

“I Do Not Feel ‘Soft’ at All”:

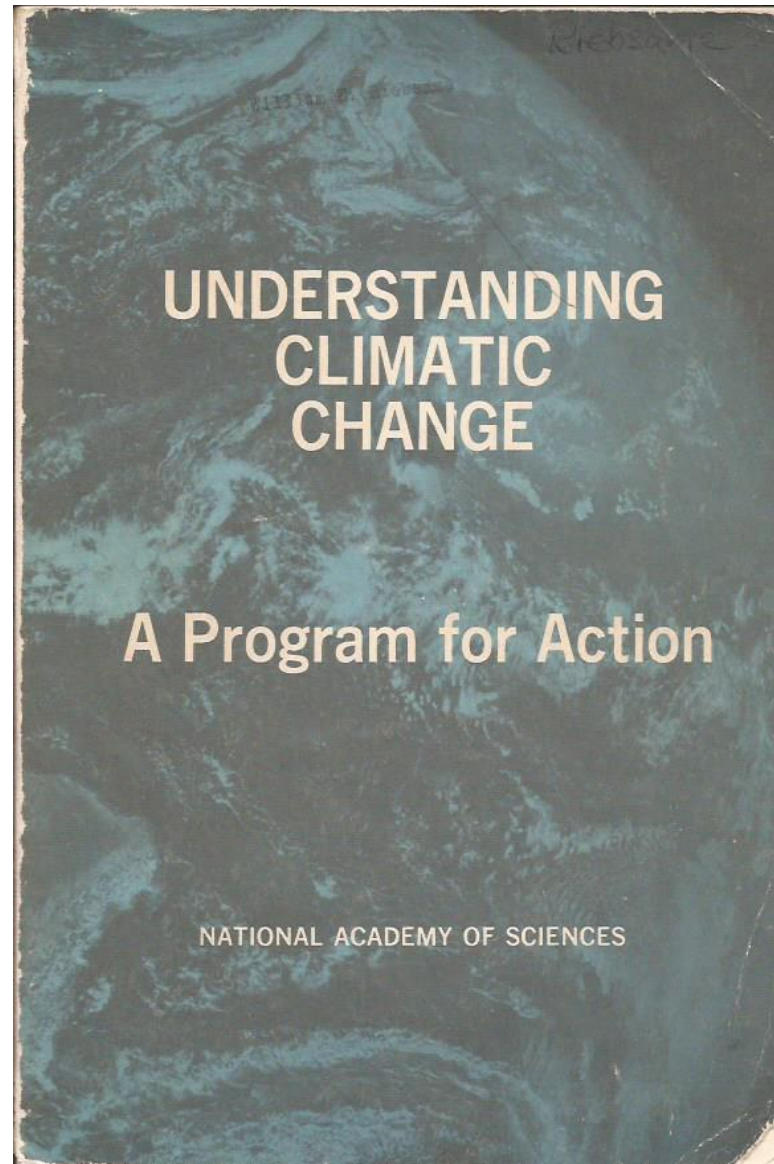
**A look back at Climate and Society Research
between the first (1979) and second (1990) World
Climate Conferences**

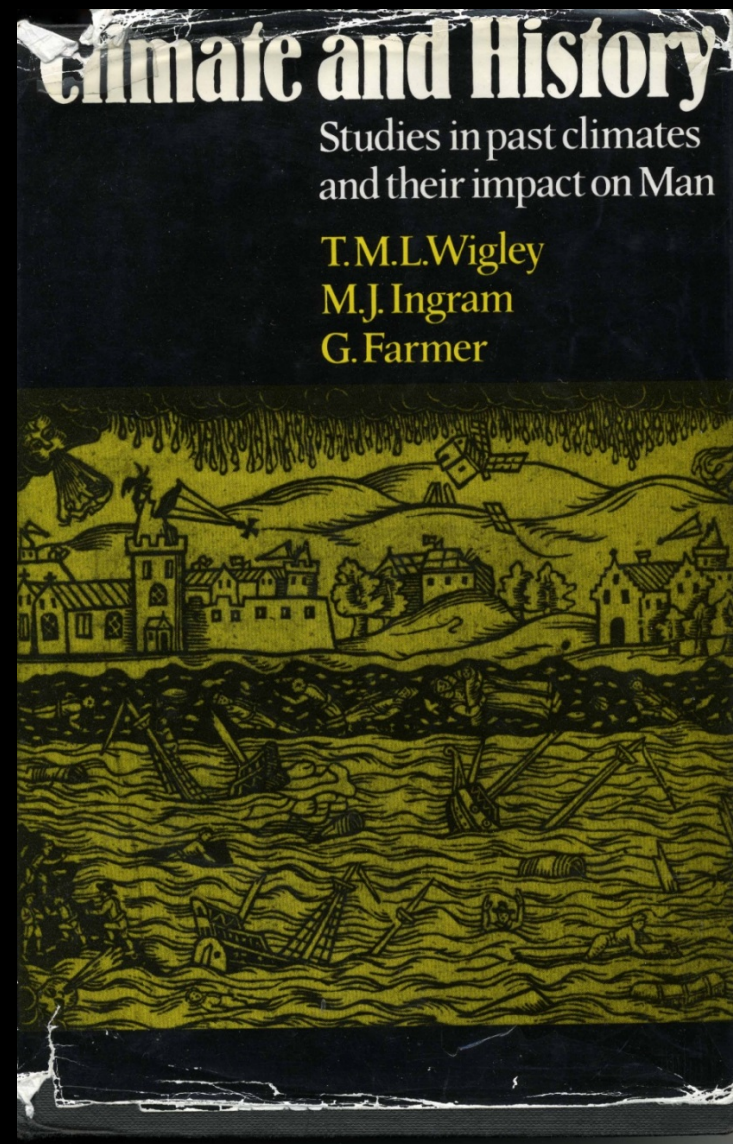
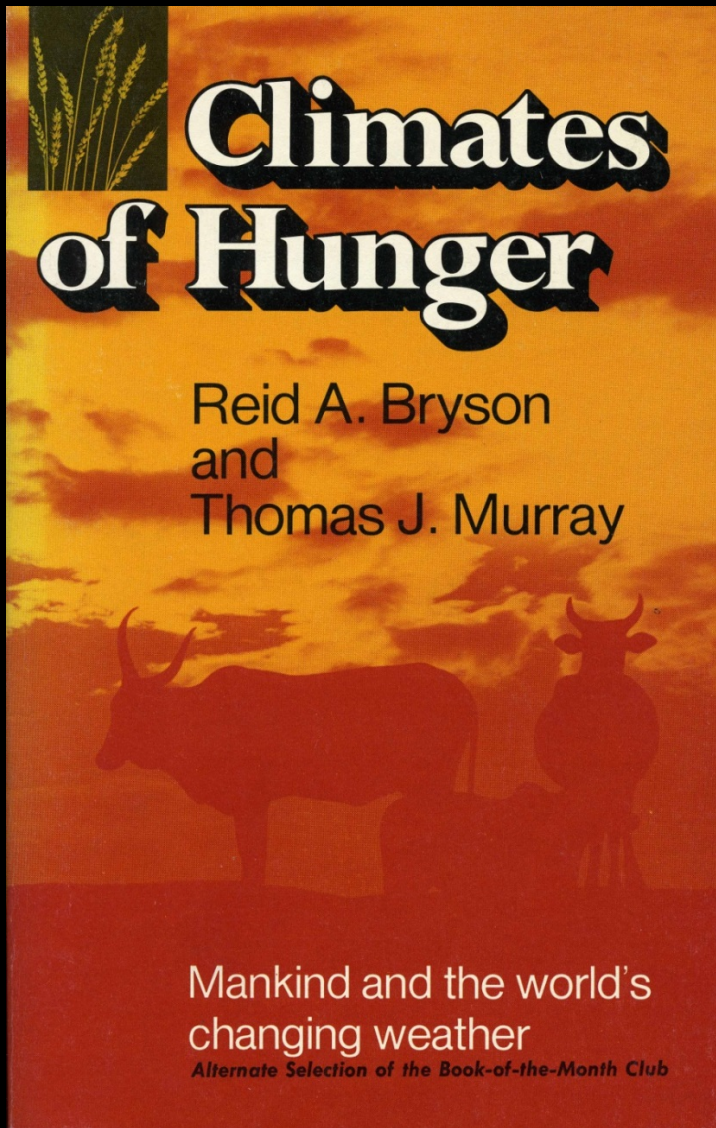


**William Riebsame Travis
University of Colorado**

1975 Academy report

Brief mention of social impacts in first sentence as justification for a concerted climate science, and concern over potential for “man’s impact” on climate, but no hint of integrating social science.





