data

General discussion:

Issues arising:
1. Who validates the climate models?
The climate expert make a decision, and regional PI's use that but the final responsibility for the data used lies with the PI. PI's should state clearly what level of error is acceptable, and validate (ie sensitivity analyses) in that context.

2. Translate model uncertainty (scale, time) to stakeholders.
There is a need for more info about GCMs and climate mechanisms to empower participants to express their needs in ways that climate modelers understand. Not all users understand/have access to the same data and arising discrepancies are confusing.

3. AIACC need to inventory project needs
RCM outputs might be more applicable due their finer scale. However, RCM not that easy, even with a perfect GCM, you might not capture local scale variability.
Provide data at user level needs: what can you say about precipitations/temp/relevant variables at the level of individual projects ie for regional planning (Sahel) it might be sufficient to know that summer is earlier and less rain is expected whereas for water supply planning monthly data is needed.
Level of data detail and certainty dependent on application
Project teams need to take responsibility for the scenarios/approaches/data that they need for their individual projects.

Action items from general discussion:
1. A common validation document for African GCM's
2. State confidence on existing data products
3. Assess project cluster data needs - similar projects (ie food security) might have similar data needs (input from Ana Iglesias on existing info in this regard on website data base)
4. Developing producer-user partnerships, beyond AIACC horison.
5. Presentations from individual projects on how they intend to use what scale climate data.

SESSION A2: SOCIOECONOMIC AND ENVIRONMENTAL DATA, TRENDS AND SCENARIOS

Chair: J.C. Nkomo
Rapporteur: Molly Helmuth

Speaker: Pius Yanda (AF91). Socioeconomic characteristics of malaria and cholera in the Lake Victoria region.

Presentation is based upon the AIACC project "Capacity Building to Evaluate and Adapt to Climate Change Induced Vulnerability to Malaria and Cholera in the Lake Victoria Region" (AF91), PI Shem O. Wandiga, Kenyan National Academy of Sciences.

Socio-economic focus
Participatory approach in two villages, representative stakeholders
Get data on:
What local adaptation options are taken?
What are the conditions indicating when an outbreak may occur?
What time of the year are they most at risk?
Is the incidence of malaria and cholera increasing?
What are the health facilities?
What quality and to what extent is water available?

3 types of classes identified in each village dependent upon resources, education level, etc.

Both drought and high rains seem to indicate malaria.
Drought→ shortage of food, followed by rains → ruining crops and having breeding grounds.

Highest malaria incidence found in infants, women (esp. pregnant), and elderly

Adaptation against malaria:
Bednets, often chemically treated
medication
traditional methods, local herbs

Cholera outbreaks:
Not using toilets
Mango season—waste spread all over, bacteria abound
1983 brought from neighboring village
1997/98 El Nino rains

Action points:

1. Update/test questionnaires in order to gain information on who is most vulnerable, who may need more help.
2. Which strategies need to be enhanced
3. Need to compare different villages, and their respective responses to cholera/malaria threat. Enrich information
4. How to integrate socio-economic information into models? (As well as use this information as validation of the models).
5. Recommendations from this study may be able to be used by policymakers.
6. Linking climate and socio-economic factors to cholera and malaria incidence.

7. Verification of perceived causes (from participatory approach) with scientific data/information (if it is available).

Speaker: Wills Agricole (SIS90). Constraints and problems in generating climate scenarios over Seychelles and Comoros

Small Islands in Caribbean

1. Action new MAGICC/SCENGEN at higher spatial resolution, with more climate variables
2. Run RCM PRECIS model. Higher resolution, less memory and processor needs, provides a more accurate simulation of observed rainfall data. Problem with land/sea mass. (limited area models driven at the boundaries by GCMs, 25-50 km resolution).

SESSION B1: CLIMATE SENSITIVITIES AND IMPACTS – AGRIGULTURE, LAND COVER AND LAND-USE

Chair: James Adejuwon
Rapporteur: Yetunde Odeyemi

Speaker: Mike Rutherford (AF04), "Dynamic migration modeling: developing a new tool for AIACC biodiversity projections"

The AF04 project group has been looking at developing a set of tools for predicting species dispersal by considering the different challenges to dispersal and migration of plant species in South Africa specifically. Two types of diffusion models have been considered, by the AF04, the Landscape Modelling Shell (LAMOS) and the Migrate model, with lots of concentration on the LAMOS. This is because the LAMOS is considered a modular program designed to explore the role of different processes in the dynamics of landscapes with minimum programming. LAMOS could be used with single plant species or species with similar behavior, but for specific species it has to be a parameterization. It is also not able to work for areas with extreme climate conditions such as the Artic and Antarctic regions.

Speaker: Abdoulaye Sarr (AF20), "Climate Sensitivity and Impact on Agriculture in the Sahel"

The aim of this project is to identify the impacts of atmospheric circulation on agriculture in the Sahel region of West Africa. Efforts by the project group has been on measuring the impacts of climate change on agriculture in the Sahel, identifying and demarcating climate disturbances spells as they vary between the western and eastern, northern and Guinean sections of the Sahel in West Africa. Anomalies so far identified are in the areas of pressure, temperature and geo-potential heights. The AF20 project group has discovered that changes in climate factors especially rainfall affects groundnut production in the year 2002.

Action Items:

It is hoped that AIACC would help develop validation of the LAMOS model through the use of past climate variability records which though is being worked upon by individual groups has not been fruitful. The model currently allows for identification of migration induced by climate change, but human interferences to plant migration has not been built into the model. This is suggested as a challenge to AIACC.

LAMOS deals with life and death issues, that is, would a plant be able to move on due to certain changes or does it die off completely as a result of not being to cope, with little efforts on the probability of plants adapting to the change induced by climate. A further future major leap will be to develop a number of features to make migration model user friendly.

The AF20 project group has had problems with GCMs capturing wet and dry years effectively and in the near future it will be using the RCMs.
The acceptance of predictions of climate/weather situations by country governments individually and on a regionally will depend on the way AIACC communicates its results. AIACC needs to distil the result of the AF20 project and those of other related projects working on other factors that affect plant production so as to reflect a total picture of factors influencing plant productivity.

