

CIMR -- FINAL REPORT

CLIMATE INFORMATION FOR MANAGING RISKS PARTNERSHIPS AND SOLUTIONS FOR AGRICULTURE AND NATURAL RESOURCES

10-13 June 2008, St. Pete Beach, FL
<http://www.conference.ifas.ufl.edu/CIMR>

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1. INTRODUCTION

Agricultural and natural resource managers need climate information at the regional and local levels to address short- and long-term challenges posed by variable and changing climate. Risks posed by climate variability would include hurricanes, drought, floods, freezes, heat stress, and wild fires. Risks posed by climate change, include changes in the frequency and intensity of extreme events, sea level rise, and agricultural emissions of greenhouse gases. In addition to risks, climate change offers new economic opportunities for agricultural and natural resource managers, such as bio-fuel production and carbon sequestration.

Because of the complex interplay between agricultural and natural resource vulnerabilities, risks, and opportunities, solutions will depend on integrated research, teaching, and extension programs, with decision-makers and other stakeholders included as partners in these programs. We will need new educational curricula, new research programs, and new communications tools to provide information that decision-makers can use to manage risks and benefit from new opportunities.

To help us prepare for these challenges, the CIMR Symposium was organized to meet three objectives:

- To provide a forum for climate professionals and agricultural and natural resource managers to share knowledge, experiences, and ideas.
- To identify priorities and plan strategies for future climate research, education, and outreach that will enable universities, agencies, and organizations to provide climate information for decision makers in agriculture and natural resource management.
- To explore opportunities and needs for developing climate information and decision support systems, as well as how to downscale and apply global climate information at both regional and local levels.

Of 133 registrants, 122 people participated in the CIMR Symposium. About half were university researchers, 15 were students, 13 were from federal agencies, 10 were university administrators, 8 were extension agents, and 10 were from private sector organizations and non-governmental organizations. Participants came from 12 countries and from 19 states of the USA plus Washington DC.

The program of the CIMR Symposium had three principal components: 1) Plenary Sessions; 2) Poster Sessions; and 3) Facilitated Break-out Discussions. The remainder of this report will briefly review these sessions as well as to summarize evaluations by participants.

2. PLENARY SESSIONS

In addition to the opening session, the CIMR Symposium included five plenary sessions during which speakers addressed the following topics:

- Impacts of climate variability and climate change on agriculture and natural resources
- Stakeholder needs for climate information related to agriculture and natural resources
- Integrated approaches that combine research, extension, and education in the application of climate information
- Extension and application of climate information for agriculture and natural resources
- Short- and long-term needs and opportunities for education to promote the use of climate information by decision-makers

All 20 of the speakers in these plenary sessions were invited based on recommendations from members of the organizing committee.

3. POSTER SESSIONS

In addition to the 20 plenary presentations, CIMR participants registered 69 posters for display. We held a Poster Session and Reception the first evening of the Symposium; plus all breaks and lunches were held in the poster room to maximize the time that CIMR participants had to view posters and interact with one another.

A panel of 16 volunteer judges identified the top two posters submitted by students. Vitoria Keener, UF ABE, won the first place award for her poster entitled *Categorical ENSO effects on simulated phosphorus loading in South Florida*. Marie Boisserie, FSU COAPS, won the second place award for her poster, *Impact of precipitation assimilation on soil moisture in the coupled land-atmosphere FSU/COAPS model*. Congratulations to both of our winners!

4. BREAK-OUT DISCUSSIONS

The CIMR Symposium included four facilitated break-out discussion sessions on the mornings of 12 and 13 June. Symposium organizers and facilitators developed lists of questions to guide discussions on each of four topics.

- Educational needs for application of climate information
- Research to meet stakeholder needs
- Extension needs for application of climate information
- Improving integration of research, extension, and education

These discussion topics correspond roughly with the topics of the last four plenary presentation sessions.

Each break-out session was followed by plenary presentation and discussion of results and recommendations. Notes from these sessions follow.