But climate and society research was underway, especially on historical cases, but also in impacts of urbanization, weather modification, and some natural resources and hazards.

1979 First World Climate Conference

The project of the time, as described by Bob Kates, one of the two social scientists asked to speak at the first World Climate Conference (along with economist Ralph d'Arge), was to build a social science of climate; as Bob said in his opening remarks:

This Conference has many remarkable qualities, not the least of which is the initiative of the WMO and the organizers to extend the welcoming hand of collegiality to those of us in the human sciences and to propose a partnership for the joint solution of one of the potentially great questions of the human environment.



Evolution of natural and social science interactions in global change research programs

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Efforts to develop a global understanding of the functioning of the Earth as a system began in the mid-1980s. This effort necessitated linking knowledge from both the physical and biological realms. A motivation for this development was the growing impact of humans on the Earth system and need to provide solutions, but the study of the social drivers and their consequences for the changes that were occurring was not incorporated into the Earth System Science movement, despite early attempts to do so. The impediments to integration were many, but they are gradually being overcome, which can be seen in many trends for assessments, such as the Intergovernmental Platform on Biodiversity and Ecosystem Services, as well as both basic and applied science programs. In this development, particular people and events have shaped the trajectories that have occurred. The lessons learned should be considered in such emerging research programs as *Future Earth*, the new global program for sustainability research. The transitioning process to this new program will take time as scientists adjust to new colleagues with different ideologies, methods, and tools and a new way of doing science.

global change programs | multidisciplinary | sustainability science

could be viewed as dominated by the physical, geological, or meteorological sciences, when its main goal is to preserve the global life-supporting system" (3).

The second thread is related to the neglect of the social sciences in this new program formulation. At the Ottawa symposium, there was one direct contribution on the human drivers of global change (4), but it was tacked on at the end of the program. William S. Fyfe, a geochemist from Canada, made the summary of the overall symposium, and it was his dramatic oral presentation, where he focused on the human impacts of global change, that seemed to convince the delegates at the General Assembly to embrace planning for this new initiative.

Robert W. Kates, geographer, contributed a comment to the published results of the Ottawa symposium, where he noted the lack of social scientists at the meeting who could contribute to the emerging goals of the new global change program (5). It was the sense of the organizers of the meeting, however, that the challenge of bringing the physical sciences together with the biologists was a sufficient challenge and that it would be unwise to attempt to go to the next step of incorporating the social sciences.

Kates did note in his remarks what impediments needed to be surmounted to actually make this important social-natural sci-

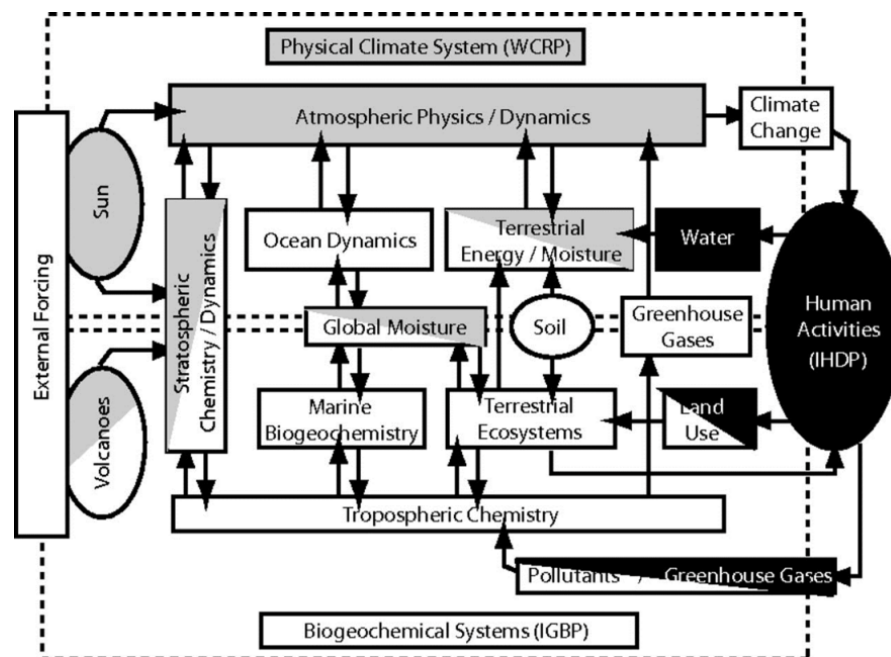
It works out that Kates was asked to speak near the end, to sum up the discussions from the point of view of a social scientist. Here's some of what he said:

It is common, though somewhat insulting, to use such terms as 'hard' and 'soft' science to describe differences between physical and social science, and one is struck by how difficult it would be to apply such terms generically in the context of our common subject – climate. Indeed, in a very real sense there is a convergence of our common scientific problems.

Earlier I singled out three scientific problems that we scientists of society face in understanding climatic impacts.....However, after a week of listening to the disarray of the atmospheric theory of forcing mechanisms, to the debate over the so-called "robustness" of the atmospheric system, and to the confusion of how to recognize the signals of slow, pervasive cumulative climate change, I do not feel 'soft' at all. Some of our understanding seems to be considerably harder than that of the physical scientists.

Why the “welcoming hand”?

- Another forcing function to include in models (SRES, RCPs, SSPs)
- Provide evidence of impact, threat (early damage functions) and logic for mitigation
- Reduce those impacts via adaptation
- Learn more about human behavior



1990 Second World Climate Conference

A full program of atmospheric and social science, as well as significant policy analyses, and then a ministerial meeting, a proto-COP.

- Main social insights from the first era of “Climate Impact Assessment”—first-order assessment
- hints of the rise of “vulnerability” as over-arching theme
- unsophisticated notions of adaptation
- no integrated modeling

