Asia-Pacific Network for Global Change Research

Climate prediction and agriculture: An assessment and perspective

Final report for APN project 2004-17-NSY-Gadgil

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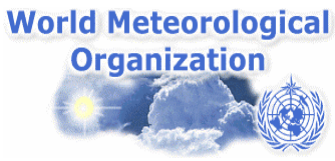
2004-17-NSY-Gadgil

Final Report submitted to APN



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Overview of project work and outcomes

Non-technical summary

The second International Workshop on Climate Prediction and Agriculture was held at the World Meteorological Organization's headquarters in Geneva, Switzerland on 11-13 May 2005. Participants at the workshop reviewed the advances in application of seasonal climate prediction to improve agricultural production, and identified issues and challenges to be addressed in the next five to ten years to operationalize the use of seasonal and intra-seasonal forecasts of climate variability in developing countries. During the workshop experts in seasonal forecasting, applications to agriculture and leading socio-economists presented keynote review papers. Working groups engaged participants in discussions on needs for future research, capacity building, and future collaboration and coordination between various major organizations involved in climate prediction and applications to agriculture.

Objectives

The main objectives of the workshop were:

- To summarize and synthesize the current status of seasonal climate predictions and their applications to smallholder agriculture around the world;
- To identify ways to foster greater use of seasonal climate forecasts in agricultural planning and operations for the benefit of smallholder agriculture and rural livelihoods in developing countries;
- To develop an effective strategy for the communication and coordination of climate applications to a broader network of users at all levels (education, policy, research, extension, and farming communities); and
- To promote regional research to enhance understanding of the interactions between climate processes and their complex linkages with agricultural production and food security.

Amount received and number years supported

2004-2005: US $15,000

Activity undertaken

The grant funds were used to support scientists from the Asia-Pacific region to participate in the International Workshop on Climate Prediction and Agriculture: Advances and Challenges held at the WMO headquarters in Geneva, Switzerland during 11-13 May 2005.

Results

A major accomplishment of the workshop was the state-of-the-art review and assessment of the application of forecasts of seasonal and intra-seasonal climate variability to agriculture production. The review, to be published in the peer-reviewed journal "Climatic Research", will include papers on advances in seasonal climate forecasts, prediction of agricultural impacts of climate fluctuation, advances in communicating climate information to agricultural decision-makers, and use of forecasts in decision support systems. The workshop identified the gaps in knowledge, tools and methodologies, capacity building priorities and institutional needs for the future. The workshop also considered potential applications of climate science to other sectors, such as water resource management.

Relevance to APN scientific research framework and objectives

Agricultural production is inextricably linked to climate variability. More specifically, the success or failure of a given season's crop is highly dependent on that season's weather. CLIMAG addresses this linkage by utilizing the enhanced ability for seasonal forecast to improve management and decision-making in respect to crop production. If accurate and timely forecasts can be effectively communicated to a farming community, which has decision options and the capacity to use this information, then the improvements in agricultural practice could provide major additional benefits or help avoid losses during extreme climatic events. Such a process requires a dynamic process of dialogue and feedbacks between the forecasters and farmers. This project is therefore directly related to two priority APN themes of global change, namely: "Human Dimensions of Global Change" and "Climate Change and Variability."

Self evaluation

The workshop was very successful. In total, 49 participants from 22 countries attended. Experts presented papers and participated in discussions that led to recommendations on future efforts in the field for all organizations involved in climate prediction and applications in agriculture. The workshop recommendations, if implemented, could pave the way to operationalizing the use of climate information in agricultural decision-making. The workshop engaged a number of senior and leading scientists and a group of young scientists from developing countries into a network of collaborating partners.

Potential for further work

There is great potential for future work in terms of both climate and agriculture related research and capacity building. During the workshop working groups assessed and prioritized strategic gaps in knowledge, methodology and implementation; and proposed a way forward to enhance knowledge, methodology, awareness, integration, training/capacity building and institutionalization. It was decided that work needs to be done to strengthen networking and institutional partnerships, and capacity building at all levels from forecasting and research to intermediaries and the farm level, especially in developing countries.