4.1. Educational Needs for Application of Climate Information

Facilitator: Greg Kiker
Reporter: Ken Boote

- 4.1.1. What is the status of current educational opportunities for the above audiences related to climate, agriculture and natural resources? What are the gaps?
- Most universities in the region are missing a holistic course for undergraduate students; one that puts together all the basic pieces of climate change issues.
 - Universities in general may lack of climate change courses for graduate students, particularly courses that include theoretical and technical issues related to climate change.
 - Courses on climate policy and application of climate information are as important as courses on climate theory. At the same time it is important that courses on climate policy avoid becoming mired in climate politics.
 - We should emphasize cross-training through “good citizen” science courses.
- 4.1.2. What new areas (jobs) should we be training students for? What courses are needed?
- The American Meteorology Society should require some courses in climate for their certification program.
 - Climate background is needed for students of economics and business.
 - Climate risk should be introduced to courses that relate to insurance and actuarial applications.
- 4.1.3. How should climate change education programs balance issues related to local and regional impacts versus global impacts, especially differential effect on industrial and developing countries?
- Students want and education programs should provide information across scales of climate from local to international.
 - Students need a good mathematics and biology toolkit in addition to climate.
 - Climate signals are world-wide and have direct effects on prices of oil and food.
 - Education programs should engage local service courses to meet needs of local governments and industry.
- 4.1.4. What are examples of successful educational programs that can be models to guide new programs?
- Service course on sustainable water supply for city and district managers conducted by University of South Florida in Clearwater.
 - Climate change course for undergraduate students offered by Florida State University.
 - Northern Illinois University offers design courses that train in climate and atmospheric sciences students in problem solving, sustainability, adaptation, mitigation, and climate engineering.

- Columbia University’s interdisciplinary MS program for climate and society.

4.1.5. Contrasts among education programs that address climate change.

- Tim Wheeler described an undergraduate course for students who will become climate “extension agents” in contrast with the inter-disciplinary masters-level course that Mark Cane described for students who will work in the field of climate policy. Thought the undergraduate course is still very new, students of both programs appear to be in high demand.
- The undergraduate course is a science-heavy 4-year program whereas that for the masters-level has more of a social science focus in a 1-year program. A 1-year policy course could offer excellent advantage to expose engineers to policy issues.
- Some courses emphasize professional options others focus on policy and management.
- Paul Ruscher described an excellent K-12 program to develop climate-literacy among students. At this level, teaching the scientific method is equally or more important than the particular subject. It is unfortunate that many schools have the attitude that Earth Sciences courses are less rigorous or remedial science courses. Often teachers are ill equipped to teach Earth Sciences.

4.1.6. Regional approaches for cooperation to increase effectiveness of educational programs on climate, agriculture, and natural resources.

- Universities should develop more options for course sharing, in which students pursue selected courses and partner institution, or joint degree programs as are offered at Reading & other European universities.
- The first step should be to conduct a survey of courses available within the region.
- Distance education courses from anywhere in world
 - ✓ Many universities, including the University of Florida, limit students to 6 credit hours that they can transfer from other universities.
 - ✓ We need a system in which we can list courses taught by partner universities for credit at UF.
 - ✓ Programs that would provide important information from potential partners include GIS programs at Utah State and Ohio State, meteorology at Iowa State, and broadcast meteorology at Mississippi State.
- Intensive 2-week course on specific topic, such as the Decision Support System for Agro-technology Transfer course that was taught jointly by UF and UGA.
- Evening courses for K-12 teachers and summer certification courses in partnership with community colleges.

4.1.7. Regional approaches for cooperation to increase effectiveness of educational programs on climate, agricultural and natural resources.

- Alternative Programs (other than distance education or traditional degree programs)
 - ✓ Re-usable “learning” modules using recorded lectures.
 - ✓ Intensive 2-week short courses.
 - ✓ Evening courses.

- ✓ Workshops at professional meetings.
- ✓ “Use of Tools” courses taught cooperatively by research and extension faculty.
- ✓ Games for K-12.
- ✓ Alternative programs must be profitable for both teachers and students.

4.1.8. Who are the stakeholders for CIMR recommendations on climate education? How best can we deliver the recommendations?

- Professional organizations
- Curriculum committees at Department level, Deans, and other university administrators
- K-12 teacher organizations
- State Department of Education and legislative committees
- NGO/Non-profit: translate science into sound bites
- Student-training, scientist-OJT, meteorologists, government policy people
- Survey stakeholders: What are the needs?

4.1.9. What are recommendations on climate education needs that CIMR should communicate to stakeholders over the next 1 to 5 years?