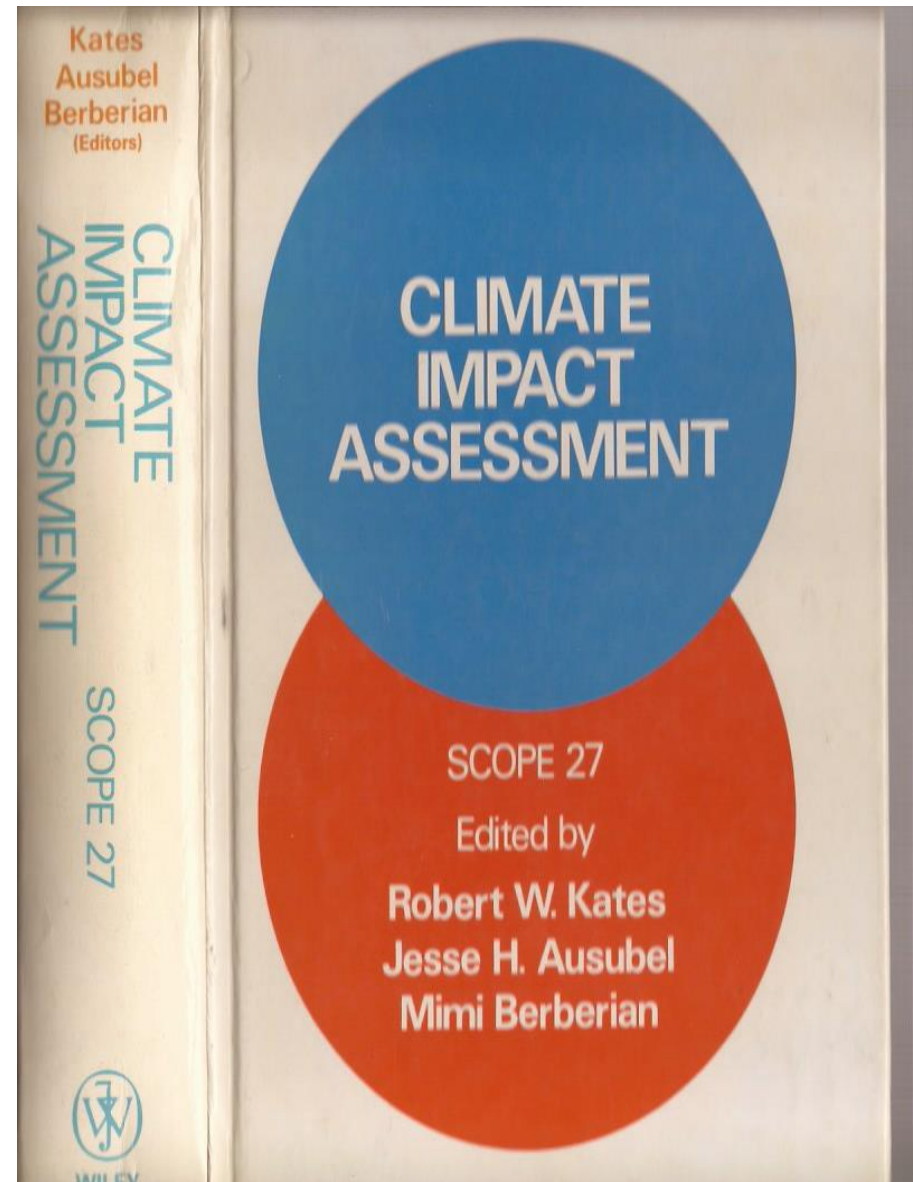
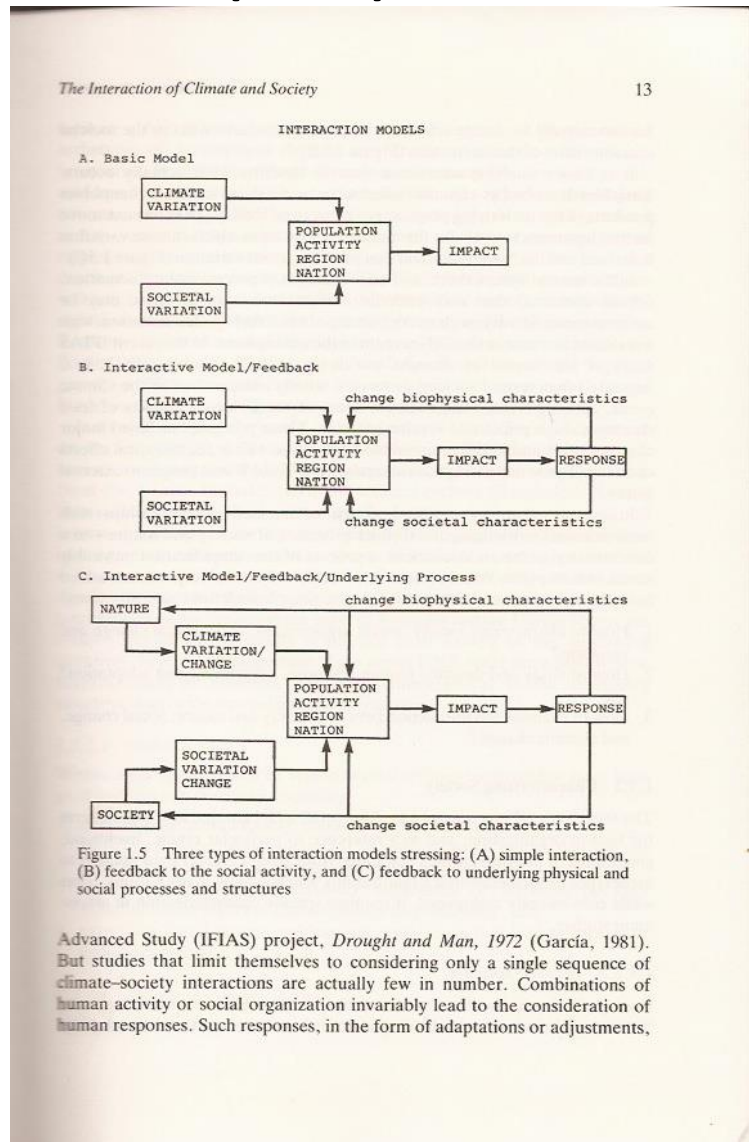


Some Themes (1979-1990)

- Lessons from the past, e.g., Little Ice Age, Dust Bowl (**Now distrusted as method**)
- Integration of natural & social science (**Done**)
- Development of climate impact assessment methodology (**Done but lots of methodological diversity, and sloppiness**)
- Adaptation vs. mitigation tensions (**Recently resolved**)
- Emerging focus on limits to adaptive capacity and vulnerability (**paradigmatic now**)
- Mixed hypotheses on the role of extremes in societal response (**one of Bob's "challenges" from the 1979 conference**)



Development of Comprehensive and “Integrated” Impact Assessment (1985)



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Adaptation vs. Mitigation

The 1988 Toronto *Conference on the Changing Atmosphere*

A moment of optimism for a quick agreement to limit greenhouse gases modeled on the Montreal Protocol on Chlorofluoromethanes.

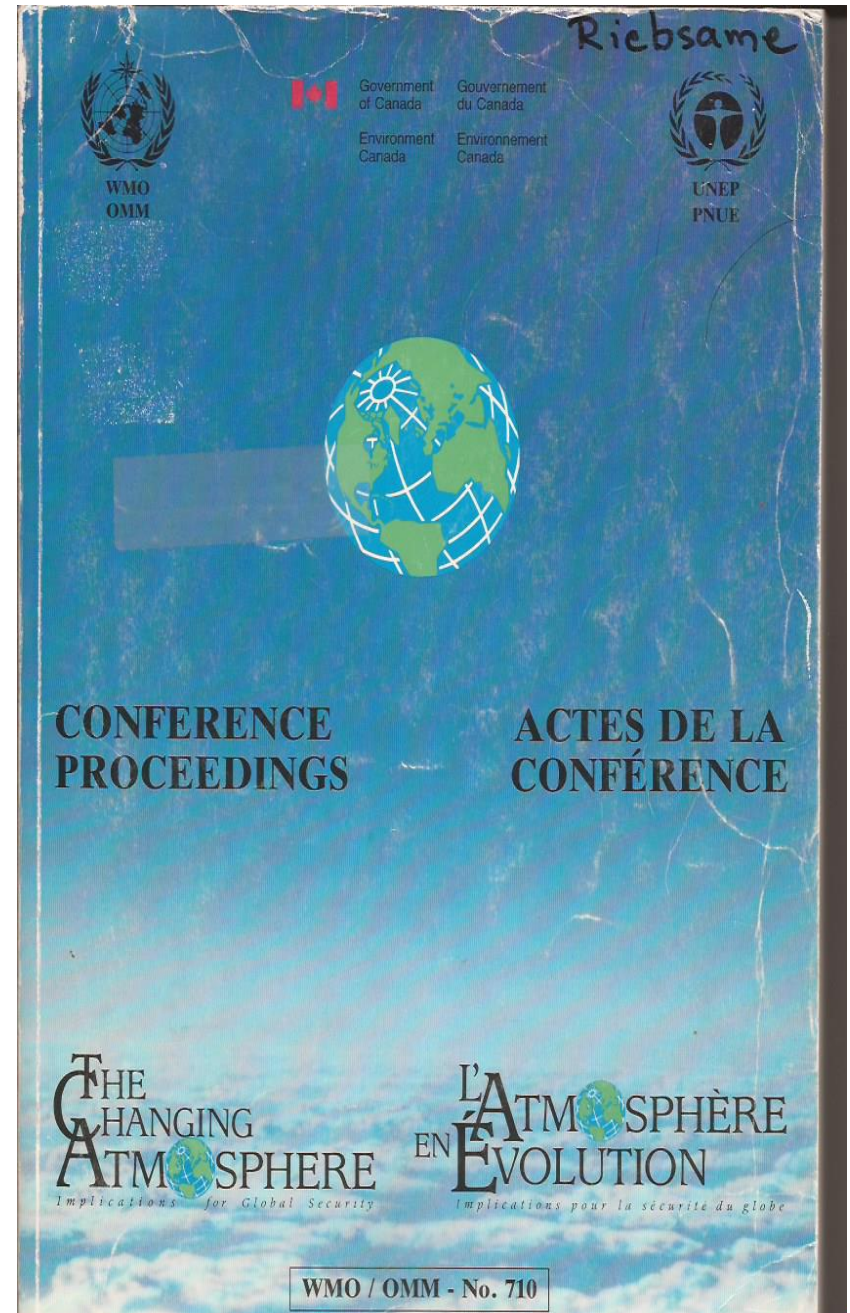
Notion that we'd fix the problem before adaptation was needed.

