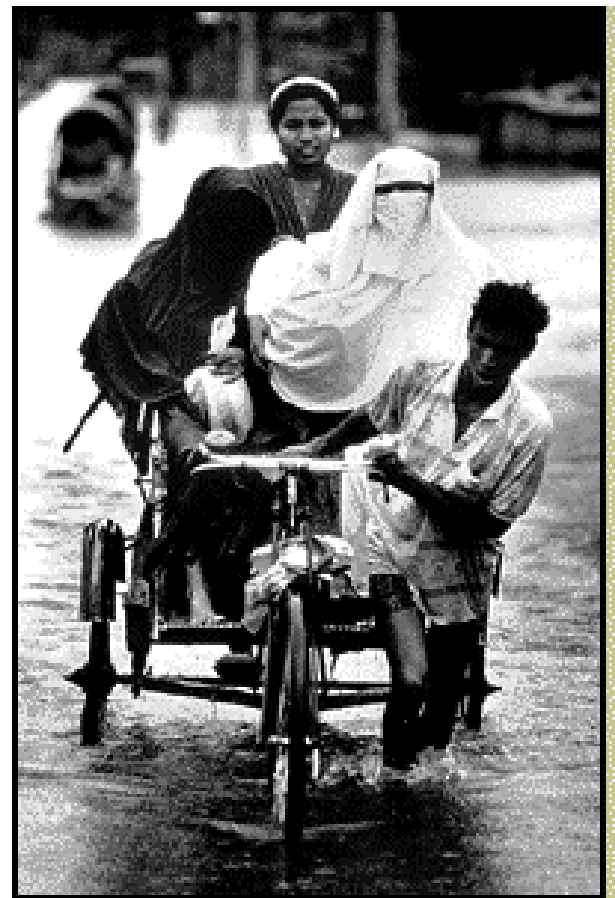
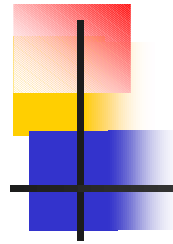


Preparing for El Nino: A climate affairs challenge

Michael H. Glantz
Senior Scientist
**National Center for
Atmospheric Research**
Boulder, Colorado, USA

**Presentation to ADPC and
the AIT**
Bangkok, Thailand
May 9, 2002





EL NIÑO, LA NIÑA & WATER

- WHAT WE KNOW about **PROBLEM** CLIMATES
- Trewartha (1960s) wrote about problem climates, **BUT all climate regimes have their anomalies**
 - Precipitation & Temperature
 - Floods
 - Droughts
 - Meteorological
 - Agricultural
 - Hydrologic