SESSION B2: CLIMATE SENSTIVITIES AND IMPACTS – WATER

Chair: Amadou Gaye
Rapporteur: Andre Kamga

Speaker: B.P. Parida (AF42), Likely effect of climate change on runoff in the Limpopo basin-Botswana

The presentation shed some lights on the importance of the Limpopo basin for the SADC region. As the major source of water, the basin supports four dams with a capacity of 350 M m3 in Botswana. The projected increase of temperature over the region (IPPCC reports) will leads to reduction in rainfall and runoff. The objective of the project (AF42) is to find out the percentage change of runoff and trends during the next decades because new strategies for water management may rely upon a knowledge of possible change scenarios. The artificial neural network approach with evaporation, rainfall, soil moisture holding capacity as input parameters will be used in the runoff model. The network is trained with observed monthly climate data to produce observed runoff during the training period. These neural network outputs could be compared with GCM/RCMs scenarios driven runoff models.

Speaker: Francis Mutua (AF91), Factoring climate change in hydrological modeling

The speaker discussed evidences demonstrating the importance of water and links to human health problems such as malaria and cholera. A focus of the project (AF91) is to develop techniques for better water management considering climate scenarios for the future. GHGs influence climate parameters that drive the hydrological cycle. Uncertainties in GHGs concentrations and GCM/RCMs outputs make synthetic and analog scenarios a solution of opportunity.

Many hydrological models are driven by analog and synthetic climate change scenarios. The AF91 is among the projects that could benefit from scenarios provided by other AIACC projects. Minimum/maximum temperature and rainfall at daily timescale from GCM/RCMs groups are requested for the AF91 project. Climate, land use change and socioeconomic scenarios are the basic inputs to the statistical hydrologic model. Runoff, soil moisture, surface water and storage anomalies are outputs that could be used to drive malaria and cholera incidence forecasting systems.

However, small islands states may not be able to use this model because some intrinsic parameters cannot be modified. However, a free model (ACRU) is being developed and can be adapted to the characteristics of small islands states. Exchanges of products, methodologies and students could facilitate comparisons and inter-comparisons of models outputs related to diseases incidence and water management parameters. In Kenya, extensive studies have been completed on water related disasters and management strategies, reports could be made available.

Discussion

A close collaboration between countries to protect and share water resources efficiently was recommended during the session and considered as one adaptation strategy to future climate change impact. Future actions following AIACC to develop contacts and facilitate the use of AIACC products were suggested. Additional recommendations included:

- investigators commitment to make AIACC products feed in national communications.
- Demonstrations and pilot experiments by advanced research groups for the interest of countries within their region of investigation.
- Design of proposals for adaptation for most vulnerable groups with detailed budget requirements as well as implementation strategies are expected by the UNFCC secretariat in the coming national communications.
- Capacity building for adaptation to be integrated in adaptation strategies.

SESSION B3: CLIMATE SENSITIVITIES AND IMPACTS – HUMAN SETTLEMENTS

Chair: Abou Berthe
Rapporteur:

Speaker: Andrew Githeko (AF91). A retrospective assessment of vulnerability and impacts of malaria and cholera epidemics in the East African highlands and the Lake Victoria Basin.

No rapporteur notes are available for this session. The presentation by Dr. Githeko can be found on the AIACC website.

SESSION C1: VULNERABILITY AND ADAPTIVE CAPACITY – AGRICULTURE, LAND COVER AND LAND USE

Chair: Opha Pauline Dube
Rapporteur: Mark Tadross

First speaker : Akin Farinde (AF23). Institutional strategies for the enhancement of resilience in the Nigerian agricultural sector

Institutional stakeholders with role in implementing strategies to enhance resilience include government at all levels, non-governmental organizations, farmer unions/organizations, international agencies, educational institutions, and extension institutions.

Resilience in agriculture is capability to resist changes that may adversely affect food production, food security and human security.

Strategies to enhance resilience include

- Promotion of sustainable Agriculture
  - Soil conservation, pest & disease management, improved seed varieties, efficient farm management techniques
- Extension Education.
  - Approaches to extension work in Nigeria includes commodity-based extension, innovation, education, integrated rural development
- Promotion of crop of relative advantage.
  - Identify and promote crops that are suited to particular ecological zones
- Provision of storage facilities.
- Strategic grain reserve.
- Credit facilities for farmers
  - Micro-credit institutions, agricultural cooperative and rural development bank, State agricultural credit cooperation
- Development of rural infrastructure.
  - Road networks, health facilities, primary education, rural water supply, rural electricity

2nd Speaker: Patrick Mushove (AF38), Assessment of drought impacts: results of a dialogue with stakeholders

Research issues addressed include

- On farm management practices under changed climate
- Appropriate crop varieties and livestock breeds under changed climate

Have conducted a case-study in Zambia. Semi-structured questionnaires and informal interviews conducted in the districts of Ndola, Choma and Buhera. Agriculture in these districts is mostly subsistence. Farmers recollections and perceptions of rainfall and drought events elicited and compared to meteorological data.

Farmers estimate that drought frequency has increased, from 1 in 5-10 years to 1 in 5 years. Length of the agricultural season perceived to have shrunk. Farmers attribute the changes to climate variability and not climate change. Drought is not perceived in meteorological terms by farmers. Drought is when crops fail (agricultural drought).

Problems encountered in the research

- Bureacratic difficulties in gaining access to production data for rural farmers. To resolve this need to strengthen engagement with appropriate stakeholders.
- Lack of reliable meteorological data at local scale. Need to promote establishment of low cost rainfall stations and improve farm records.

Small scale, poor farmers are more vulnerable to droughts than wealthier, large scale farmers. Characteristics of poor farms that make them particularly vulnerable include large household size, small fields, less than 4 head of cattle, no plough, located in harsh agricultural zone, few assets to cope with drought – depend on handouts.

Adaptation options include

- soft loans depending on rainfall pattern
- irrigaion schemes
- plant in dambos
- short rotation crop varieties
- family gardens
- improve post-harvest processing and storage technology
- migration

Discussion on vulnerabilities and adaptation strategies:

- Less disasters in nigeria (higher food security)
- More arid areas have higher variability and more vulnerable
- Solutions (patrick): more soft loans i.e. ones that can roll over from year to year
- Dispersal of loans can be improved
- What about livestock ? wildlife management and resources ploughed back to community (botswana)
- How do you get the money to those that need it ?
- How do political influences come into play ?
- What is the correct definition of drought.
- Future seasonal forecasting of sub-seasonal attributes for agriculture
- What are the social stresses ?
- Social providers e.g. water/sanitation must be in place to provide cover.
- What about role of the international community ? Even when climate is OK people expect assistance.
- Educate people to change their attitudes.
- Noted that in nigerian crop production there is a lot of resilience to climate variability.