A strong aversion to explicit work on adaptation.

William Gough, now dean of graduate education at the University of Toronto, when asked last year to take a 25-year look-back to the Toronto Conference, corroborates this notion:

[Interviewer Don Campbell]: What is the most important contemporary issue about climate change that no one could have predicted 25 years ago?

[Gough]: Physically, the rapid disappearance of Arctic sea ice has surprised us by outstripping climate models. In the 1980s and 1990s, climate change discourse largely focused on reducing emissions and now, sadly, the stage is shared with adapting to climate change. I think we were far more optimistic that action could take place and thus adaptation would not be needed. More subtly, even engaging in an adaptation discussion then would have diverted the discussion away from emission reduction, a wedge that would have allowed those reluctant to reduce emissions to stall even more. (Campbell, 2013; underlining emphasis is mine).



WHAT'S SOCIETY'S ADAPTIVE CAPACITY?

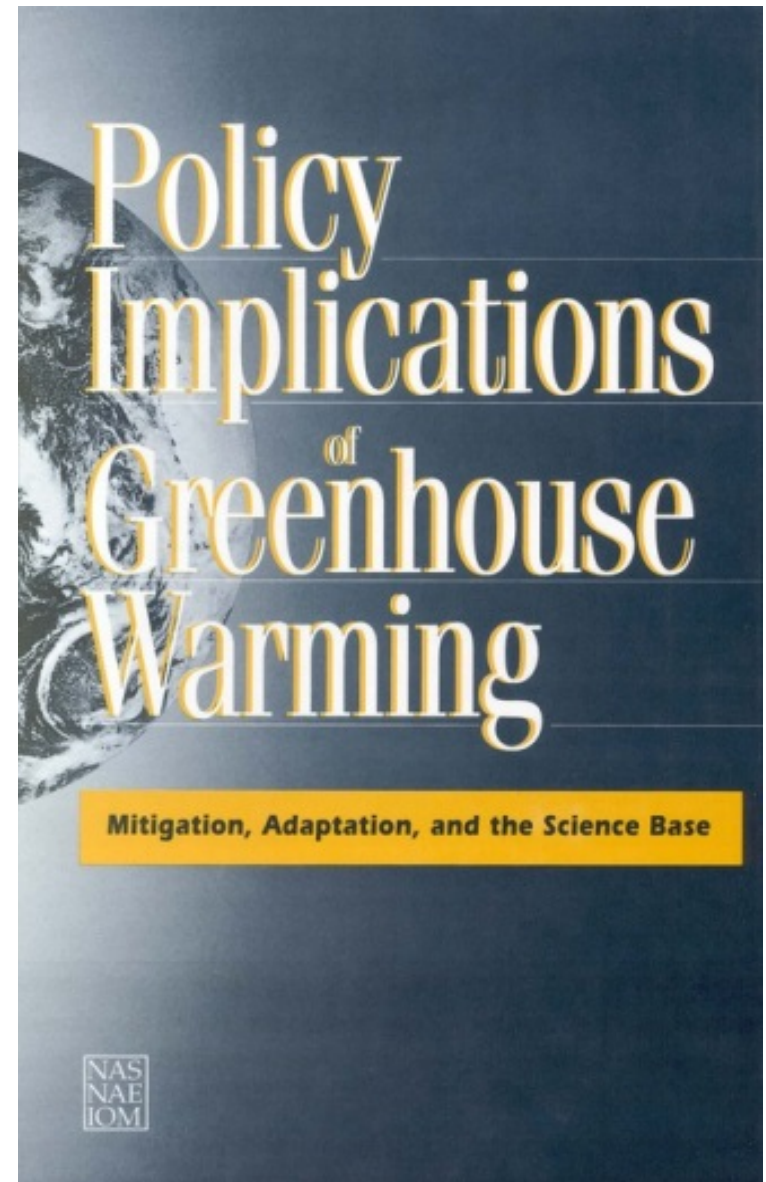
(Is it 1.5 or 4.5?)

NAS (COSEPUP) report “Policy Implications of Greenhouse Warming”, with IPCC-like three-part structure science, adaptation, and mitigation.

COSEPUP's adaptation panel asked how adaptable are human systems. How do we judge the limits to adaptive capacity? What lessons do we draw from past extreme impacts? **We talked ourselves into an optimistic stance, concluding that:**

"So far as we can reason from assumed gradual changes in climate, their impacts will be no more severe, and adapting to them will be no more difficult, than for the range of climates already on earth and no more difficult than for other changes humanity faces" (p. 657).

Similar sanguine conclusions for agriculture, industry, infrastructure and ecosystems led one adaptation panel member, Jane Lubchenko, to write a dissent to the Adaptation panel's “*complacent tone*” and to conclude: *“In summary I disagree with the report's implicit message, that ‘we can adapt with little or no problem’” (p. 659).*



My list of current to near future challenges in social science of global change

- Conflation of **extremes** as climate change
 - Study role of extremes in adaptation
 - Fundamental research on how people cognize climate
- **No Regret/Low Regret** adaptation options?
- **Adaptation efficiency** (over-adaptation perhaps driven by extremes, worry about an “adaptation deficit”)
 - Define terms, offer hypotheses, test them
- Take advantage of the turn to **risk framing** of the climate change problem, to apply formal, quantitative risk and decision analysis to adaptation but so far often without sufficient attention to technical concepts and methods of formal risk and decision analysis. Chap. 26 (Moss et al.) in NCA-2014 lay this out.
 - A future AGCI session?
- Harvest **natural experiments** whenever possible

Risk

$$R = p * c$$

Expected utility of decision

$$EU(di) = \sum_{j=1}^N P(s_j) U(di, s_j)$$

d_i = alternative decisions $i = 1, 2, \dots$

N = number of possible future states (s_j)