- Re-format courses, RLO (pre-recorded lectures).
- Identify gaps in University programs
- Identify available DE courses, short-courses, and regular courses (other universities that give desired content)
- Design/vision hybrid courses between US & FL universities (implement & expand in 5 yr) that give full academic credit. Student advisement

4.2. Research to Meet Stakeholder Needs

Facilitator: Wendy-Lin Bartels

Reporter: David Letson

4.2.1. Are we asking the right questions? What other questions should we address?

- Food, water, climate, and energy overlap as problems, but holism has its limits.
- Carbon credits are an important but overlooked issue.
- It is important that researchers broaden their audience.
- Researchers should publish more review articles as well as more articles for trade newsletters and extension publications, such as the Electronic Data Information System (EDIS) of UF IFAS.
- Researchers should also write more books because more people read books.
- Meeting stakeholders information needs will require both specialists and generalists along with academic incentives and opportunities for both types of researchers.

- Many universities issue mixed signals when they argue the need for inter-disciplinary¹ expertise while academic departments strongly emphasize disciplinary specialization. We need to clarify how inter-disciplinary we want our students and colleagues to be.
- There is a direct relationship between prestige and size of audience, which may restrict research that would benefit socially disadvantaged groups.
- It is important include a climate perspective when evaluating research outcomes in order to assure relevance. For example, we may need to evaluate a new cultivar or case study for scenarios that would include changing climate and increasing costs for energy and water.

4.2.2. Who are the principal stakeholders for research on climate, agriculture, and natural resources at local and regional scales? Are there any important stakeholders missing today?

- Stakeholders will differ across temporal and spatial scales of climate research products. Many stakeholders have locally specific needs and interests.
- Stakeholders would include both end-users and intermediaries, each of which has different capabilities to use climate information.
- Stakeholders may include both winners and losers with respect to how they are affected by climate variability and climate change.
- Important stakeholders include
 - ✓ Water managers
 - ✓ Trade groups
 - ✓ Financial sector
 - ✓ NGOs
 - ✓ Builders
 - ✓ Various levels of government

4.2.3. How can researchers best identify the needs and wants of stakeholders for climate information? What are the regional and local information needs and priorities of stakeholders?

- Dialog with users and intermediaries.
- Tiered structure of user communities.
- Observing how users adapt climate information to meet their needs, e.g., weather derivatives.

4.2.4. What are examples of research programs that effectively meet stakeholder needs and how can we model new programs after them?

¹ The term inter-disciplinary to refer to educational programs in which students gain proficiency in two or more complementary fields. In contrast, the term multi-disciplinary to refer to programs that involve experts from two or more complementary fields, in particular, fields that include physical, biological, and social sciences.

- Oklahoma Mesonet, Extension, IFAS one-minute radio show, Regional Integrated Sciences and Assessments (RISA) centers
- Programs must have both longevity and trust.
- Access to users
- Engage users early to develop a base of support
- Recognize mutual learning, not one-way information flow.
- Develop multiple products for many clients.
- Partner with intermediaries who have access to and existing relationships with end-users.

4.2.5. Emerging or anticipated climate change-related questions that should be addressed at the regional scale.

- Infrastructure – renovation and retrofitting are equally or more important than new construction.
- Adaptation to climate change and variability, e.g., new cultivars.
- Update climate bases. What is a 100-year storm today?
- Need improved monitoring of climate impacts.
- Support the discovery process as there are still many unknown unknowns.

4.2.6.. Regional approaches for cooperation that could increase effectiveness of research

- Translating what we have learned to what user actually needs. Strengthening delivery channels.
 - ✓ Participatory research, demonstrations, discussion.
 - ✓ Social science research to tweak our message.
 - ✓ How do users make decisions? Organizational cultures, behavior.
 - ✓ Extension specialists who are also researchers.
- Understanding resilience of farming systems. Diversification is one way to adapt to climate variability and climate change.
- Natural land management, e.g., invasive species. How will changing precipitation patterns alter burning and pulling? Endangered species.

4.2.8. Main Messages

- Potential users of climate information do not always see how or why they may use climate information.
- Researchers need identify opportunities and be pro-active in meeting user needs, e.g., carbon sequestration and trading.
- Need to develop new research methods, e.g., linking climate models with crop models. Basic research.
- We must expand the role of researchers. The day is past when a research can be successful with the attitude that, “I am a scientist and I’m here to solve problems, not to talk with people.”

4.2.9. Recommendations

- Remember basic research!
- Develop incentives for multi-disciplinary research programs and opportunities for inter-disciplinary faculty members.
- Incentives, retention: We are losing the generalist. New publication venues. Review articles. Books.
- Trade newsletters should count, too.
- More faculty members should be based at Research & Education Centers to put research on the ground.
- Funding security for longevity.