Publications

The following publications will be outputs from this activity:

- Special Issue of "Climate Research" Journal, which will include all the keynote papers presented at the workshop
- A book entitled "Climate Prediction and Agriculture: Advances and Challenges" which will have extended abstracts of keynote papers and full papers of the presentations in the International Workshop on Climate Prediction and Agriculture and all the papers presented at the Synthesis Workshop for the Advanced Institute on Climate Variability and Food Security
- A brochure on "Climate Prediction and Agriculture" meant for a wider audience based on the book

We hope to publish the book volume and distribute it during late 2005/early 2006. A copy will be provided to the APN Secretariat. The special issue of the journal "Climate Change" will be published and distributed in mid-to-late 2006.

Acknowledgments

The workshop was made possible through generous support from the Asian Pacific Network for Global Change Research (APN), the Inter-American Institute for Global Change Research (IAI), the National Oceanic and Atmospheric Administration/Office of Global Programs (NOAA/OGP), the Netherlands Ministry of Foreign Affairs (DGIS), the International START Secretariat (START), the World Meteorological Organization (WMO), and the International Research Institute for Climate Prediction (IRI).

Technical Report

Preface

The International Workshop on Climate Prediction and Agriculture: Advances and Challenges aimed to review advances in application of seasonal climate prediction in agriculture over the past five years, and identify challenges to be addressed in the next five to ten years to further enhance operational use of climate prediction in agriculture in developing countries. The workshop program engaged participants in discussions of session themes, and in developing recommendations for all organizations involved in climate prediction and applications in agriculture, in particular in developing countries.

Table of Contents

1.0 Introduction

START's initiative on climate prediction and agriculture has its roots in the 1995 meeting of the World Climate Research Program's (WCRP) Joint Scientific Committee (JSC). During this meeting, the JSC recognized the need for a sharper focus on societal outcomes in WCRP's scientific research, leading to a proposal to develop a multi-disciplinary project on the application of climate prediction to agriculture under the leadership of START. This proposal also presented an opportunity for START's program sponsors, IGBP, IHDP, and WCRP to collaborate on an inter-disciplinary project, representing the first time these international global change science programs have co-sponsored a research project.

The overall objective of CLIMAG is to utilize the enhanced ability to predict climate variability on the scale of months to a year to improve management and decision-making in respect to crop production at local, regional, and national scales. In 1997, the CLIMAG Task Group developed an implementation plan for a comprehensive regional approach for the program. Small-scale pilot activities in South and Southeast Asia and Oceania were conducted in 1997-1998 to test the utility of seasonal climate forecasts on a variety of cropping systems. These pilot projects addressed the use of climate forecasts to improve agriculture production for a) rainfed rice in Thailand, b) winter wheat in China, c) rice production in the Asia-Pacific, d) rainfed groundnuts in southern India and e) sugar cane production in Fiji. In each case, the pilot projects demonstrated that climate forecasts have the potential to be a vital tool in improving agricultural management. The projects also demonstrated that a truly integrated project, which includes input and interaction with local farmers and decision-makers, is necessary to fully utilize these benefits.

As an inter-disciplinary project, CLIMAG must draw upon research from the meteorological, agricultural and social sciences. To address the interfaces between these disciplines, and to review the state of the science in support of CLIMAG, an international workshop was held at the World Meteorological Organization (WMO) Headquarters in Geneva, Switzerland in September 1999. During this workshop, scientists addressed such issues as climate model outputs and crop model requirements, terminology and modeling methodology including the use of weather generators, and the potential mechanisms for a feedback loop from local decision makers, including farmers. Regional coordination meetings were held in Africa and Asia to develop larger-scale demonstration projects. One such meeting was hosted by the Asia Pacific Network for Global Change Research (APN) in October 1999 in Kobe, Japan to further plan for a demonstration project in Asia.