$P(s_j)$ = probability of state j

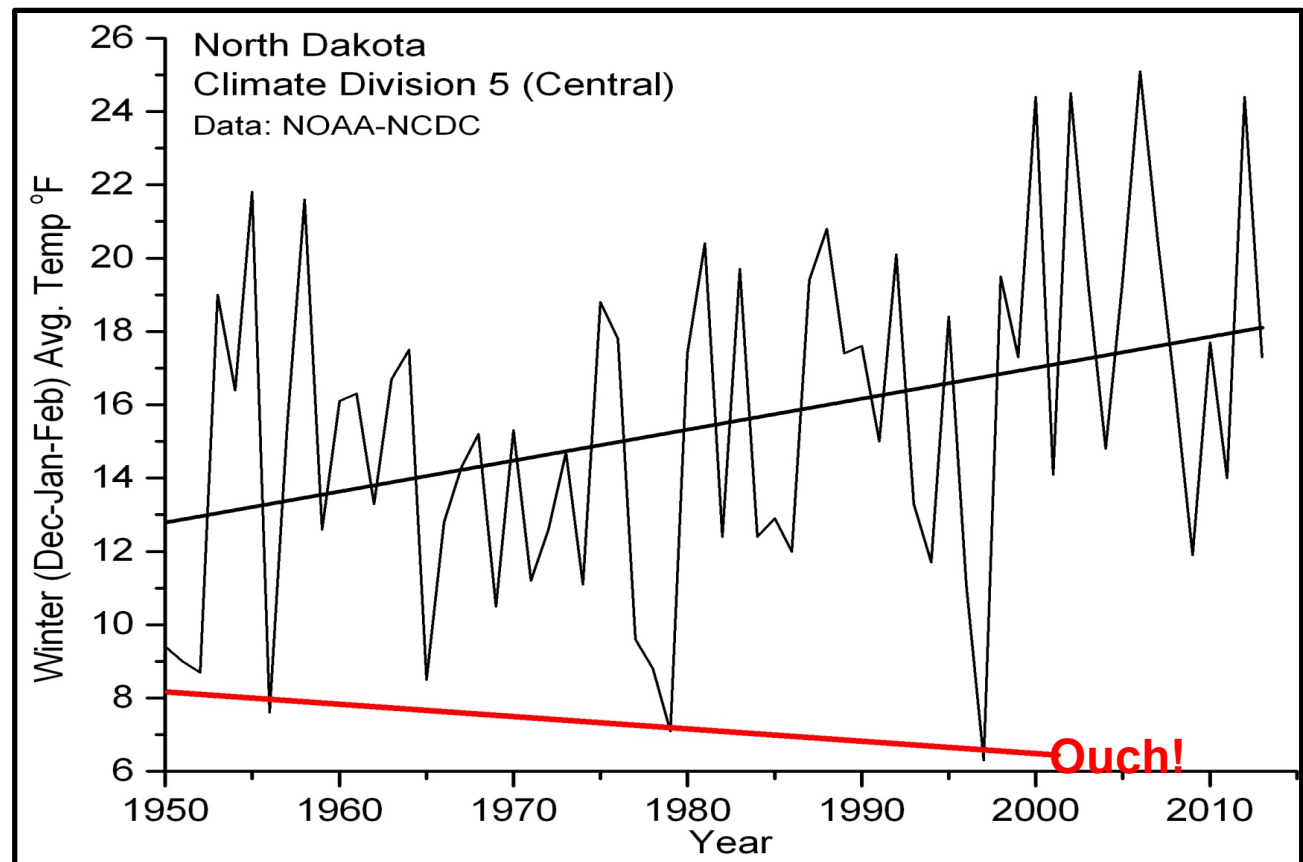
Risk and regret aversion

If S is a state, and P a policy choice,
let $P^*(S)$ be the best policy choice
conditional on S being the state, and
 $V(S, P)$ the value of choosing policy P if the
outcome is S . Then the goal is:

$$\text{Min}_p \text{Max}_S [V(S, P^*(S)) - V(S, P)]$$

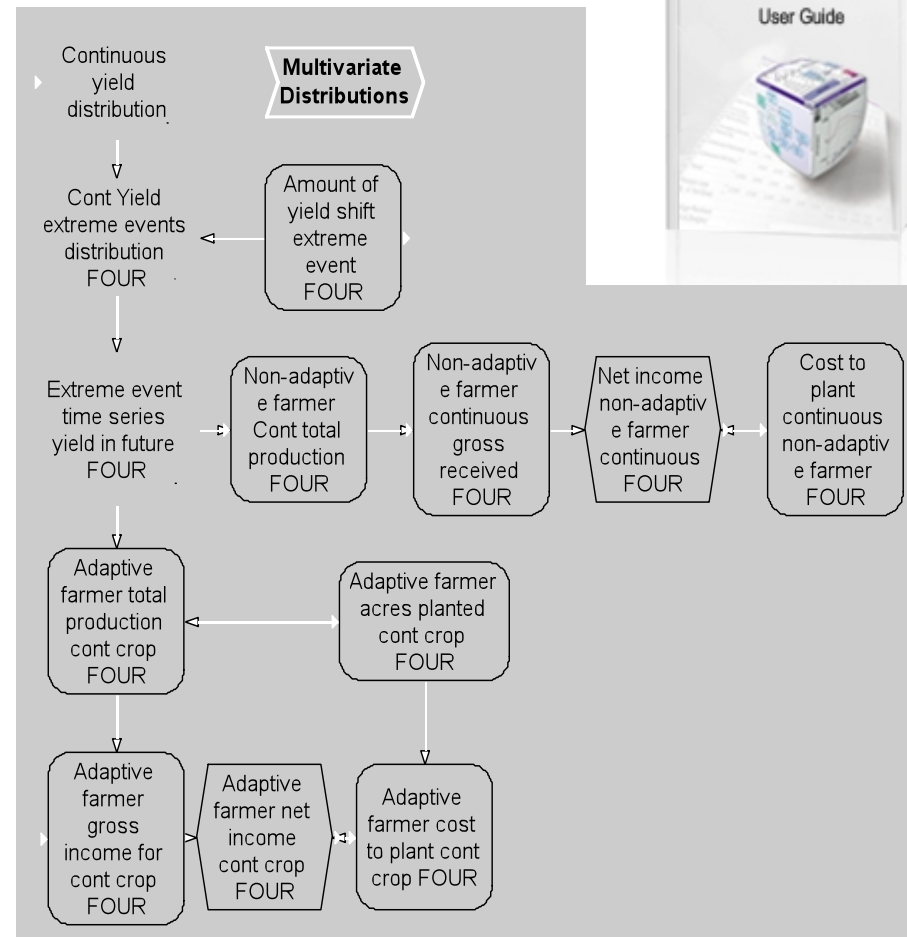
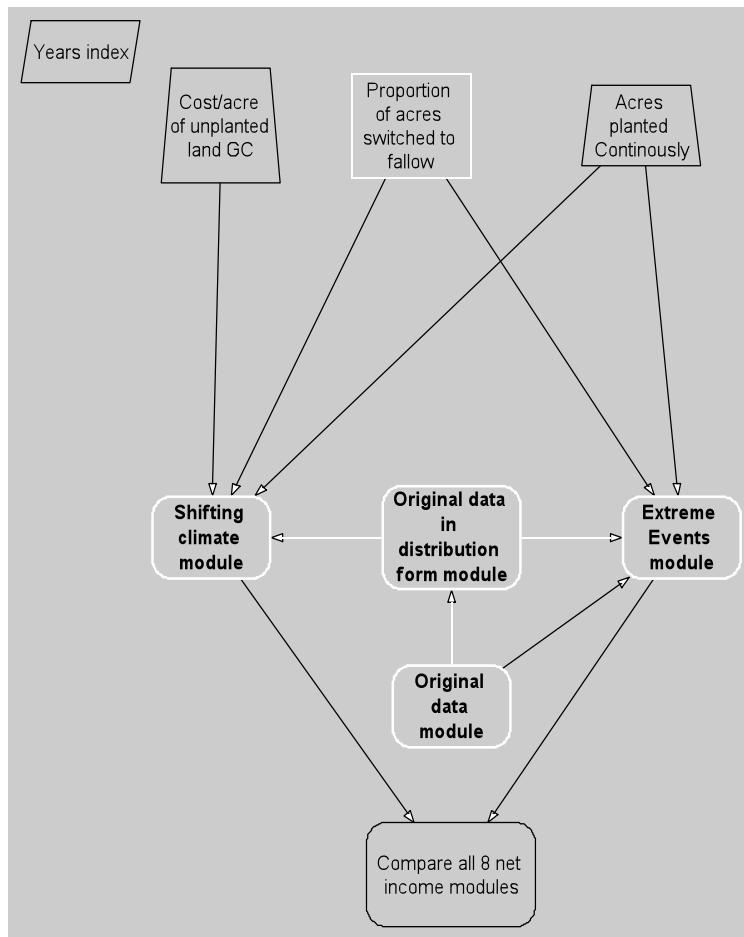
Adaptation decision-making