4.3. Extension Needs for Application of Climate Information

Facilitator: Carla Roncoli
 Reporter: Kristen Chow

4.3.1. Are we asking the right questions? What other questions should we discuss?

- How do you identify stakeholders if they are not aware that they are indeed stakeholders?
- How to disaggregate producers in terms of vulnerability with respect to commodities, locations, etc.?
- How to communicate uncertainty, both short term and long term to stakeholders?
- What are the politics relative to discussing climate change and variability with different groups of stakeholders?
- How does language frame people's responses to new information? For example, the terms 'climate change' and 'global warming' evoke different responses.

4.3.2. Who are the principal stakeholders for the dissemination and application of climate information in agriculture and natural resources? What are their main wants and needs with respect to managing climate risk?

- Producers
- Buyers
- Suppliers
- Green businesses
- Land owners/managers
- Homeowners
- Water resource managers
- NGO's and Environmental groups
- Media
- Schools
- Municipalities (Signatories of Climate Change Agreements)
- Carbon sequestration and carbon trading programs
- Policy-makers

- 4.3.3. What are their main wants and needs with respect to managing climate risk?
- Information that helps reduce anxiety and inform proactive planning
 - Addressing locally relevant questions (e.g., disaster preparedness)
- 4.3.4. What is the current status of extension programs related to climate effects on agriculture and natural resources?
- Much information is not yet reaching the local levels.
 - Examples of information programs that both reach local levels and provide opportunities for partnerships that might help disseminate climate information include:
 - ✓ Master Naturalist and Master Gardener Programs
 - ✓ 4H Program, youth development programs (potential opportunity)
 - There is some concern for issues of liability and repercussions, both legal and political relative to the dissemination of probabilistic predictions.
 - We need to be sensitive to clients as their perspective will depend on whether they are urban or rural, on their educational level, political leanings, and other cultural factors.
- 4.3.5. What does extension need to help it meet the local/regional information and educational needs of their clients?
- Timely information
 - Clear information
 - Consistent message
 - Locally specific research
 - Relevant to local needs
 - Lay person terms
 - Success stories
- 4.3.6. How can extension harness existing partnerships and establish new partnerships to help them acquire, interpret, and communicate information to its stakeholders on climate change, risk management, etc.?
- Identify and follow procedures to establish credibility.
 - Provide transparency regarding source of information and levels of reliability.
 - Identify common ground with other organizations, such as environmental NGOs, for exponential impact.
 - We need to improve relationships with broadcast and other news media and find ways to disseminate information on climate sciences through popular programs, such as *Survivor*.
- 4.3.7. Recommendations
- Identify stakeholders and classify them into “consumer classes” based on vulnerability to climate and other parameters.

- Build on local experiences of climate variability to develop awareness and preparedness to climate change.
- Help stakeholders prepare for what is expected but also convey the uncertainties. It is imperative that researchers do not espouse one specific model and ignore others.
- Build information around win-win situations by addressing what stakeholders will accept and embrace, while also building long-term resilience to climate variability and change.
- Stress opportunities such as carbon trading, not only the negative impacts of climate change.
- Build climate literacy and competence into trainings for extension agents and extension specialists. Promote participation in conferences such as CIMR.
- Develop inventories of available information and credible literatures, customized for different stakeholders.
- Build coalitions to tackle the most complex tasks.
- Recognize the importance of language used:
 - ✓ Be sensitive to the heterogeneity of stakeholders: urban versus rural, differences in educational level, political perspectives, and culture.
 - ✓ Translate information into layman terms. Be sure to define abbreviations and acronyms.
 - ✓ Package information in easily transferable modules.
 - ✓ Convey clear message, but recognize uncertainties.
- Need better integration of existing research on ecosystem and wildlife impacts of climate variability and change into extension and outreach activities.

4.4. Improving Integration of Research, Extension, and Education

Facilitator: Norman Breuer
 Reporter: Gerrit Hoogenboom

4.4.1. What are essential characteristics of integrated research, teaching and extension programs on climate, natural resources, and agriculture? Should we consider integration issues related to other dimensions?