Action points: Empowering people to be adaptable

1) Modelling and methods: haven't spoken about it that much.
   - Suite of models for agriculture from US country study
   - Network with Ana Iglesias & release country studies e.g. Zimbabwe
   - Review national communication and see if anything in documents
   - Issues of assessing were discussed at Trieste & material is on the website
   - Build on experience of groups who are already working in his area. E.g. north africa project along the nile.
   - Do the research questions drive the methods or the methods drive the research questions ?
   - Some concern regarding the notion of modelling - what should be modelled ?

- Definite emphasis needed on getting groups to share their different kinds of modelling experience with each other.
- Discussion about LUCC. Would like there to be a LUCC tutorial e.g. with paul desanker.
- Some general points: main challenge is adaptive capacity e.g. using technology and getting funding from international donors but not to become dependent on foreign technology. Building capacity at the individual level e.g. education

2) Make country studies more specific. E.g. costing of adaption (one concern is that there is sometimes tension between culture and certain kinds of adaption)

3) Build understanding of climate change and variability amongst farmers and planners
   e.g. W Africa - very good programs on communication to farmers + note UNEP handbook on adaption.
   Build climate training into educational curriculum.
   Teach water conservation strategies at range of scales (household through to international transboundaries). E.g. malawi: lining granary with plastic for water storage, challenges of internationally shared watersheds.
   Fire management strategies (in light of fact that fire incidence under climate change may be up) e.g. malawi concerns about smoke and precipitation over the lake (water quality issues); make southern africa fire network more wideranging and implementable

4) Adaption strategies in country vulnerability and assessment studies should be more action oriented
   People presented the strategies and then they were shelved and not implemented.

Session C2: Cancelled.

SESSION C3: VULNERABILITY AND ADAPTIVE CAPACITY – HUMAN SETTLEMENTS

Chair: Gina Ziervogel
Rapporteur: Balgis Osman Elasha

1st Speaker: Anthony Nyong (AF92). The way we live: livelihood structures in the Sahel

Research questions:
- What are the various livelihood systems of the rural people of the Sahel?
- Who can achieve a sustainable livelihood, and who cannot in the face of climate change?
- What resources, institutions and strategies are important for enabling the options open to the rural poor in the Sahel to adapt to climate change?
- What practical, operational and policy implications stem from adopting this approach?

Livelihoods perspective encourages a broader understanding of factors, institutions and processes that can explain the differing success with which rural households make a living.

Methods of the study:
- Rapid rural reconnaissance to identify livelihood systems and stakeholders.
- Participatory rural workshops and data collection
- Scenario and model development
- Evaluation of adaptation strategies

Rural livelihood structures in the Sahel are heavily reliant on the natural resource base: agriculture, wildlife, fuelwood etc.

Agriculture: arable farming, both rain fed and irrigated/Fadama; pastoralism, both commercial and domestic; fishing
Non-agriculture: handicrafts, small scale manufacturing

Anticipated problems
- Choosing what livelihood systems to include
- Selecting scale of analysis
- Integrating local knowledge with scientific knowledge
- Coordinating project across two countries with different cultures, languages – Nigeria and Mali

Expected outputs
- Definition and characterization of drought impacts from community perspective
- Identify determinants of vulnerability
- Evaluations of adaptation strategies

2nd Speaker: Bill Dougherty (AF14). Community scale adaptation assessment fieldwork methods

Project background
- Focus on urgent adaptation needs of most vulnerable groups
- Increase coping capacity by looking to sustainable livelihood and natural resource management measures currently being used to cope with drought
- Will document cases of effective community resilience building, evaluate for lessons to apply more broadly

Will undertake 3 or 4 case studies in communities with successful sustainable livelihood projects. Evaluate if/how these projects built resilience, capacity. With what effect?

Policy process analysis: what factors enabled success? How can these be built upon?

Initial site visits made to get community trust, interest and support for the project; confirm success of SL activities from community perspective; scope and schedule fieldwork; identify key stakeholders and informants.

Samples of the type of data to be collected presented.

SESSION D1: ADAPTATION STRATEGIES AND EVALUATION -- AGRICULTURE, LAND COVER AND USE

Chair: Graham von Maltitz
Rapporteur: Emma Archer

Speaker: Chinyere Adeyemi (AF23). Breeding improved crop varieties for adaptation: effects and breakthrough in Nigeria

- under-nutrition a major concern of medical specialists, nutritionists, agriculturist & demographers, @ local & international levels in Nigeria
- One solution – breeding improved crop varieties
- Challenge to produce very hi yielding varieties with hi nutritive values, and resistant to diseases, pests & other env hazards

Exploring the efforts of breeders to improve crop varieties & their breakthroughs & successes + objectives & hindrances in achieving these goals

Involved with IITA & IAR & T for *development* of improved seeds of grain crops (primary institutions responsible)

Inst responsible for *distrib* of improved seeds include IAR & T, National Seed Services, Government Seed Production Company, State Agricultural Development Production

Major crops of interest: maize, sorghum, millet, rice, beans, cassava and yam

Concentrates today on maize & rice

Crop improvement activities include:
- id of the pool of genetic variab within each crop (can be a wide variety)
- id of agronomic characteristics
- manipulation of useful agronomic characters to produce improved cultivars
- Field evaluation of the cultivars for further improvement
- Production of improved seeds and release to the farmers

Breeding Scope
1. High yielding
2. resistance to single/multiple diseases/pest
3. tolerance to acid soils, drought, low soil nutrient level
4. hi nutrient and protein fortification (e.g. in rural areas, where people have to supplement their nutrition)
5. various combinations of the above

Results (releases in maize & rice)

<u>A. Maize releases</u>
Wide variety – ES, ES2, NS, Bulk 3, H503 etc
(some of the letters reflect the diseases to which they are resistant)
TZPB (resistant to light)