AND Seasonality

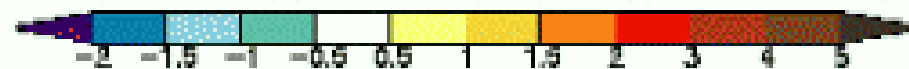
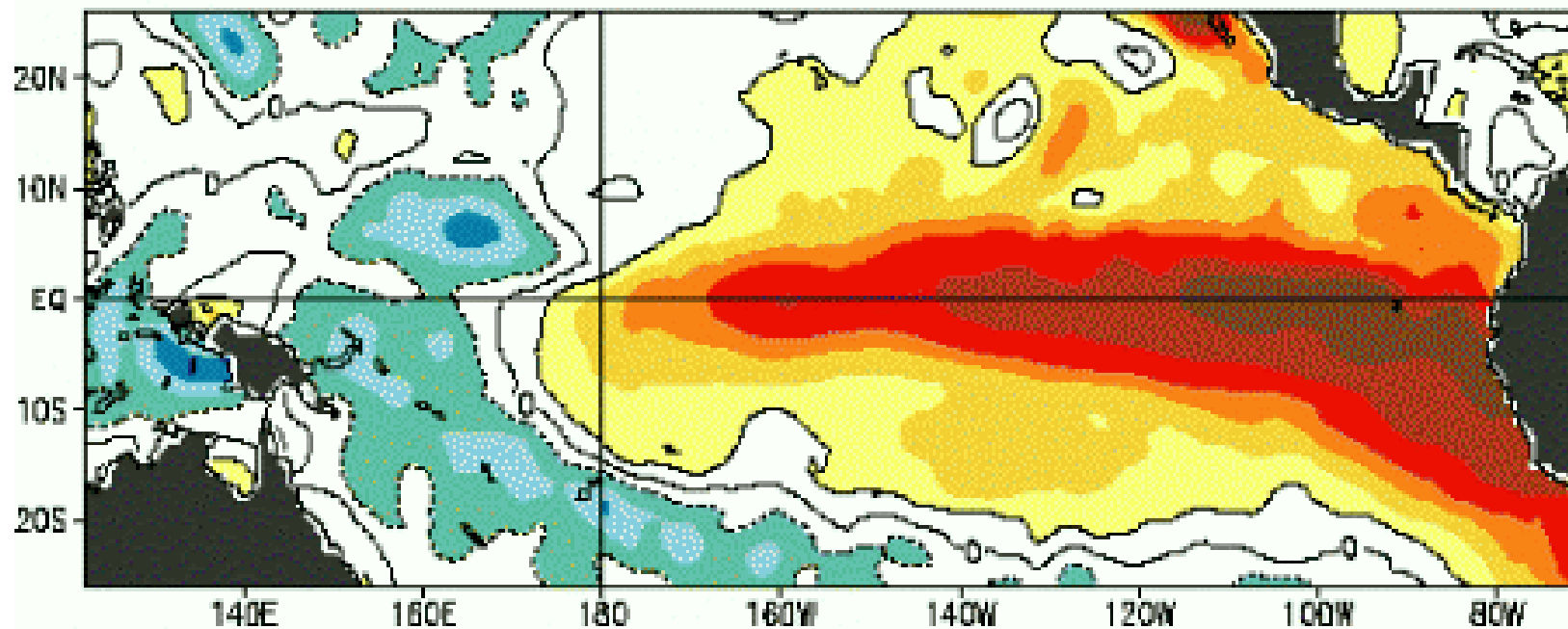
AND Global warming



ENSO: What it is

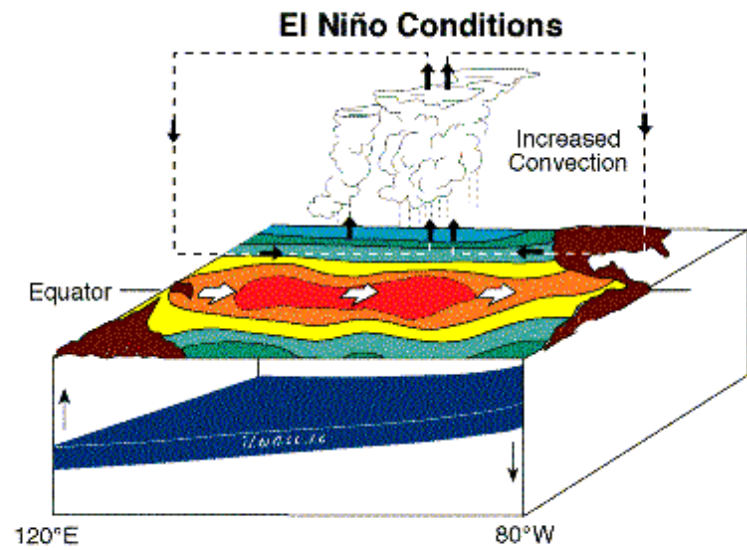
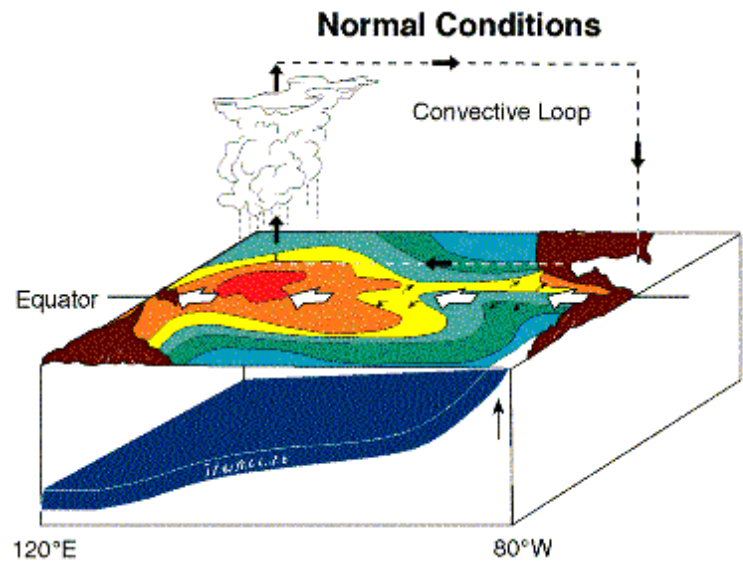
- **Recurrent phenomenon**
 - Warming of the Central and Eastern tropical Pacific by a few degrees C
 - Average return period of 4.5 years
 - Can vary in intensity
 - Perturbs regional climate regimes globally
 - Scientists are still on an ENSO learning curve
 - Forecasts still leave much to be desired
 - Monitoring oceanic changes in the Pacific has greatly improved since the mid-1980s