- Linkage between researchers and users should be strengthened through greater awareness and understanding of each others' profiles.
- Research must be relevant to user needs. Relevance will depend on identifying common features among diverse stakeholders with diverse interests.
- The spatial and temporal gaps between researchers and users must be reduced in order to make scientific goals more convergent with decision maker and user needs.
- Research and extension clientele are changing. As farmers become more concerned about environmental issues and as non-farming residents demand greater attention to environmental issues, extension must respond with scientifically-based programs to meet clientele needs and demands.
- Extension needs have changed in the last 10 years. Questions currently being raised present a new challenge to traditional models of technology transfer. Instead of a model in which research produces new knowledge and technology that extension transfers to

clients, we need to adopt an iterative model in which clients of research and extension provide inputs and feedback throughout the research and development process. Climate change, ecosystems health, food security and safety, water management, and international relations are intertwined and must be approached in an integrated manner.

- In the southeast US, few with expertise in climatology also have close connections with farming, forestry, and extension services.
- Because the private sector is expected to play an increasing role in climate change, both as users of climate information and by helping others apply climate information, universities should explore means for extension to more actively partner with the private sector.
- Universities should strive to bring together agencies and organizations that have common interests.
- Establish an information chain from researchers to user, but there is a need for a feedback loop to get information back from the users to the researchers
- An important challenge is that issues of interest at the grassroots level often differ from issues at the policy level. We need a mechanism to transmit information from the grassroots to the policy level, for example, through focus groups or field days. The addition of political scientists to multi-disciplinary research teams could help those teams assess how climate research at different scales can translate into action and policy.
- Scale is important. Researchers need to develop methods both for downscaling of global and regional models and scaling up from local observations to the regional level.
- Some groups do not have access to the typical channels for information and assistance. Establishing partnerships with NGOs who work closely with socially disadvantaged communities and other hard-to-reach communities may improve our ability to improve access to climate information.
- There are important differences between problem-oriented and problem-driven programs. Integrated programs should address the needs of stakeholders and stakeholders should help scientists to define the priorities, goals, and objectives so that social learning may lead to a convergence of community and scientific endeavors and benefits.
- Research is needed on effective ways to deliver and communicate information. We may need different means and forms of communication for different stakeholder groups. Multiple languages may also be needed. We may need to “promote” or “advertize” research and educational programs to clientele, administrators, and governmental decision makers.
- Integrated programs must be willing to go outside traditional academia and outside the boundaries of specific disciplines. Coordinated, multi-disciplinary programs should include both strong disciplinary scientists representing a variety of disciplines as well as inter-disciplinary generalists that can help build cohesiveness in the group and facilitate communication among disciplines.
- Administrators must identify means of providing incentives support for work in integrated programs.
- Summary:
 - ✓ Communication is important. Each member of a program needs to know what others are doing.
 - ✓ Develop common work areas or platforms.

- ✓ Successful integrated programs often grow from a self-selected grassroots effort with visionary leadership.
- ✓ Extension plays a key role in translating, disseminating, and providing feedback to scientists.
- ✓ Incentives are crucial to retaining staff for long-term adaptation research and extension programs.

4.4.2. What are the principle barriers to effective integrated programs?

- Issues that require multi-disciplinary, integrated approaches are so complex that it is hard for individuals, let alone teams, to embrace. Multiple spatial scales, such as farm, community, and region, are an important component of this complexity. Interdisciplinary scientists play a critical role in coordination and translation.
- Similarly, there are significant challenges to defining criteria for evaluation of integrated programs, both for progress and impact.
- Lack of leadership is often an issue. Effective leaders must command broad respect. Examples of success and evidence of long-term commitment may aid this challenge.
- Important obstacles to integrated climate applications programs are disbelievers who deny that human activity explains climate changes and those that believe that climate problems will be solved by science and engineering. A common-ground framework of actions to which all parties can agree is likely the best approach.
- University system barriers include the strong disciplinary nature of academia and a relative lack of reward system that recognizes integrated programs. This barrier may require changes systems of faculty evaluation and will certainly require an institutional commitment that goes beyond individual administrators. Throughout this paradigm shift, however, universities must continue to value strong disciplinary sciences. Thus universities must strive toward multiple objectives.
- The failure to recognize potential benefits from climate change, at least in the short run, and failure to develop strategies for adapting to and taking advantage of new opportunities are barriers both within and outside of academic institutions.
- An important barrier to the success of integrated programs is that many potential users of information products have a poor understanding of probability distributions. A strong, integrated effort is needed to develop educational materials and methods for teaching risk, risk management, decision making under uncertainty, and how to use probabilistic information to the benefit of the enterprise at hand.
- Learning materials, especially visual aids are needed to communicate specific messages. Learning materials such geographic information systems, maps, analog events, and tables and needed to complement textual narrative in our visually-oriented society.
- University administrators typically promote transformational research that leads to substantive change in scientific knowledge outlook of students, whereas extension agents typically need translational research that bridges the gap between theory and application. A stronger focus on the roles of extension in translating research and gathering feedback for research is essential to the success of integrated climate science programs.
- Budget uncertainty is a major obstacle. An apparent lack of political will to fund research that stretches beyond short-term political scales often leads to inadequate funding for