The CLIMAG project has been a distinct success. The state-of-the-art scoping report[1] of the 1999 conference in Geneva and the initial pilot projects have led to major on-going demonstration and capacity building projects in West Africa and South Asia, with substantial support from the European Commission (EC) and APN[2] respectively. Parallel activities have been undertaken in Latin America under the auspices of the Inter-American Institute for Global Change Research (IAI). A number of scientists, working in collaboration with START and CLIMAG, and independently, are now addressing strategic research gaps to more fully implement a comprehensive, end-to-end program.

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[1] Sivakumar, M. V. K. (ed.) 2002. Climate Prediction and Agriculture: Proceedings of the START/WMO International Workshop held in Geneva, Switzerland, 27-29 September 1999. Washington DC, USA: International START Secretariat.

[2] In 2004 alone, APN has allocated some US$140,000 for support of CLIMAG-related activities in the Asia-Pacific region.

The initial CLIMAG project was envisioned to be a five year-effort. Now it is timely to assess the progress and to take stock of the current state of science in support of CLIMAG objectives. for this purpose, an international workshop was held on May 11-13, 2005 at the WMO in Geneva, Switzerland that brought together scientists and institutions engaged in CLIMAG related research.

The overall objectives of the meeting were:

- To summarize and assess the state of knowledge on seasonal climate forecasts applications to smallholder agriculture;
- To expand communication and coordination of climate applications among a broader international network of professionals and institutions;
- To formulate a strategy for expanding the appropriate application of seasonal climate forecasts for the benefit of smallholder agriculture and rural livelihoods in developing countries;
- To bring together national, regional and international scientists involved in CLIMAG-related research activities to encourage exchange of information, development of future collaborative research projects; and
- To consider the future of the CLIMAG project in light of its experience, the rise of new organizations and the establishment of the new joint project on food security (GECAFS) of the Earth System Science Partnership (ESSP).

Leading scientists from a number of institutions representing past and ongoing CLIMAG and related activities were invited to the workshop as keynote and sessional speakers or to report on their projects. These activities include the South Asia and West Africa Demonstration projects, other relevant APN-funded projects, the Advanced Institute on Climatic Variability and Food Security sponsored by the David and Lucille Packard Foundation, and several sub-projects under START's Assessment of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors (AIACC) project. Topics discussed include:

- The state of knowledge of climate, crop and social sciences relating to application of seasonal climate forecasts to agriculture products;
- Present and future needs;
- The future of CLIMAG;
- Broadening the CLIMAG-research network, and capacity building activities.

The Meeting's session topics included:

- Advances in Climate Applications in Agriculture:
  - Integrated Climate Applications: Where Do We Stand?
  - Advances in Climate Prediction and Downscaling
  - Advances in Predicting Agricultural Impacts of Climate Fluctuations
  - Advances in Decision Responses to Seasonal Climate Forecasts
  - Advances in Assessing Societal Impacts of Climate Applications
  - Advances in Communicating Climate Information to Agricultural Decision Makers
  - Institutionalizing climate applications for agriculture

- The Way Forward – Extending Climate Applications in Agriculture:

    - Science agenda: gaps, strategies and priorities related to knowledge and methodologies.
    - Linkages between the climate and agricultural communities.
    - Capacity building, curricula development and institutional partnerships.
    - CLIMAG – Synthesis of lessons learnt and future challenges

- Three working groups, which:
    - Assessed and prioritized strategic gaps in knowledge, methodology and implementation
    - Proposed a way forward relative to knowledge, methodology, awareness, integration, training/capacity building, and institutionalization

2.0 Workshop Outputs

The following products will be outputs from this activity:

- Special Issue of "Climate Research" Journal, which will include all the keynote papers presented at the workshop
- A book entitled "Climate Prediction and Agriculture: Advances and Challenges" which will have extended abstracts of keynote papers and full papers of the presentations in the International Workshop on Climate Prediction and Agriculture and all the papers presented at the Synthesis Workshop for the Advanced institute on Climate Variability and Food Security
- A brochure on "Climate Prediction and Agriculture" meant for a wider audience based on the informal publication

APN will be fully acknowledged as a co-sponsor of the workshop. The APN logo and full title will be displayed in publications resulting from this activity, as well as the workshop website.