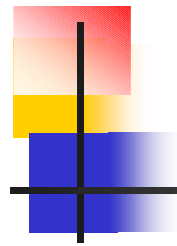
Observed Sea Surface Temperature Anomaly ($^{\circ}\text{C}$)



7-day average centered on 17 September 1997

Climate Prediction Center/NCEP/NWS





Regional Climate Anomalies

what we know and what we don't know

■ Knowns

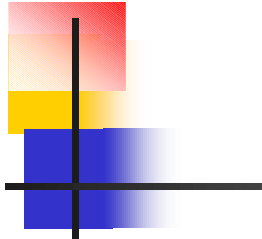
- Who is at risk
- Regions at risk
- Possibility of impacts
- History of previous anomalies' impacts
- What needs to be done to reduce risks

■ Unknowns

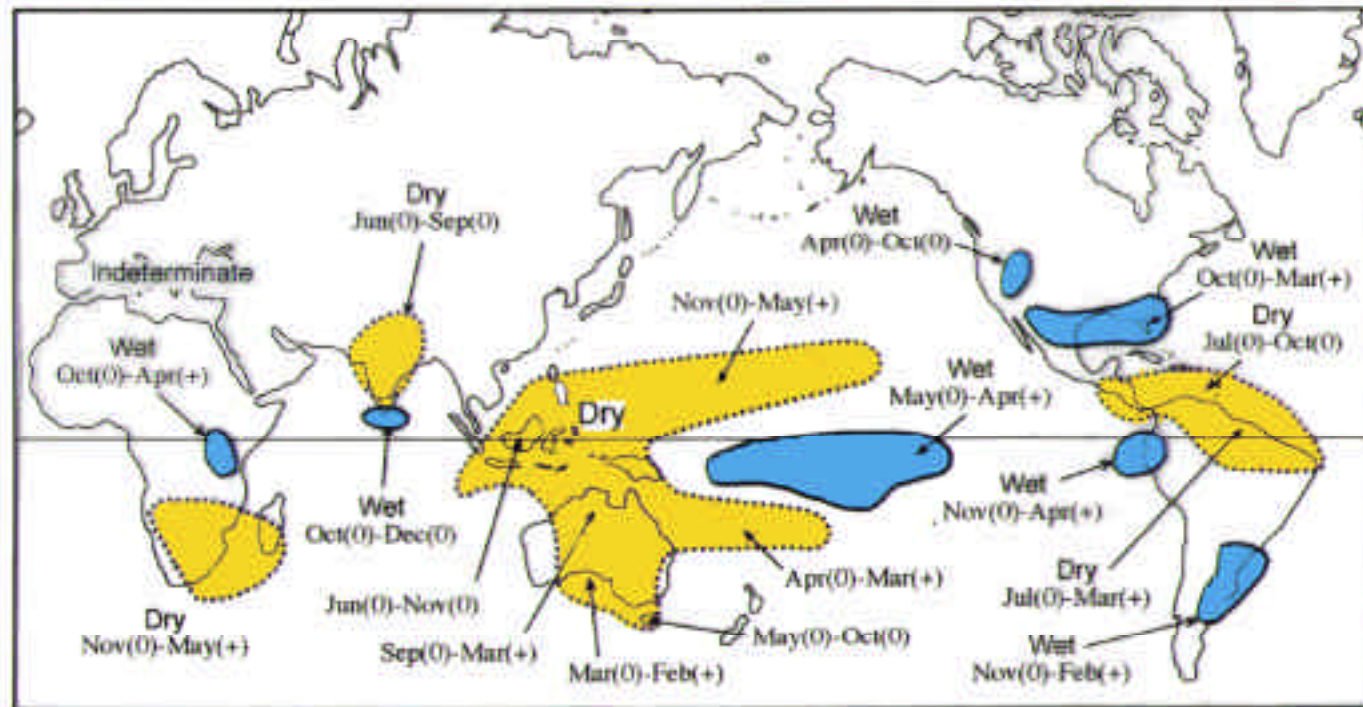
- When: timing of onset; duration
- Exact intensity
- Exactly where
- Exactly who affected
- Impacts: food, energy, water, health, safety
- How to fund actions that are known to be needed
- Surprises