essential long-term, multi-disciplinary research. This barrier is especially great in comparison with the transaction costs of building a multi-disciplinary team.

- Interagency communication must improve so we can avoid redundancy of efforts. Collaboration must supersede competition if climate sciences are to meet the current challenges.

How can these barriers be overcome?

- Identify early adopters.
- Learn from the international development strategies for research on how to effectively engage each target audience.
- Foster a translational role; strong disciplinary people in a multidisciplinary team with a need for one or two people in a translation role.
- Provide equitable access to information. Establish a clear information loop and clearly identify roles of individual roles in gathering and responding to feedback. Similarly, delineate responsibilities between the academic and private sectors with respect to climate information issues.

4.4.3. How might stakeholders for integrated programs differ from those for ordinary research programs? What are the information needs of stakeholders that might benefit from integrated programs?

- Social sciences should employ their full range of methods for interaction with clients, sometimes interviewing focus groups or individuals; ethnographic analysis; participant observation; statistically designed surveys, and others. Each method provides unique and valuable information. It is important to get users to think ahead as individuals before they participate in group interviews. Extension agents may play roles in this research as co-facilitators or as key informants.
- Engage some early adopters to practices and who can then serve as examples.
- The need for rapid changes requires different modes for eliciting information on stakeholder needs and developing deliverables than in the past. Social scientists may facilitate this acceleration by working closely with extension partners.
- Take some key stakeholders along to higher-level meetings to more fully engage them in the issue. Try to get the innovators involved.
- Use demonstration plots either at research centers on-farm trials. Farmers need to see real-world examples of research applications.
- Expand the stakeholder pool by looking beyond the previously contacted client groups. Engaging new stakeholders should be done while maintaining a focus on key issues in agriculture, water, and forestry.
- Different funding agencies might have a different target audiences and priorities. We also need to look beyond traditional funding sources to agencies and foundations that fund programs in wildlife, community development, food safety, tourism and others.
- Need to focus on integration; identify and establish the right partnerships.
- Need to communicate effectively with the target audience, as they might be able to provide assistance with obtaining funding. Client organizations should become partners in a co-learning process.

- Traditional research programs generally focus on delivering results to scientific community and funding agencies. The dominant forms of communication have been scientific publications and reports. We need to also communicate through popular press, e-mail lists, radio, TV, video, blogs, and other modern communication systems.
- Integrated programs are generally problem-driven, multi-disciplinary, and target a variety of stakeholder groups. Forms of communication are more diverse as they aim to inform decision makers, educators, extension specialists, and others, not just the scientific community.

4.4.4. What are the priorities for integrated programs to meet these information needs?

- Effective translation of science and technology tailored to specific user communities.
- Definition of roles of all individuals within integrated programs.
- Recognize and support traditional research activities because strong disciplinary research is a prerequisite to interdisciplinary research and extension programs.
- Identify problem through a stakeholder-driven process.
- Data generation, standardization, and sharing must be improved.
- Allow sufficient time for the program to deliver results.

4.4.5. Recommendations

- Conduct a market survey for climate products and develop an action plan.
- Educate citizenry on climate, environmental, and global change issues.
- Extension should lead short-term efforts in delivery, implementation, and gathering feedback, such as through train the trainer programs.
- Adapt core undergraduate curricula for long-term implementation.
- Change the “publish or perish” paradigm to “publish and partner to benefit society or perish.” This paradigm change must permeate university administration, the tenure and promotion process including peer faculty, and granting agencies.
- Develop and strengthen partnerships between:
 - ✓ Research and extension
 - ✓ Research and users
 - ✓ Public and private entities
 - ✓ State and Federal governments
 - ✓ Others as appropriate

5. EVALUATIONS

About half of the CIMR Symposium participants submitted evaluation forms with the following responses. Values are % of respondents. Answers to question 22 and other comments are below the table. Question 25 refers to participant affiliation and those results are summarized in the introduction.