3.0 APN-Funded Participants

Since climate variability strongly affects agriculture in the Asia-Pacific region, it was imperative that regional scientists be prominently involved in this workshop and the formulation of future collaborative activities bearing on the region. APN funds were used to support the participation of scientists from developing countries in the Asia-Pacific region who gave oral or poster presentations during the workshop. Selection of the participants to be funded through this APN grant was made by the workshop organizing committee.

Originally we had planned to use the APN funds to cover travel and in-country costs for 6 participants from 4 countries in the Asia-Pacific region. Fortunately we secured additional funding for some of those participants' airfare costs and were therefore able to fund a total of 8 participants from 4 countries. A list of funded participants is shown in table 1 below.

Table 1. APN funded participants

Participant Name	Contact Information	Presentation Title
Felino Lansigan	INSTAT and SESAM University of the Philippines Los Banos (UPLB) 4031 Laguna Philippines Tel: +63-49-536-2381 Fax: +6349-536-2381 Email: fpl@instat.uplb.edu.ph	Delivering Climate Forecast Products to Farmers: Knowledge-Based Corn Yield Forecasting System in Isabela, Philippines
Thuan Nguyen	Sub-Institute of Hydrometeorology & Environment of South Viet Nam 19 Nguyen, Thi Minh Khai St. District 1 Ho Chi Minh City Viet Nam Tel: +848 8243815 Fax: +848 8243816 Email: hienthuanvn@yahoo.com	Application of Climate Prediction in Rice Production in the Mekong River Delta (Vietnam)
Rengalakshmi Raj	M.S Swaminathan Research Foudnation Iii Cross, Taramani Institutinoal Area Chennai Tamil Nadu India 600113 Email: rengalakshmi@mssrf.res.in	Localized Climate Forecasting System: Seasonal Climate and Weather Prediction for Farm Level Decision-Making
Nageswara Rao	Systems Modeling Global Theme - Agro Ecosystems ICRISAT Patancheru 502 324 India Fax: +9140 23296161 (ext 2436) Email:v.nageswararao@cgiar.org	Will Climate Forecasting and New Knowledge Tools Help Resource-Poor Farmers From Debt to Prosperity? Farmers' Participatory Approach to Manage Climate Variability
Ramasamy Selvaraju	Department of Agricultural meteorology Tamil nadu Agricultural University Coimbatore 641003 Tamil Nadu India Fax: +91422 431672 Tel: +91422 430657 Email: selvaraju_r@hotmail.com	Improving Food Security and Resource Use of Irrigated Crop Production Systems Through Climate Forecasts in Southern India
Barry Shapiro	ICRISAT Patancheru, AP 502 324 India Tel: +9140 3296161 (ext 2227) Fax: +9140 3241239 / 3296182 Email: b.shapiro@cgiar.org	The CGIAR Perspective on Institutional Support for Climate Applications
Michael Manton	Bureau of Meteorology Research Centre P.O. Box 1289K 13th Floor, 150 Lonsdale Street Melbourne, Victoria 3001 Australia Tel: +613 96694444 Fax: +613 966946600 Email: mmm@bom.gov.au	Advances in Communicating Climate Information
Sulochana Gadgil	Indian Institute of Science Center for Atmospheric Science Bangalore 560012 India Tel: +9180 2933065 Fax: +9180 3600865 Email: sulo@caos.iisc.ernet.in	Challenges Ahead: An Indian Perspective

The $15,000 granted by APN was spent on the travel, accommodation and per diem, for these 8 scientists. A break down of these costs is shown in Table 2.

Table 2. Cost breakdown for each participant funded through APN

Participant	Country	Airfare	Hotel	Per Diem	Visa Costs	Ground Transport
Felino Lansigan	Philippines	1189	489.35	539	88.20	66.66
Thuan Nguyen	Vietnam	0	489.35	539	12	112
Rengalakshmi Raj	India	0	489.35	539	170	23
Nageswara Rao	India	0	489.35	539	85.56	32.70
R. Selvaraju	India	1630.73	470.10	539	130.33	0
Barry Shapiro	India	1970.92	498.47	373	0	53
Mike Manton	Australia	215.60	498.47	373	0	0
Sulochana Gadgil	India	1302.62	498.47	373	99.80	116.66

Participant Evaluation

Each APN funded participant was asked to write an evaluation on how the CLIMAG workshop was valuable for their career agendas, and specifically for networking and capacity building. The feedback we received was very positive. A selection is shown below.