Improvements over time as technologies evolve
In some cases farmers rejected the seeds, so breeders went ahead and improved them
Improved diseases characteristics, etc; stress tolerance

B. Rice releases

Some breakthroughs
1. DTPMFe+ with following properties: heavy tillering, low grains, earliness 90 – 110 days, dwarfness, heavy panicle/hi yielding, tolerance of low iron in the soil)

2. 'New Rice for Africa'/NERICA → with following properties: weed competitiveness, early maturity (90 – 100 days), drought tolerance, resistance to gall midge, resistance to rice yellow mottled virus (RYMV), resistance to blast disease, taste aroma and other grain qualities accepted by the farmer, non-shattering grains, responsive to mineral fertilization, higher protein content, non-shattering grains

Other releases:

e.g. rice varieties for rainfed upland & irrigated lowland (some early maturing, some late maturing) (characteristics classed as Duration, Yield t/ha, Iron toxicity, RYMV);

Problems confronting breeding of improved crop varieties in Nigeria

- right technology
- level of devt of biotechnology in Nigeria
- dearth of base-line info on potentials and reproductive biology of crops and their wide relatives
- lack of understanding of type, form of diseases and pests, dearth of info on mode of gene action conditioning
- inadequate to complete lack of funds and infrastructure
- unstable and unfavorable govt policies

Recommendations

1. urgent need for multidisc approach from scientists (breeders, geneticists, entomologist, pathologists, biochemists, weed scientists, etc) in national & international research programs to co-operate in the exchange of ideals and materials
2. should be conscious efforts by all stakeholders to avoid and prevent the genetic erosion of Nigeria's rich biodiversity (they do have a genetic bank)
3. more base-line studies on the wild relatives of the crops should be encouraged & funded
4. regular training of professional breeders, biotechnologists, molecular biologists etc to face greater challenges of new millennium (no real training programs at the national level)
5. proper tech transfer to enhance breeding

Conclusion

Utilizing highly variable & diverse genotypes has enhanced devt of better performing adapted lines & varieties – has boosted food production

Could be made less time-consuming and more productive by better funds and other recommendations as per above

Action Item – link to AIACC's emphasis on building research capacity here ?

Questions:

Qu: In planning for expansion of new breeds, are they taking into consideration ways for preventing the spread of waterborne diseases ?

Answer: yes. Have support from health programs (not specific part of breeding, but work in partnership with health programs). That way will have biological control as well as improvement of crops.

Qu: by improving crop varieties, is there resilience not being reduced ?

Answer: no. studies have shown that by the time that whenever there is a disaster, some of these varieties will not 'give up'. These changes can be resisted.

Qu: is it true that improved varieties are undermining traditional knowledge ? E.g. in old days, farmers did use a variety of seeds.

Answer: we do look at farmers' local strategy. In Nigeria, some farmers to resist new cultivars, because they tell you that it is not in agreement with their practices. It takes time for them to accept the new varieties. If they accept it, they mix it up with what they have – they prefer to have a mish-mash so that they feel they can withstand any eventualities. So the farmers do not easily accept the new varieties.

Speaker: Jenny Cooper (AF04). Adaptation of Biodiversity to Climate Change in southern Africa

3 case study areas:
- North Eastern Lowveld
- Succulent Karoo
- Cape Floral Kingdom

Characterized by very different characteristics

Five adaptation options
1. no action
2. re-configure parks (change boundaries of existing parks)
3. consider alternatives to the parks (is land use migration friendly ?)
4. facilitate migration & dispersal (physically moving species like lions to another are)
5. In-situ conservation (e.g. botanical gardens, gene banks, zoos)

Key Analyses:

- work with stakeholders to id project plan (complete)
- determine current knowledge, past/present biodiv management, and species distrib
- introduce climate change and land cover scenarios (UP & NBI currently doing this); determine species environmental envelopes, model species responses in dynamic models (in progress)
- identify and analyze adaptation options to achieve conservation objective (economic tools – Jenny's contribution – later this year
- Synthesis, recommendations and training

Research questions to be investigated (for Jenny)
- what are the economic, social and environmental costs and benefits associated with a range of adaptation options ? (Multi Criter Analysis)
- What are cost implications if species richness increases/decreases

- What are the benefits (potential economic returns) of eco-tourism activities (NE Lowveld)
- What is most desirable adaptation option/s in each of the study areas
- What is the sensitivity of the costs & benefits to changes in species richness ? (what is the elasticity between the two)

Approach adopted

- primary objective to examine ways of reducing Vuln of biodiv to CC in the most cost-effective and sustainable means
- From previous phases will have identified the V that is likely and the adapt options which can reduce it
- Thus will have a short list of 'viable' alternatives, which will then be assessed using MCA to identify the most preferable options
- Derivation of marginal costs curves for each adaptation option in the study areas (includes examination of land use efficiency, species representation and irreversibility of species loss)
- Collection of eco-tourism stats for the Lowveld area (e.g. tourist numbers visiting the KNP, average tourist expenditure etc)
- Derivation of marginal benefit curves for eco-tourism in the NE Lowveld area
- Test of the sensitivity of costs and benefits to different levels of species richness (i.e. determine the elasticity's associated with different costs and benefits)
- Select and justify adaptation options in each of the 3 areas in a manner which is understandable to all stakeholder groups (MCA also allows you to weight different impacts which can also allow you to select your adaptation options)

No results as yet; Anticipated Problems:

- Data availability
- Determination of TEV (use and non-use values)
- Methodological problems (e.g. defining appropriate discount rate)
- Lack of existing economic models unique to each area

Solutions to overcome the problems

- where no data on extent of land required to achieve required level of biodiv conservation is avail then the IUCN figure of 10% of total land area will be used
- Use best available data to determine appropriate discount rate
- Undertake sensitivity analysis to establish the impacts of data assumptions
- Generic economic model will be developed and applied to each area

Questions

Qu: community outreach ?
Answer: will hold workshops with communities in the early processes

Qu/comment: Thinks the social aspect/welfare should be well pronounced. Would like to have clear picture of elasticity relationship between environmental awareness and social welfare
Answer: initially were only going to look @ costs and benefits, but now doing MCA where incorporate notions of welfare → e.g. looking at communities adjacent

Comment: suggestion; applying different discount rates – discounting is rather controversial – often helpful for policy-makers - not just do present value numbers but to also provide information of how costs and benefits are distributed through time

Comment: IUCN 10% rule of thumb – on economic side why not perturb that and look at the cost implications (e.g. set it at 9% and 11% and look @ changes – is the marginal cost curve really flat around 10% or is it really steep). Could you push 10% a little further, or would that be really costly ?