Key: VD = very dissatisfied; D = dissatisfied; N = neutral; S = satisfied; VS = very satisfied

Question	VD	D	N	S	VS
1. Overall level of technical and program quality of plenary presentations	0	2	2	39	58
2. Format and length of plenary presentations	0	2	2	53	44
3. Length of facilitated break-out discussions	2	2	14	47	35
4. Overall quality of facilitated break-out discussions	0	2	12	43	41
5. The symposium met my expectations for learning	0	2	7	44	47
6. Insights gained were applicable to my situation	0	2	12	34	53
7. Overall formation of symposium	0	0	5	32	63
8. Wednesday evening poster reception	2	4	9	43	42
9. Early morning, mid-morning, and afternoon refreshment	2	2	2	31	64
10. Wednesday and Thursday lunches	2	0	0	20	78
11. Opportunities for interaction with plenary speakers	0	0	5	44	51
12. Opportunities for interaction with poster presenters	0	5	9	28	59
13. Opportunities for interaction with symposium sponsors	0	2	16	40	42
14. Website communication and information	0	0	5	29	66
15. Abstract solicitation, management, and communication process	0	0	7	38	55
16. Pre-symposium registration communication and assistance	2	0	5	27	66
17. On-site staffing and registration assistance	2	0	0	17	81
18. Quality of symposium CD	0	0	20	27	52
19. Quality of additional symposium materials	2	0	2	38	58
21. How satisfied were you with the hotel and facilities	0	2	9	32	57
23. What is your overall rating of this symposium	0	0	5	37	58
24. Overall value for symposium fee	2	5	5	37	51
26. Would you attend a future CIMR symposium	Yes = 93%; No = 7%				
27. This symposium should be:	Continued = 72%				
	Shortened = 13%				
	Expanded = 11%				
28. This symposium should be held:	Annually = 18%				
	Every 2 years = 73%				
	Every 3 years = 9%				

22. Comments regarding hotel and facilities:

Positive

It meets all needs in one location (3)
Many activities to support meeting environment
Excellent food (6)
Family friendly
Excellent/clean rooms and location (14)
Excellent conference facilities (6)
Attitude and service of staff was great (15)
Green hotel is great (3)
Close to meeting room
Many opportunities for informal networking
Great layout
Good to have food service in poster room
Very relaxing, beautiful setting (8)

Improvements needed

Those asking questions need to use microphones.
Poor quality wireless internet connection in rooms (6)
Check-in too late
Check-out time too strict
Parking was difficult (2)
Room was too far from sessions; I kept getting directions confused
Too far from airport
Cleaning and room service were poor
Problems with lighting or TV (3)
They charged me \$15/day to park because I stayed at another hotel
Resort atmosphere is distracting

Which session was the most beneficial?

All (9)
Opening session (5)
First plenary session – impacts of climate on agriculture and natural resources (8)
 Cynthia Rosenzweig (1)
 Thomas Chrisman (1)
Second plenary session – stakeholder needs for climate information (3)
Third plenary session – integrated approaches (3)
Fourth plenary session – extension and application of climate information (3)
Fifth plenary session – short- and long-term education needs (4)
Poster sessions (3)
Break-out discussions (9)

Informal networking (2)

Those with big-picture focus (1)

Which session was least beneficial?

Presentations with dense data (2)

First plenary session – impacts of climate on agriculture and natural resources (1)

Second plenary session – stakeholder needs for climate information (3)

Third plenary session – integrated approaches (2)

Fourth plenary session – extension and application of climate information (0)

Fifth plenary session – short- and long-term education needs (2)

Poster sessions (1)

Break-out discussions (5)

Second day of break-out discussion (2)

Other comments and suggestions:

Please, please! Let's make sure we do an Action Plan and present it to the "appropriate people." Let's make sure we set priorities and make it part of the Action Plan. There are short-term and long-term actions. I hope we identify these in the Action Plan. I hope there are individuals assigned to do things. I hope there's time table and a plan for follow up.

Don't forget to invite NRCS to be a sponsor in 2010.