Felino Lansigan

My research interests are agricultural statistics, statistical hydrology, risk analysis and applications in agricultural development and natural resources management. For the past several years I have been involved in research activities involving analysis and assessment of impacts of climate variability and change on crop production systems. I am currently leading a research project funded by the Philippines Department of Agriculture (DA) on developing and piloting a knowledge-based crop forecasting system to complement the crop production estimation and projections made by DA for its planning activities and extension program. My participation in the CLIMAG workshop in May 2005 has enabled me to learn from the experiences of other research scientists doing similar or related work, as well as gain additional knowledge useful in improving our research strategies and approaches such as on the issues of downscaling seasonal climate forecasts, coping with climate variability, and communicating climate information products and crop production forecasts to extension workers and farmers. The meeting also provided an opportunity for me to share the results of our recent on-farm experiment and field studies with farmer-cooperators, which showed the value of using climate information in crop production and also identifying the most cost-effective strategy for dissemination of climate information. The network of CLIMAG scientists should be sustained, and the science should be further developed and promoted. Perhaps, networking of research scientists in the regions (e.g. Southeast Asia, South Asia, Latin America, etc.) may be the best and most efficient way to pursue this. The efforts of START and its donors and partner institutions in CLIMAG are greatly appreciated.

Thuan Nguyen

During the CLIMAG Workshop, we saw how climate prediction is applied in various sectors, such as agriculture, hydrology, water management, and healthcare, as well as in different parts of the world to effectively assist decision-making. Methods and data used in climate predictions shown at the workshop were valuable for me as they can vary from simple empirical, analog methods to more sophisticated ones such as downscaling or using GCMs. The new approach to finding appropriate predictors in climate prediction, presented by Sulochana Gadgil, is quite impressive. During the workshop we were introduced to a range of WMO Agro-meteorology agencies and programs which will be useful sources of information and support. Finally, I would like to thank APN, START, WMO and IRI for giving us an opportunity to engage with those leading scientists and practitioners in the field of the application of climate forecasts for agricultural activities.

Rengalakshmi Raj

My focus of research interests is application of participatory approach in the implementation of agro-biodiversity conservation, natural resource management, climate variability and adaptation, sustainable agriculture, rural development and multiple livelihoods. The CLIMAG workshop provided a wide exposure to the recent developments in the climate research and applications across several regions. It was a good sharing and learning opportunity and instilled interest towards its innovative applications. The workshop helped us to meet and interact with experts at different levels from researcher to policy makers. Particularly, the interaction enabled me to expand individual networks and opportunity for the institutional network and partnership for the future activities.

Nageswara Rao

Analyzing seasonal climate forecasting based cropping options for farmers' decision-making is my research interest. This topic is important to clients of ICRISAT, the dry land farmers. It was an excellent opportunity for me to attend the CLIMAG workshop for an update on the current status and challenges in this emerging field from a group of richly experience scientists. The knowledge sharing on downscaling and forecasting techniques, identifying agricultural impacts due to climate variability, and effective communication of forecasts through presentations and keynote lectures was a great benefit to all who attended. Interactions with scientists from different parts of the world, especially from similar climatic zones really assisted in identifying common research issues and the opportunities for collaborative proposals for farmers' participatory research projects.

Ramasamy Selvaraju

My interests are to understand the impacts of regional climate variability and change on highly fragile smallholder socio-economic and agricultural systems in the tropics. My current efforts are related to assessment of vulnerability of smallholder agricultural systems and to improve the adaptive capacity of farmers and resilience of agricultural systems to climate variability and change. I try to achieve this through applying and institutionalizing seasonal climate predictions to improve agricultural decision-making.