Qu: is there any intention of producing a methods document that AIACC could make available in less than 6 months to other projects (e.g. if they decide that they want to look at the economic side of adaptation strategies.

Answer: a generic framework on the methods could certainly be compiled – plus looking out for assumptions that are made. (Bob: can just arrange time sequencing so that Jenny could make the time to do this).

Comment: Neil – could they also point to references they found helpful (as a guideline to other projects)

Qu: putting a number on the conservation axis might be rather difficult (e.g. 2 X elephants, won't necessarily equal 2 X tourists → how to collapse biodiversity into a single number – Bob reckons that the relationships will be extremely non-linear (how could you measure this?) → probably vague relationship between biodiversity and ecotourism potential (many many other factors)

DISCUSSION

- Neil: How are other projects planning on evaluating adaptation options? How do you determine whether an adaptation problem is worth implementing ?
- Patrick: reckons all these studies are quite context specific → likes the CSIR project, seems trying to do cost benefit of biodiv conservation as a land use strategy. Their case study would be very different – the type of adaptation options they go for would involve different land use and much larger numbers of people – so an issue of scale.
- What about incentives to communities surrounding the conserved area – an issue under Tanzania – how do neighbouring communities get alternatives & incentives ?
- Graham: outside SADC, seems to even be a trend to contract conserved areas
- Barend: if a community directly benefits from being next to a park, should the community carry part of the costs for adaptation ? Answer: no → these are poor communities. Barend: not even in volunteer work ?
- Clearly getting communities involved in adaptation and biodiversity conservation will be very challenging → any attempt to discourage community from using the ecosystem for livelihood, they will need to be given alternatives. Wildlife = 'economic treats'
- Comment: when you talk of protected areas in South Africa like the KNP, different to what you would find in Zimbabwe and Zambia – these areas are protected in ZA – there is no soft boundary, so people have come to accept that these are not a part of their livelihood – different in Zim and Zambia, still count on biodiversity resources that are in the park
- Jenny: lots of parks have a community levy that you pay when you enter
- Graham: # different ways the communities can get benefits: levies, job opportunities; but from CSIR a more important aspect is that this is a pilot model, would like it to eventually be relevant to take beyond South Africa → e.g. in situations with soft boundaries – need to start incorporating this sort of thinking

- Neil: a key factor in the effectiveness and sustainability of conservation preserves are the incentives for the surrounding communities. Will communities benefit by respecting the purpose of the preserves? Or would they benefit by violating the preserves for personal advantage. It would be helpful to look at different incentive programs that have been tried and evaluate their effectiveness.
- Graham with regard to the 1st presentation: are they trying to breed cultivars that would be more adaptive to a future climate ? Answer: are breeders in her group who are looking at this.

SESSION D2: ADAPTATION STRATEGIES AND EVALUATION -- WATER

Chair: Shem Wandiga
Rapporteur: Momodou Nije

Speaker: Namomi Moswete (AF42), Eco-tourism: A potential adaptation strategy to climate change in the Greater Limpopo Basin

Study objectives are (1) identification of trends in tourism market, (2) develop awareness of eco-tourism potential, (3) study nature of cultural heritage tourism.

Highlights:
Being, natural resources-based, eco-tourism inextricably linked and quite sensitive to climate change and its impacts on ecosystems.

Botswana also promoting cultural tourism which could very well serve as a buffer to adverse effects and inadequate coping capacity in eco-tourism. Cultural tourism underpinned by a rich cultural heritage, and market trends is also on the ascendancy with respect to resort tourism.

Most tourist arriving in country originate from South Africa and Zimbabwe. Except for hiccup in 2002, records show a continuous upward trend in arrivals. Domestic visitors also form a majority of visitors to sites of interest such as museums.

Progress: Literature review (completed),
Verifications survey (partially completed)
Oral data collection (next steps)
GIS mapping of resources (next steps)

Discussions:
Drive to promote and expand cultural tourism is in consonance with the objectives of making eco-tourism more resilient to climate change.

Cultural tourism expected to have insignificant impacts on land use as development for new infrastructure is a minimal requirement for the activity.

Observed/reported growth in eco-tourism market is not conclusively linked to changes in taste (previous visitors), or new interests (new visitors).

2nd Speaker: Mac Callaway (AF47), Benefit-cost analysis of adaptation measures

Activities (1) develop analytical tools/guidelines for estimating benefits and costs of adaptation, (2) demonstrate tools using projects sensitive to market activities (e.g. water and agriculture)

Highlights:
Definition of terms central to benefit cost analyses as they relate to climate change (e.g. damages, cost, imposed costs, benefits)

Resource allocation as it relates to the production of good and services and investments is a critical element in evaluation framework (on climate change, environment, and institutional/individual behaviour).

Progress: Preliminary project concepts revolving around water resources development, cost recovery, and on-farm management, developed for South Africa. Adaptation options identified for further work in the

Gambia revolve around flooding and saline intrusion risks.

The translation of options to conceptual projects and paucity of data and resources/tools turn out to be serious bottlenecks. No easy solution, but press ahead with efforts to collect/compile/acquire missing/necessary data and tools. As a fall-back option, reverse focus from adaptation projects to options.

Discussions:
The project is not developing new models, but pooling existing resources, and making modification/updating existing tools as and when necessary.

Off-the-shelf cost-benefit analysis tools are not a panacea because of site/project specificities.

Costs of climate research should not be factored into adaptation costs. Extremely difficult otherwise to establish connection between literature and peoples' behaviour.

Part of AF47 framework to attempt a separation of benefits and costs of adaptation to climate change from development/other costs (Best adaptation measures are indeed sustainable development measures).

Caution to be exercised in situations where non-market values equally important or preponderant over market values.