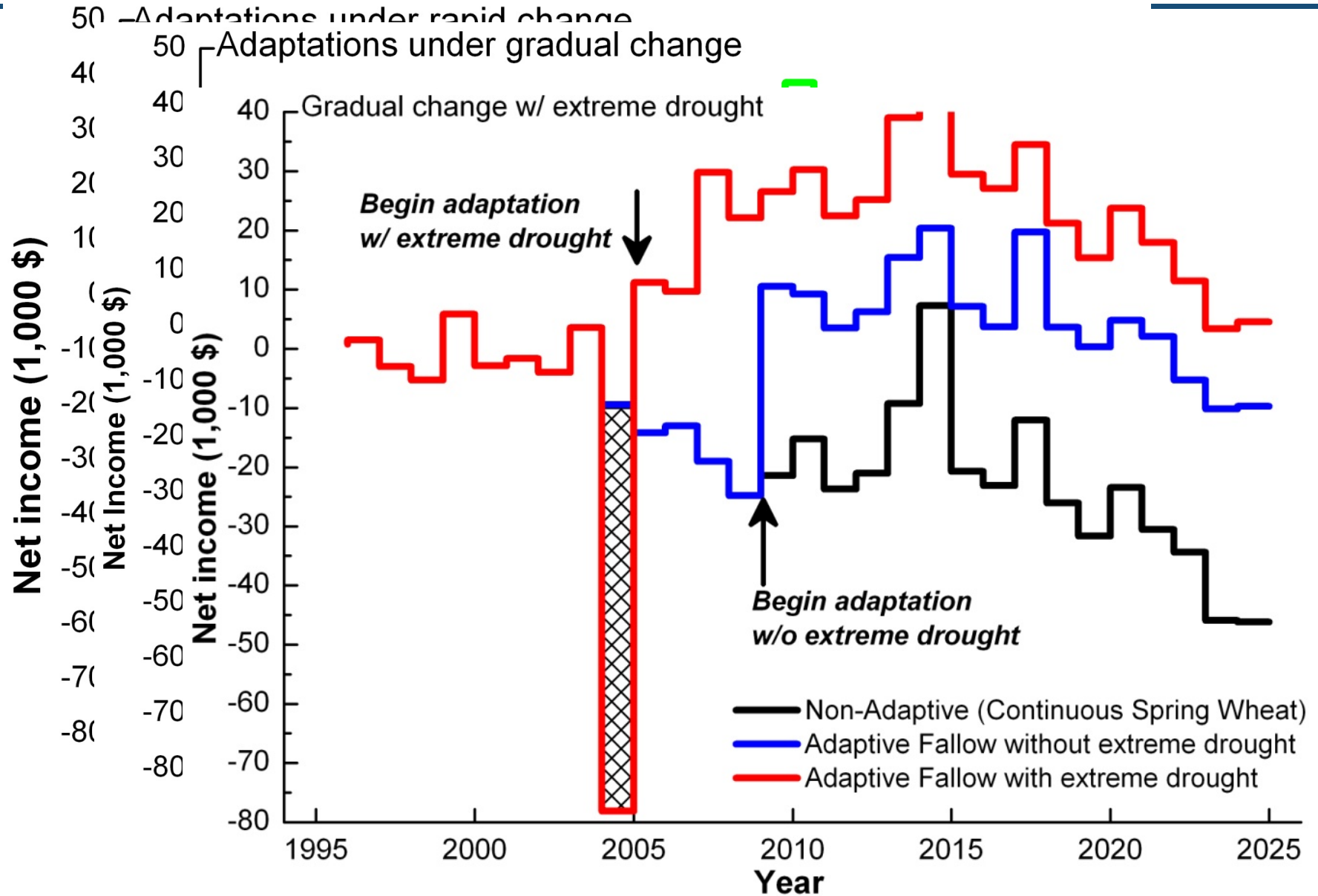
- Adapt to what trend?
- When to adapt?
- What adaptation?



Farmers in central North Dakota are growing more **Winter Wheat** as winters warm and cold-hardy varieties become available. But watch out for those cold extremes! Is it time to switch yet?

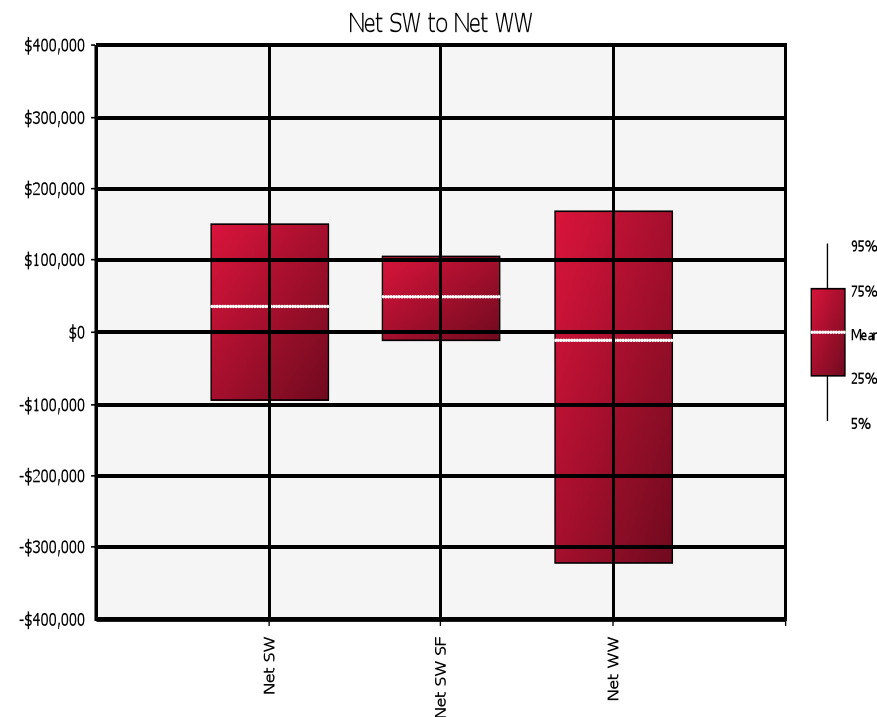
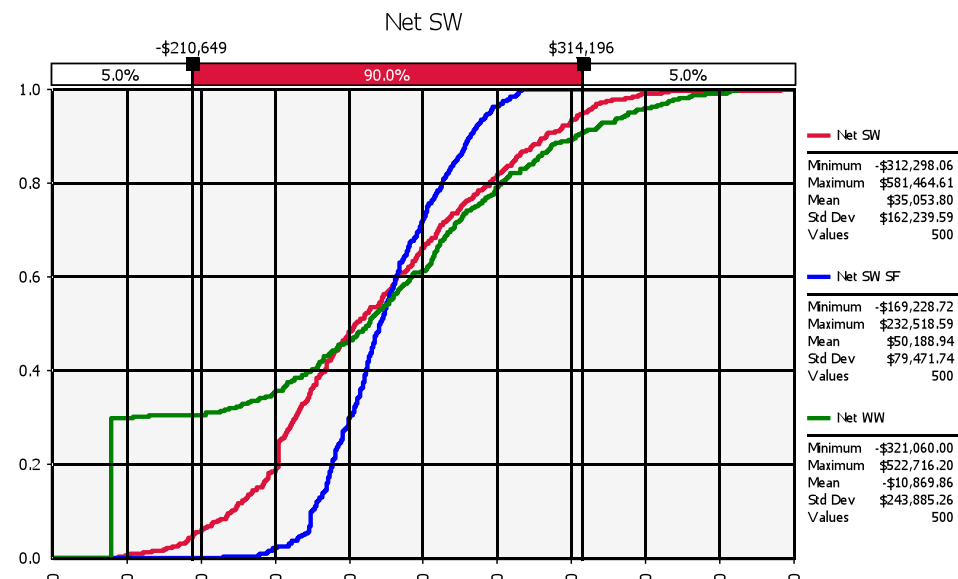
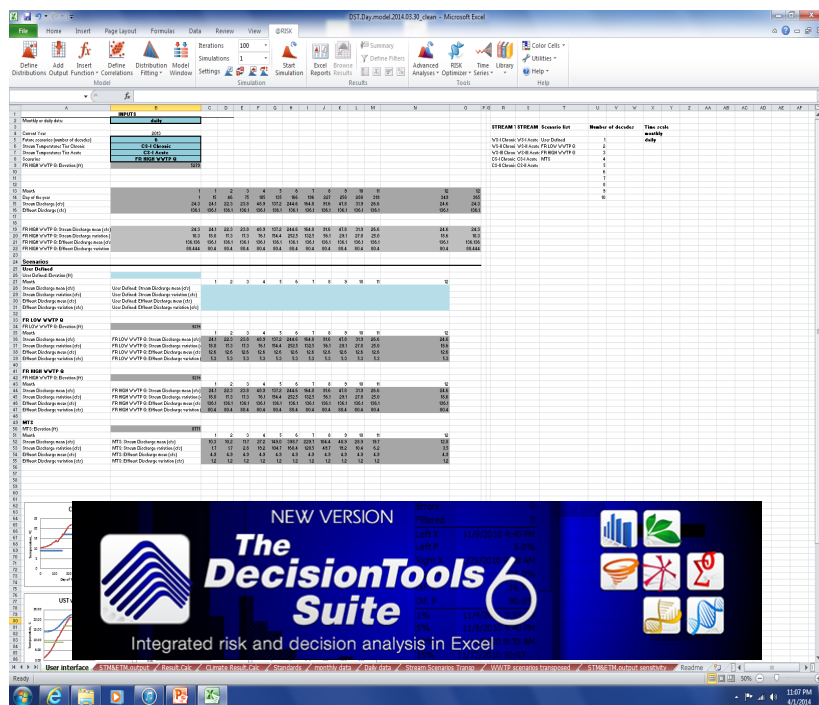
FarmAdap: Great Plains Dryland Wheat Farm Decision Model