I am one of the principal investigators of the inaugural Climate Prediction and Agriculture (CLIMAG) project in South Asia endorsed by IHDP, IGBP, WCRP and WMO through START and funded by APN. The CLIMAG workshop has helped me to channel my research focus in the future. It also gave me enormous exposure with regard to recent developments in climate prediction and agricultural applications. This workshop is valuable for me as I am trying to institutionalize the climate forecast application in South and South East Asia through my new assignment. It was helpful for me to network with international organizations for creating a climate forum for tropical Asia. Furthermore, as I am concentrating on capacity building activities for intermediaries in the climate information flow, experiences of other organizations are very valuable.

Barry Shapiro

I am an Agricultural Economist with a background in Natural Resource Management whose research has focused on using weather predictions in bio-economic modeling to devise adaptive technology recommendations to help farmers manage climate risk. I am now Director, Project Development and Marketing for ICRISAT, the International Crops Research Institute for the Semi-arid Tropics, one of the 16 Future Harvest Centers of the CGIAR, the Consultative Group on International Agricultural Research. I am co-leader of the International Research Consortium on Desertification, Drought, Poverty, and Agriculture. The work of the consortium focuses on the sustainable agricultural development to protect the environment and reduce rural poverty and the nexus between climate predictions and agriculture. For me the CLIMAG workshop presented a particularly useful opportunity for meteorologists and agricultural specialists to discuss a major constraint and opportunity to improve agriculture production through better use of climate information and how to get this information more effectively to farmers. I also particularly appreciated the opportunity to network with colleagues in both the meteorology and agriculture communities. I made several contacts, which I am pursuing for future collaboration. I also appreciated that we discussed in the workshop how we could institutionalize the gains in collaboration through CLIMAG. ICRISAT and the CGIAR are very interested in continuing the collaboration and partnerships begun in CLIMAG.

Mike Manton

I appreciated having the opportunity to attend the International Workshop on Climate Prediction and Agriculture: Advances and Challenges. I found the meeting to be very worthwhile. The best talks where by Neil Ward and Colleen Vogel. If there are plans to continue the CLIMAG steering committee, I suggest drawing in some new blood, such as Neil and Colleen.

4.0 Conclusions

During the International Workshop on Climate Prediction and Agriculture: Advances and Challenges scientists from the CLIMAG community gathered to review advances in application of seasonal climate prediction in agriculture over the past five years, and identify challenges to be addressed in the next five to ten years. The main purpose of this workshop was to further enhance operational use of climate prediction in agriculture in developing countries. As a community, the scientists involved in CLIMAG achieved the objectives of the workshop. Supported scientists were able to present their work to the CLIMAG community and learn from research presented by other CLIMAG scientists. We have received positive feedback from the supported scientists on the usefulness of the conference as it related to their research and professional growth.

Appendix

Agenda:

INTERNATIONAL WORKSHOP ON
CLIMATE PREDICTION AND AGRICULTURE: ADVANCES AND CHALLENGES

World Meteorological Organization
Geneva, Switzerland
11-13 May 2005

AGENDA

11 May 2005, WEDNESDAY

0900-1000 hrs **OPENING SESSION**

Welcome: Roland Fuchs
Director, START

Welcome: David Carson
Director WCRP

Opening Address: Prof. Hong Yan
Deputy Secretary-General, WMO

Group photo

1000-1030 Tea/Coffee Break

1030-1200 **SESSION 1: Integrated Climate Applications: Where Do We Stand?**
Chair: Hassan Virji

Keynote: Climate Prediction and Agriculture: Current Status and Future Challenges *M.V.K. Sivakumar, WMO*

Keynote: Actionable Climate Knowledge: A Plea for Synthesis in a Sea of Analyses.
Holger Meinke

Open discussion

1200-1330 Lunch

1330-1530 **SESSION 2: Advances in Climate Prediction and Downscaling**
Chair: G. Maracchi

Keynote: Recent Developments in Dynamical Climate Seasonal Forecasting
Francisco J. Doblas-Reyes

Keynote: Enhancing the Scale and Relevance of Forecasts.
Neil Ward

Presentation: Challenges Ahead: An Indian Perspective
Sulochana Gadgil

Open discussion

1530-1600 Tea/Coffee Break

1600-1730 **SESSION 3: Advances in Predicting Agricultural Impacts of Climate Fluctuations**
Chair: Coleen Vogel