Recommendations
Greater efforts (by AF47 team) to acquire data/tools crucial to successful project completion.
Natural and Social Scientists to team up in order to develop behavioural models of household resource allocation

SESSION D3: ADAPTATION STRATEGIES AND EVALUATION -- HUMAN SETTLEMENTS

Chair: Ahmed Hanafi
Rapporteur: Anthony Nyong

1st Speaker: Dr. Paul Desanker (AF38): Methods of Identifying Urgent Adaptation Actions under the LDC NAPA (National Adaptation Program of Action).

He gave a brief background on the formation of the LDC NAPA. IPCC's Third Assessment Report stated that those countries with the least resources have the least capacity to adapt and are therefore the most vulnerable. The LDCs are recognized under the UNFCCC as a group of countries that require special attention and help and that the developing countries are required to assist developing countries in meeting their cost of adaptations. He also showed specific data and graphics that show the vulnerability of Africa to climate change. He mentioned that individuals determine what is urgent adaptation needs depending on what impacts may affect their economies the most.

He proceeded to outline the objectives of and justification for NAPA, noting that one of the goals of the goals of NAPA is to lay out a plan of action on how to build capacity to adapt to the impacts of climate change.

The end products of NAPA, he said, should be a short document that captures the important action plans that the country would like to implement. He listed some of the main differences between the National Communications and NAPA, stressing that NAPA is not an obligation but a "bottoms-up" where countries and local communities are involved.

Regarding the tools and approach to NAPA, he mentioned the development of PRIVA – Participatory Rapid Integrated Vulnerability and Adaptation Assessment, to help countries develop their NAPA. Several materials are available on their web site to assist in the preparation of NAPA. He mentioned that there are three levels of effort required in the preparation of NAPA, depending on the quality of information available.

The main research questions, in identifying urgent adaptation actions include:

- What are rapid assessment methods for identifying urgent and immediate needs of adaptation.
- How do you engage multiple stakeholders and communities
- What international policy interventions are needed to address special needs of the LDCs.
- What are the data and capacity needs in LDCs to implement NAPA.

Major problems envisaged include:

- Uncommon understanding: Non-obligatory nature of NAPA, relationship between NAPA and National Communications, and where NAPA should be based in the home countries.
- Methods for ranking needs and activities
- Country-drivenness
- Interventions: For instance they are holding series of regional workshops to intimate countries on the NAPA Process.

2nd Speaker: Mr. Amin Sanjak (AF:14): Supporting Community Adaptation Strategies with Policy Analysis.

He started by giving an outline of his presentation, which included the rationale, objectives, approach for analyzing policy, problems encountered or anticipated to be encountered, and possible solutions.

The rationale for the study includes among others, the need for small scale community level adaptation strategies to respond to the needs of the most vulnerable groups.

The objectives include understanding how existing policies support or inhibit community-based resilience building capacity.

The main approach is to assess successful livelihood outcomes and backcasting to identify and policy/institutional determinants.

The main steps in carrying out this include:

- Determine outcomes and inputs of policies on livelihoods
- Identify important policy and institutional issues that are important in the development and success of sustainable livelihood projects.
- Explore relevant policy development processes.
- Establish a picture of the policy, institutional and process contacts
- Ctreate a history of key policy milestones.

Some of the problems they have encountered or anticipate to encounter include:

- Determining causality between project outcomes and policy/institutional factors – multiple stakeholder perspectives, and interaction between factors.
- Dealing with cross scale issues.

The only problem they think they can deal with is the causality issue, where they hope to use triangulation techniques to validate information from stakeholders.

ACTION POINTS

1. NAPA should as much as possible synchronise with the National Communication, at least building upon the first National Communications report.
2. NAPA should be broadened to include other NGOS, relevant government ministries and the academia.
3. AIACC projects should feed in to the NAPA of the various countries
4. The science communities should use the services of communications experts within the various countries to communicate science results and reports to the public and to policy makers.
5. The most current V & A results should be made available to policy to process development.

E1 PARALLEL SESSIONS: LINKING AIACC WITH POLICY & STAKEHOLDERS

Chair: Bubo Jallow
Rapporteur: Rolph Payet

The meeting went over the results of the Carousel session for that topic under discussion.

Proposition: to be able to translate our results into information that can be understood by policy-makers.

-perhaps not just translation of results, but rather to understand the policy requirements. What are the requirements for policy that we can influence?

-we have to go beyond publications. We need to understand policy frameworks and how they work so that we can influence them.

-this understanding could be done from a sectoral perspective, also cross-sectoral approaches also need to be considered. Consider linkages between sectors.

-process to incorporate the climate component within existing policies.

-where and when to intervene in the policy-making process, exploit 'windows' of opportunity. Identify strategies to influence governments – champions (influential people), UN organisations.

-raising public awareness can also be used to reach to policy-makers, concerns can be taken to their representatives, including consideration of the various levels of policy-making/policy-makers.

Proposition: linkage with other stakeholders

-one weakness is the lack of a conceptual framework to link AIACC results with policy; e.g. no provisions made for presentation of preliminary results; how do we get the scientific team to talk to all the sectors, need to identify a channel through which such engagement can e directed towards governments, also linkage through the CC focal point or the National CC Committee.

-What message to convey? Possible answer - AIACC satisfies your policy objective in such a way…

-use of the information by policy-makers to meet at means – political mileage, siphoning of budget, etc…use of sc

-it is important to understand to know of the vested interests of the various stakeholders, and how it will be used by those stakeholders to met their interests as well, without distorting the scientific results

-how it will influence national policy, who are the stakeholders involved in this type of influence; what are the deficiencies in national policy are we trying to address.

-use of IPCC in the synthesis of the results to provide a much more coherent picture and presentation of science.

-integration of climate has to be integrated

-two levels into linking – mainstream into the policy-making process; getting information generated from the studies into the national communications.

Summary

The projects need to be able to reach stakeholders that influence policy.

AIACC to get as many papers into the IPCC and National Communication process.

SESSION E2: PLANNING FOR AIACC SUMMARY AND SYNTHESIS OUTPUTS

Chair: Paul Desanker
Rapporteur: Bill Dougherty

Need to start by asking who we are writing for and for what purpose.
Hard to write for a mixed audience. Would be disappointing if solely to satisfy funders.
How can we be innovative? What is our comparative advantage? (Bob Scholes)

Be disappointing to force each synthesis into a format. Guidance may be needed but projects should be allowed to maintain their own character. (James O)

Need to be sure that we get to the end and have something to show that is useful.