ENSO: What it can do

(Based on what it has done in the recent past)

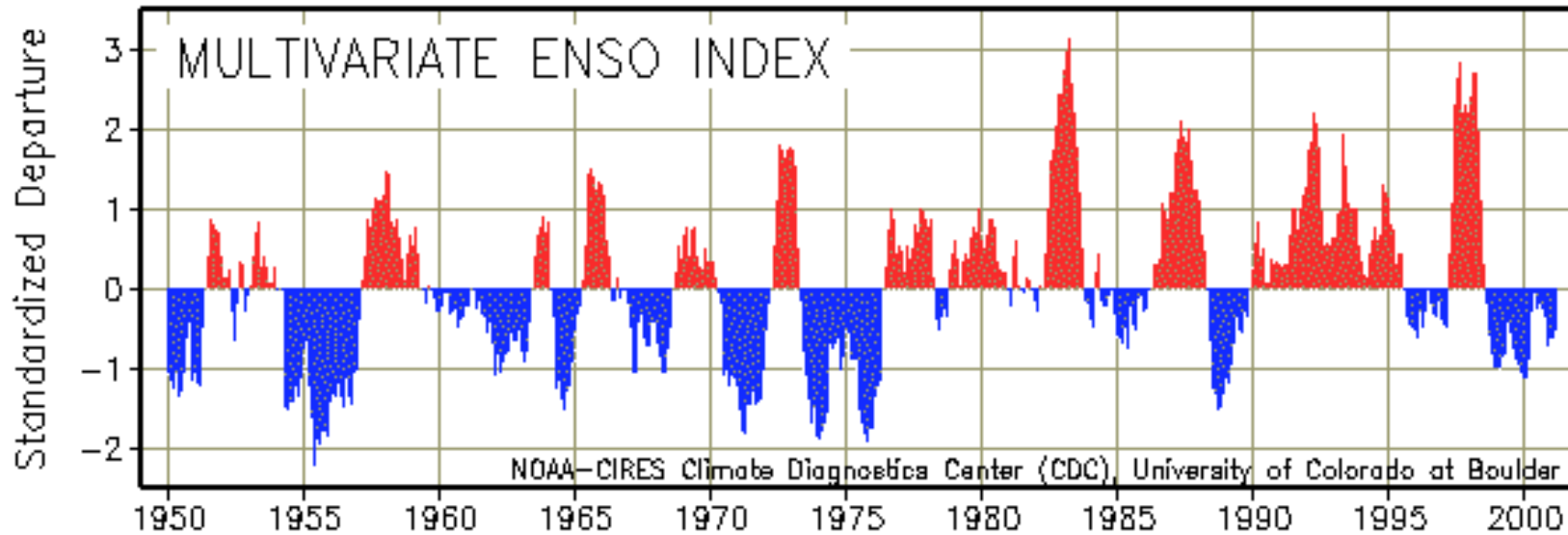


Potential Rainfall Impacts from El Niño Events
(Warm Episodes)