Keynote: Translating Climate Forecasts into Agricultural Terms: Advances and Challenges
James Hansen

Presentation The Development of a Combined Crop and Climate Forecasting System
Tim Wheeler

Presentation Delivering Climate Forecast Products to Farmers: Agronomic and Economic Impacts of Advanced Climate Information on Corn Production Systems in Isabela, Philippines
Felino Lansigan

Open discussion

1800-1930 **Workshop Reception**

12 May 2005, THURSDAY

0830-1000 **SESSION 4: Advances in Decision Responses to Seasonal Climate Forecasts**
Chair: Gina Ziervogel

Keynote: Economics and Climate Applications: Exploring the Frontier
Debora Rubas

Keynote: Bringing Climate Predictions to Smallholder Farmers: Lessons Learned from Farmer-Centered Research
Carla Roncoli

Open discussion

1000-1030 Tea/Coffee Break

1030-1200 **SESSION 5: Advances in Assessing Societal Impacts of Climate Applications** *Chair: Sulochana Gadgil*

Keynote: Advancing Ex-Post Assessment Methods for Climate Forecast Impacts.
Mark Rosegrant

Keynote: Ex Ante Impact Assessment and Seasonal Climate Forecasts: Status and Issues

Philip Thornton

Open discussion

1200-1330 Lunch

1330-1430 **SESSION 6: Advances in Communicating Climate Information**
Chair: Mike Manton

Keynote: Climate Forecasts and Food Security in Southern Africa: Who Can Eat Information?
Coleen Vogel

Presentation: Climate Outlook Forums and Agricultural Applications.
P. Lefale

Presentation CLIMAG West Africa Project
Giampiero Maracchi

Open Discussion

1430-1530 **SESSION 7: Panel presentations from the Advanced Institute on Climate Variability & Food Security**
Chair: J. Hansen

Presentation Panel: Lessons from the Advanced Institute on Climate Variability & Food Security

Open discussion

1530-1600 Tea/Coffee Break

1600-1730 **SESSION 8: Institutionalizing Climate Applications for Agriculture**
Chair: Hartmut Grassl

Keynote: Institutionalizing Climate Applications for Agriculture
Arjunapermal Subbiah

Presentation: The CGIAR Perspective on Institutional Support for Climate Applications
Barry Shapiro

Presentation: Institutional Capacity Building Through the Regional Climate Outlook Forums
Kabineh Koneh

Open discussion

13 May 2005, FRIDAY

0830 – 1000 SESSION 9: Working Group Sessions

Working Group 1: Science agenda: gaps, strategies, priorities related to knowledge and methodology.

Facilitator: *Gerrit Hoogenboom* Rapporteur*: Francisco Meza*

Working Group 2: Linkages between the climate and agricultural communities.
Facilitator: Robinson Ngugi Rapporteur*: Felino Lansigan*

Working Group 3: Capacity building, curricula development and institutional partnerships.
Facilitator: *Neil Ward* Rapporteur*: Rizaldi Boer*

1000-1030 Tea/Coffee Break

1030–1200 **SESSION 10: Working Group Sessions (continued)**

1200-1330 Lunch

1330–1500 **SESSION 11: The Way Forward – Extending Climate Applications in Agriculture**
Chair: Holger Meinke

Presentation and discussion of the working group reports

1500-1530 Coffee/Tea Break

1530-1630 **Session 12: CLIMAG – Lessons Learned and Future Challenges**
Chair: D. Carson

A Climate Science Perspective
Hartmut Grassl

An Agricultural Development Perspective
Jock Anderson

1630-1700 **Session 13: Publication Plans and Closure**
Discussion on Publication Plan

Workshop Closure

MVK Sivakumar

Participant list:

INTERNATIONAL WORKSHOP ON CLIMATE PREDICTION AND AGRICULTURE:
ADVANCES AND CHALLENGES

Geneva, Switzerland
11-13 May 2005

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