Important that we produce a number of syntheses. (Paula)
Important to have a synthesis to feed into the third assessment. (James)

Need to have a collection of things that work but also need material that can be used by IPCC. Therefore need to focus on regional work so have separate syntheses.
This will be one of the evaluations of the project – seeing how AIACC can feed into IPCC.

Need to have key vulnerabilities highlighted.

Audiences:
Different audiences will have different needs – eg. communities
Maybe think of who key stakeholders are for AIACC?
Those who want to know how to deal with climate variability
Policy making community that plays a role in national communications.
Donor organizations – focus on evaluation of achieving objectives; demonstrate that we've built capacity. Eg. NC used
Local stakeholders -
IPCC

Need to interpret synthesis quite broadly – so go for set of synthetic material that use established channels. Eg. Journal papers for scientists; for IPCC make sure team members are authors.

Guidance material – so that people know what methods are used, what worked and what didn't – cross cutting.
Moving from theoretical, methodological into practical results and problems.
Framework convention on climate change would be interested in that.

Special issue journal
What would theme be?
Regional might be superficial.
Important to recognize the burden of a special issue – delays publication, need many committed people. A workshop that controls process is a better way to do that.

Companion papers in one journal might be more suitable – with intro. etc and options for more/less. More companion pieces spreads the publicity and is more suitable to readers. How to we decide on companion papers? Need to look at themes. A workshop/common focus helps to drive.

Rockerfeller funding for workshop with 3 themes.
Need to produce paper and comment on other papers before workshop.

Barriers to international publication among group – language, culture
Key hurdle is supportive environment that means paper sails through rather than rejected.

Could we start our own journal? Maybe not that easy. Working paper series might be more suitable. Abstracts on the web that provide authors details for contact and full paper. Could be used as clearing house for companion papers.

Public outreach
Need to address public outreach. Is it our role and how does one do it?
Need special skills and it is expensive. Eg. Documentary maker or journalist
Need to be careful as can portray unintended message that may have damaging consequences. Have tried to give coverage to AIACC activities through newsletters.
Better to have individual projects to do outreach on their own.

Briefing papers.
Policy relevant synthesis – gets to ministers in credible fashion. Identify high profile opportunities initiated by AIACC.

Also need to **target peers**- so that they are aware of level of research that is happening within projects. Eg. MA, Climate networks etc. VulnerabilityNet out of SEI – could be vehicle to showcase positive experience. START's newsletter is a good channel to start with – 3/5 page piece with pictures etc.

Guidance material
For that to work need to put in additional work from projects. Eg Sudanese methodological document. We are already doing it to a large extent – eg. Documenting methodologies as we go. UNEP products are out of date and largely theoretical.
Need to focus on how to get people to do it. If you can make it into publication then there will be added incentive. How do you validate methods?

Summary:
Establish audience first.
1. scientific community
2. policy making community –specifically those involved with national communication
3. Donor organizations – focus on evaluation of achieving objectives; demonstrate that we've built capacity

Set of synthetic activities – use established channels

Outputs:
1. Companion papers – try to pull them out of workshop
2. Guidance material – using the details of the work documented as the process
3. Target peers – share experience with peers through established and new networks
4. Briefing papers – policy relevant synthesis that target high profile outlets

Public outreach – should be left to individual projects at this stage.

E3: BUILDING UPON AIACC – A 2ND PHASE OF CAPACITY BUILDING

Chair: Isabelle Niang-Diopp
Rapporteur: Emma Archer

What could be the follow up to AIACC – should there be a second phase, and what should it look like

Some ideas already raised on Monday :

New Research
- Review of final outcomes of phase 1
- ID new V areas, new priority sectors
- Reruns with new regional climate scenarios
- Compendium of adaptation strategies

Capacity Building
- Funding for implementation of some of the appropriate research findings (particularly the mitigation options)
- Training in existing software/tools

Communication/awareness/consultation
- Develop tools database
- Inventory existing country capacity
- Alternatives to internet to be developed
- Leave small funds dedicated for stakeholders workshops
- Support mediation/conflict resolution
- Work with 'non-traditional' partners

Operationalize the results

- how to translate research results into operational products useful for decisionmakers at different levels
- RESEARCH RESULTS → OPERATIONAL PRODUCTS
- A prerequisite: communicate the results to the different stakeholders

- Different levels
  - Communities, local NGOs: pilot projects
  - Governments: mainstreaming in national development plans, sectoral policies

A synthesis !
- Tools database – compendium of adaptation strategies – and training
- Reruns of the project using results of RCMs
- New projects on new sectors, new vulnerable areas
- Develop pilot/targetted projects based on experience gained in phase 1 (especially regarding the projects that are already working at a local level with communities and community-based organizations)
- Communication of the results at different levels – translation into operational actions
- Expand the involvement/consultation with stakeholders (including 'new' ones)
- Develop alternatives to the internet for communication

DISCUSSION – WHAT KIND OF FOLLOW-UP CAN WE HAVE FOR AIACC PROJECTS ?