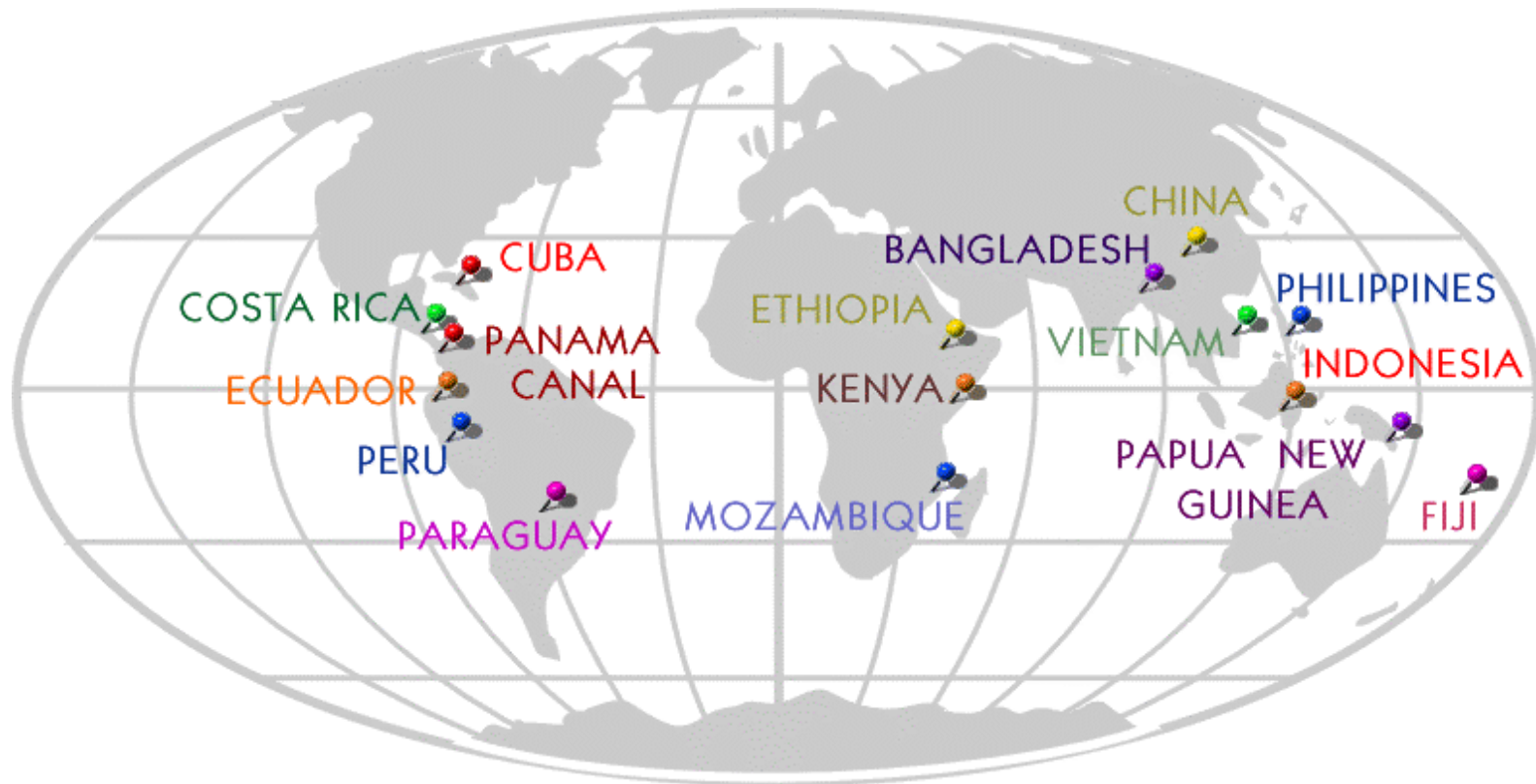


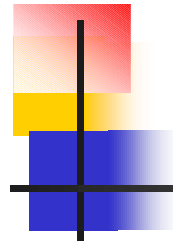
(0) = Year of El Niño Onset
(+) = Year Following El Niño Onset

El Niño - Southern Oscillation (1950- 2001)



The UN Foundation-supported 16-country El Niño study





El Niño as a hazard-spawner

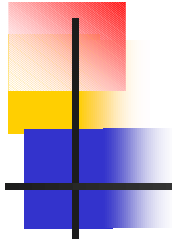
- El Niño: linked to many climate anomalies
- El Niño: forecast provides some (**not all**) countries the earliest warning possible of climate-related problems
- El Niño: Some countries have ample time to pro-act; others do not
- El Niño: is a new hazard to most societies
- “Foreseeability” of impacts



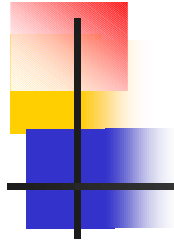
El Niño: Spawner of Hazards

Highlights of the UNEP-sponsored study on “Reducing the Impact of Environmental Emergencies: The Case of the 1997-98 El Niño”

1. Many governments **already know** about the problems sparked by the impacts of climate anomalies **but, for a variety of reasons, have not taken the steps** necessary to cope effectively with those often-devastating effects.
2. **For some countries** the association of climate-related anomalies with El Niño events is very strong and is, therefore, **reliable enough for use in decision making.**
3. **Forecasts about the potential societal impacts of El Niño are needed as urgently,** if not more urgently, than forecasts of El Niño’s onset.

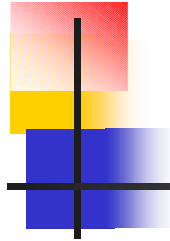


4. El Niño-related **forecasts should be of interest to ALL government ministries** and not just those primarily concerned with disasters.