Too many 15- to 20-minute sessions without a break

More break-out topics from which participants could pick and choose

Involve the Association of Mayors

No less than 30 minutes per speaker

The "REE" discussions were not different than any other "REE" discussions I've been in, but nothing seems to change. Our institutions need to grasp that the "user" world is changing and universities need to adapt or they will be irrelevant to society on the issues, not just climate change.

Make it more national in scope – not just speakers, but participants

Expand question and answer sessions

Please invite scientists giving a rudimentary overview of climate change, explain the cause, define the terms, how ozone layer forms and is it real that climate change is happening. Should we be alarmed?

Add sessions on adaptation to climate and risk assessment and management

This was a great conference and the organizers are to be congratulated for their development of this type of meeting

Expand the contribution for extension services and, if possible, growers and other users point of view.

It was a regional conference, could become much more national or international event.

Energy sector would be interesting. Engage even more local governments and NGOs.

Speakers should have live internet.

It is unfortunate that so many participants, especially plenary speakers, left early. Is there a way to contract with participants to make sure that they commit to the entire symposium?

I appreciated that both agriculture and natural resources were presented.

I would like to see more presentations on urbanization and climate change
The cost of the event was high, but worth it. I drove daily to the event and the hotel charged \$15 to park. Parking should be included with the registration fee.
Many lessons learned. The lesson that there is “no correct model” needs to be taught continuously.
Importance reinforces the need to repeat the symposium, possibly bi-annually.
I wish other symposia included more cases of Argentina.
Social sciences, economic aspects, examples of successful programs nationwide, agricultural engineering
Posters were not integrated into the meeting program
Keep inviting experienced professionals from different sectors to the audience can have a wide view of problems and needs to be addressed.
Please have persons identify themselves when asking questions. Start first question for each session in order to nudge the shy to participate. Find time to get questions asked.
I wondered why there were two break-out sessions on the same topics. Maybe these need to be refined or kept as is but with different objectives.
Perhaps presentations targeted to the science behind climate change predictions.
This type of symposium should be repeated once every year or two. Sectors to target should include all targeted this time, but also include the real stakeholders as well.
If the intention is for this symposium to become a forum for sharing research needs and new tools /programs, then there should be greater representation of use communities in order to facilitate a two-way discussion.
Need representation from stakeholders, which could include agriculture sector, county, state, federal, global.
What is needed for profitability and environmentally sensitive in the short term – climate variability. What is needed for sustainability in the long term – climate change.
Invite more stakeholders: Businessmen/women, state and city associations, K-12 curriculum developers, farmers, conservation NGOs, tourism industry leaders
Target more non-academics
Symposium was well-organized and well-run
I suggest that the next time you widen the diversity of participants, i.e. involving more people from other parts of the world.
As always it was very valuable to network with colleagues. I came to this symposium or no knowledge of climate terminology models and protocol. The conference helped me to become more versed and able to incorporate this information in terminology into my work and to understand new information better. I’ve made contacts to be able to follow up on what I’ve learned and I’ve discovered web-based resources as well.
Thank you!
Emphasis on application of research was excellent.
The time given for meeting with colleagues was very valuable.
Additional sectors to court for the next CIMR: transportation, including air, rail, ground, boat; tourism and recreation of all types; energy, including hydroelectric, coal, buyers and sellers of energy, renewable, including wind and solar; construction; media, including news directors, investigators, reporters; some private industry, vice-chancellors of extension at land grant schools.

No doubt agriculture is the most sensitive industry to climate, but there are many others.

Invite the other industries and spend at least a day on each.

The food was great.

Media participation if possible

Diversification of sponsor and stakeholder booths

Participation of users and stakeholders in planning of next CIMR

Not enough time to prepare reporters' presentation.

A social science presentation would have improved the program, not just extension or economics, particularly on the complexities of decision making and integrating knowledge into risk management.

I would prefer a more even split of agriculture versus natural resources speakers. It was much heavier agriculture. But the diversity of specific topics – precipitation, ag impacts, IRI, climate forecasts for ag, efficient ag production – was very good.

Nice opportunities to network and collaborate.

Impressive speakers and very respectful on one another – great!

Fabulous food and drinks

Good length of breaks and lunch

Great keynote speaker

Possibly attract larger, more diverse audience – informal and formal educators, NGOs, park service, local, regional government, extension.

Very educational! Thanks!

Really liked that last day discussions

Should break into long-term climate change research versus short-term applied research.

Would be more informative for some to attend one or the other.

Target more non-academics