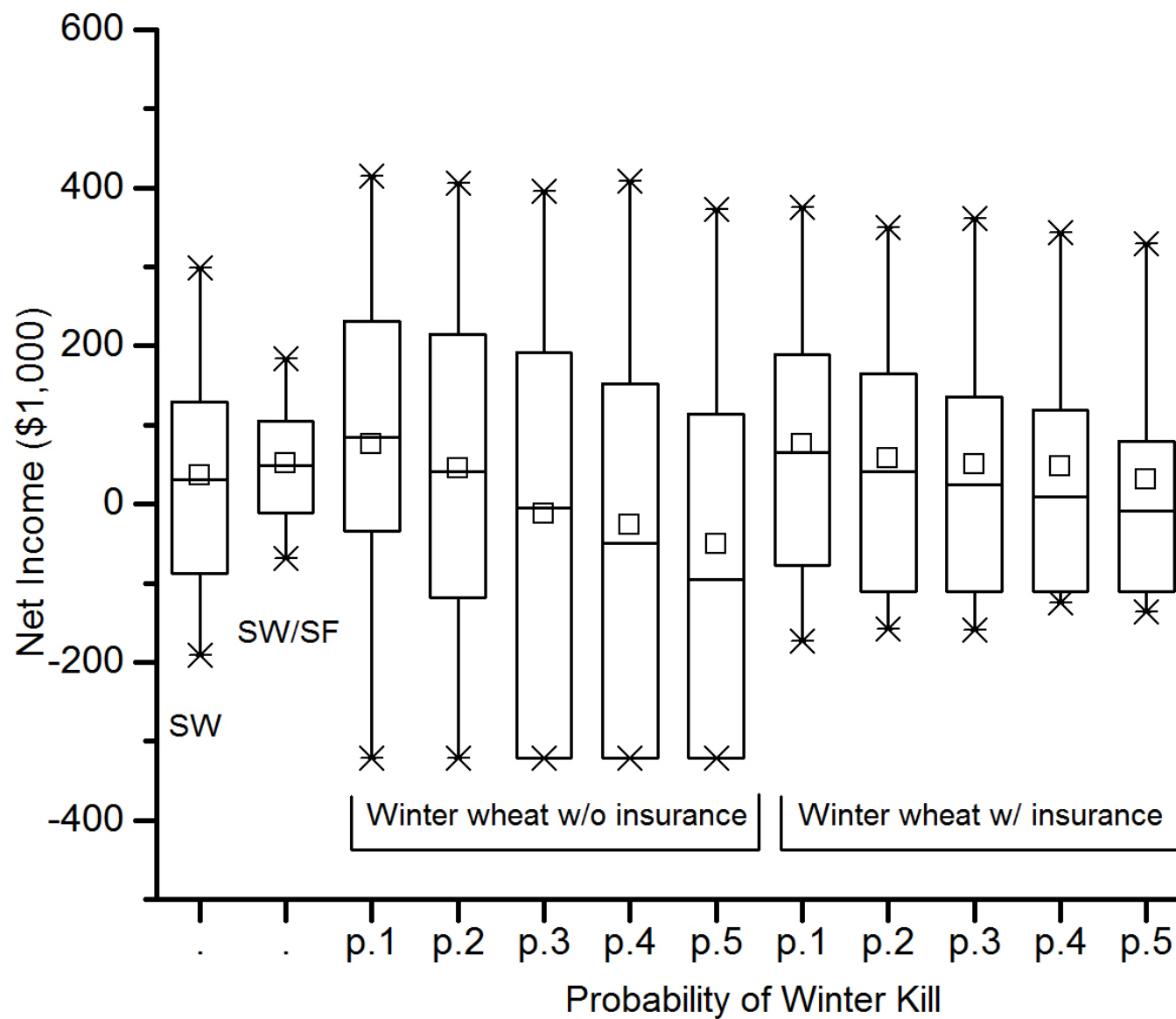




When to Adapt?