- Question (Phillip): what is meant by pilot projects based on outcomes of phase 1
- Answer: how to transfer experience of local communities in adaptation over countries;
- Another answer: look at successful outcomes of Phase 1 and see where else you can apply them (where applicable); once we've gone through the process there will still be gaps in our picture of what is going to happen in Africa – where there are holes, we could fill them in in Phase 2 to eventually get a detailed local scale picture of what might happen in Africa. Perhaps call them as targeted small scale projects
- Question (Phillip): when we refer to communicating results – national or much larger context ?
- Answer: a much larger context – not just to communicate at internat level through national communications, but also at the sub-national level. E.g. a communication plan towards subregional programs such as SADC (like the EW units)
- Simba: was also question about how to link the results of the first phase with the NAPA process
- Barend: understands NAPAs as a short document
- Phillip: in context of any of the project activities identifying specific project areas for adaptation – no specific mechanism to feed into NAPA
- Comment: when talking about capacity building in Phase 2, we need to be quite specific when it comes to stakeholder groups; particularly communities and those groups we identify to be significantly vulnerable in this phase. There may be a strengthening of strengthening technical capacity, and in the process we forget about the vulnerable groups. So could there be an encouragement for outreach programs for those communities.
- Comment: this ties in well with how to link this to NAPA. NAPA a concise user-friendly document – the more user friendly and concise the AIACC output can be, the easier it would be to communicate and build into a NAPA process. So the end point of this process needs to be concise. E.g. link an agricultural advisory to adaptation recommendations.
- Simba: e.g. from Zim, use existing strategies – like working through Agritex in Zim → build on existing awareness campaigns; communities may already have structures and sources that they trust
- Phillip: Ana's presentation on a matrix of what activities can be done by the stakeholders that are not expensive – and at the opposite end, more high tech, expensive and resource intensive resources. So will have to include some sorts of filtering processes on where to target what adaptation information. – don't recommend adaptation strategies that stakeholders are not currently equipped to adopt. When we communicate we should go to the people who are best equipped to deal with the issue.
- Phillip: on NAPA, may need to be a specific exercise where someone looks at NAPAS and specifically determines how NAPA and Phase 1 outputs should be linked. One recommendation – create some sort of specific mechanism to facilitate this
- Isabelle: in some countries people running the project are often those involved in National Communications and NAPA.
- Comment: the international agencies already have structures in place at the grassroots level – have a round table meeting with them during which relevant Phase 1 outcomes could be laid out
- Isabelle: communication plan on how to address different levels – need very specific strategies for each level
- Emma: must get better at working with the Disaster Reduction community
- Isabelle: we haven't really discussed new sectors, themes, and geographical areas

- Barend: on new themes, get impression that a lot of work done at local scale doesn't really take into account that there also need to be better ecosystem services – feels that with new work, it should have a stronger biodiversity/ecosystem services perspective (better emphasis, needs to have some sort of integrated conservation perspective in the area)
- Comment: under AIACC phase 1, lots of good work being done – unlikely that much of it will end up in journals. International Agric journals are very picky now – possibly worthwhile trying to consider publications under Phase 1. E.g. special issue of an existing journal.
- Isabelle: in the project proposals, each project was asked to state a publication plan. So each project itself must prepare publications in peer reviewed journals (which can also contribute to IPCC AR4). Must also how to publish the entire AIACC project.
- Balgis: some publications need to be targeted at the policymaker – must be in very accessible format
- Isabelle: so we REALLY need to think about a communication plan; so that the different stakeholders will take into account the research. Need to market the results – don't simply give them ! Need to use the tools and format that is applicable to the different stakeholders.
- Ravi: **four issues that first phase of AIACC focused on –**
    1. one was global mechanism to facilitate technical assistance in initiating research in LDCs. Feels they have been fairly successful. Instead of global mechanism, could countries now do this on their own.
    2. Another was policy influencing – where did we have an impact on policy ? Was NAPA and National Communications sufficient ? Bigger challenge remains influencing Sust Dev planning in the country. Should there be a stronger mechanism to facil this.
    3. Another was facilitate partic of scientists in LDCs – work in process.
    4. Last – publication in peer reviewed journals – in progress. But that global mechanism process – is there a feeling amongst participants that this is being achieved to a certain extent.
- SO for a 2nd Phase, should there be a global mechanism to provide technical assistance – or should it be regional, sub-regional or national ?
- Isabelle: from her personal experience, saw that there have been a lot of efforts towards assisting the different groups – training workshops, regional workshops – a very good way to put people together and get them to exchange their experience while learning new approaches and tools. This kind of exchange mechanisms is really important for the next years.
- Barend: agrees on the value of a workshop like this – found that hearing from different projects identifying people doing similar things – perhaps a need to formalize or make these connections more formal
- Ravi: real concern with link with the policy community. There is funding from the GEF for all countries to assess national capacities – not just on climate change, but also on biodiversity and on desertification – are receiving money and countries are actually doing this, and this includes an inventory of technical capacities in the different countries. However, these assessments often leave out NGOs, or says Isabelle – they leave out national organizations
- Isabelle: so it's a good way to assess capacity as a basis for targeting technical assistance for Phase 2 – but not alone; its very flawed.
- Emma: what about building on this process ?
- Isabelle: moves to bring more LDC experts into IPCC – need funds to continue the research and involvement. Many donors not keen to fund the research. The experts here are really specific, and need to be maintained.
- Emma: need to focus on win-win solutions like the Sudanese project – also allows us to work on a wider base of less traditional donors

- Phillip: stage 3 of AIACC is the actual implementation – in the context of trying to help that discussion and trying to provide some input to this discussion – may be useful for Stage 1 & Stage 2 to start looking at some of those definitions – would activities fall under that sort of discussion ? So perhaps include in that discussion the notion of Win-Win solutions. What does implementation mean in the context of Africa ?
- Isabelle: feeling the donor community is not restricted to GEF – so don't need to be restricted to Phase 1,2,3 – some of adaptation measures could be funded by other international and regional bodies – they cover other priorities as well ! GEF is not the only donor.
- Isabelle: do we develop an adaptation strategy to climate change – or do we *mainstream* these proposals into national development plans, sectoral strategy plans → or could we do BOTH ?
- Molly: also important to keep in mind the role of the private sector – e.g agric adaptation, the role of agric insurance, large scale agribusiness
- Isabelle: if the private sector is convinced, through communication, that climate change is an issue, they will include climate change in their investment plans ! A matter of communication priorities and plans for AIACC; and also how to integrate ALL the different stakeholders into the process (note that private companies are very active in the COP process)
- Ali: in the 2nd phase would it be worthwhile to structure research areas on themes rather than regional/national
- Gregg: can we talk about **climate risk**, rather than climate change → climate risk incorporates climate change, variability etc (NB!);
- Isabelle: in the adaptation policy frameworks they are talking about climate risks; its really important because after that when you assess your adaptation strategies you can use ALL the tools available to this assessment
- Phillip: including the business community in the work of AIACC – but no existing mechanism for them to be involved – how will we then do this ? How do we practically deal with as large and as diverse a group as the private sector ? Venture capital – insurance marketing - …
- Isabelle: this question depends on the countries. The level of the private sector and the way the private sector is organized is country-dependent. E.g. private sector in some countries more informal. But there is a need to communicate with them – clearly need to have the conversation.
- Mrs Jain: seminars can be very effective – e.g. invite relevant private stakeholders

Isabelle: in Senegal last week, the new president of the National Climate Change Community is actually a member of a peanut oil company