Crop switching in a warming and wetening climate





When I decided that I was social scientist



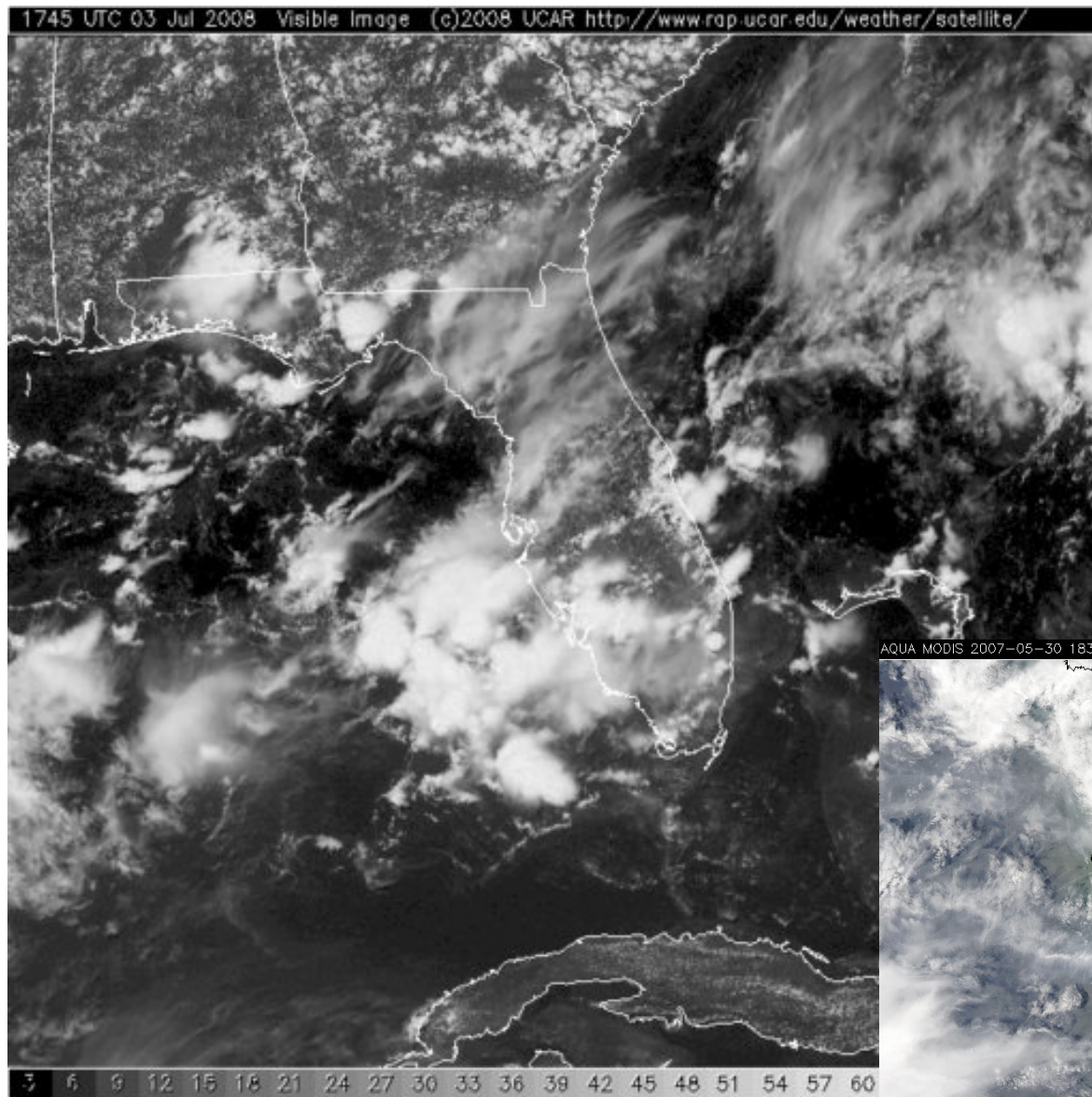
“Flooded
cane fields
attract and
make more
rainfall”



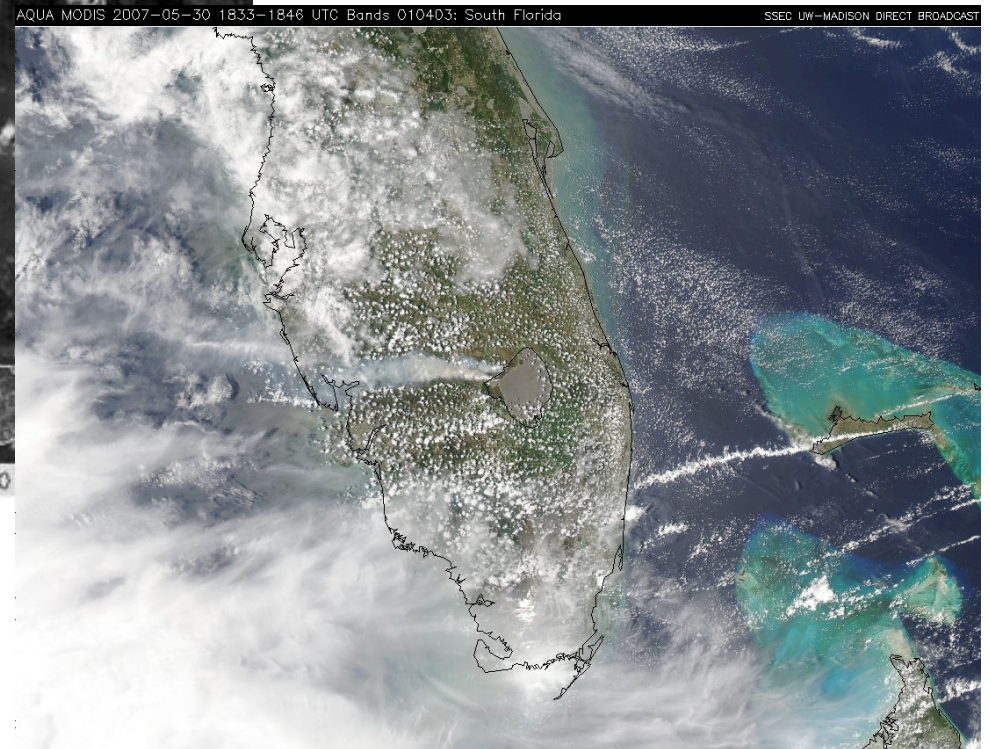


- Logic of affinity
- Sense of control
- Privilege of “local knowledge”

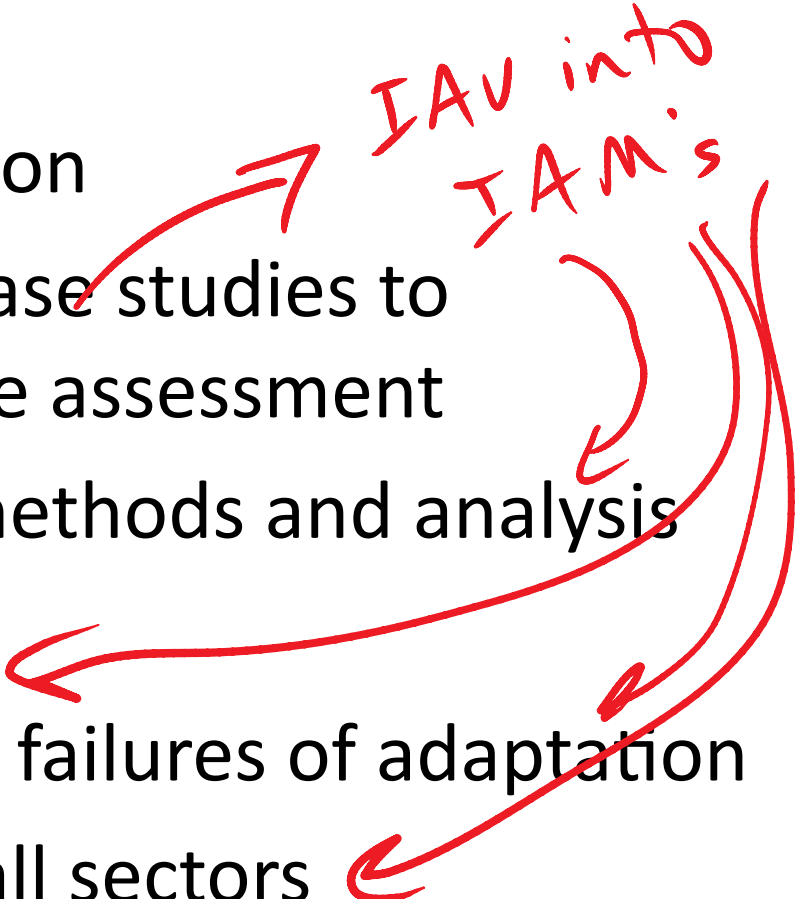




- Uncertain but unlikely
- May be just the opposite
- Too small signal to notice in any case



Enhancing the rigor of IAV research

- Define goals clearly
 - Resolve conceptual confusion
 - Move beyond qualitative case studies to comparative and quantitative assessment
 - Ensure rigorous research methods and analysis
 - Build on prior research
 - Evaluate the successes and failures of adaptation
 - Look at adaptation across all sectors
- 
- Handwritten red text "IAV into IAM's" with arrows pointing to the list items: "Resolve conceptual confusion", "Move beyond qualitative case studies to comparative and quantitative assessment", "Ensure rigorous research methods and analysis", "Evaluate the successes and failures of adaptation", and "Look at adaptation across all sectors".

from: Diana Liverman, 2012 AGCI presentation, "based on Klein and others at
"Adaptation Futures 2012" Tucson, May 2012