5. The public, policy makers, and educators **need to know more about the various ways that climate forecasts can be used** in the sustainable development of society and economy.
6. It is important for government agencies **to identify the positive aspects of El Niño** and not only focus on the negative.



Highlights continued

7. **Transparency between governments and donors is necessary**, so that the needs and expectations of both about disaster assistance are well understood.
8. It is important, if not **imperative, for each country and the sub-regions within it to develop the expertise needed to assess the El Niño forecasts** which usually come from outside the country.
9. Although there remains considerable uncertainty with El Niño forecasts, **people must be educated about the El Niño phenomenon and how best to cope with it.**

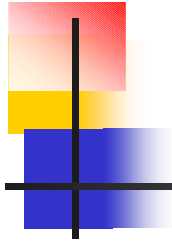


Highlights continued

10. **Countries most vulnerable** to El Niño's impacts are especially **in need of financial assistance** to carry out programs to cope with El Niño's occurrence.

11. **National scientific establishments need the support** of their governments, as well as of international donor agencies, to undertake studies on regional and local problems related to El Niño.

12. Institutions must **review their operations during the 1997-98 El Niño event to identify strengths, weaknesses and jurisdictional constraints and conflicts in institutional responses** to the forecasts and impacts of El Niño.

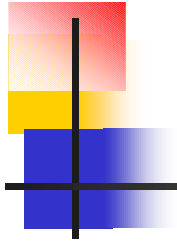


Highlights continued

13. Governments in a given region should **consider setting up a regional mechanism focused on El Niño.**

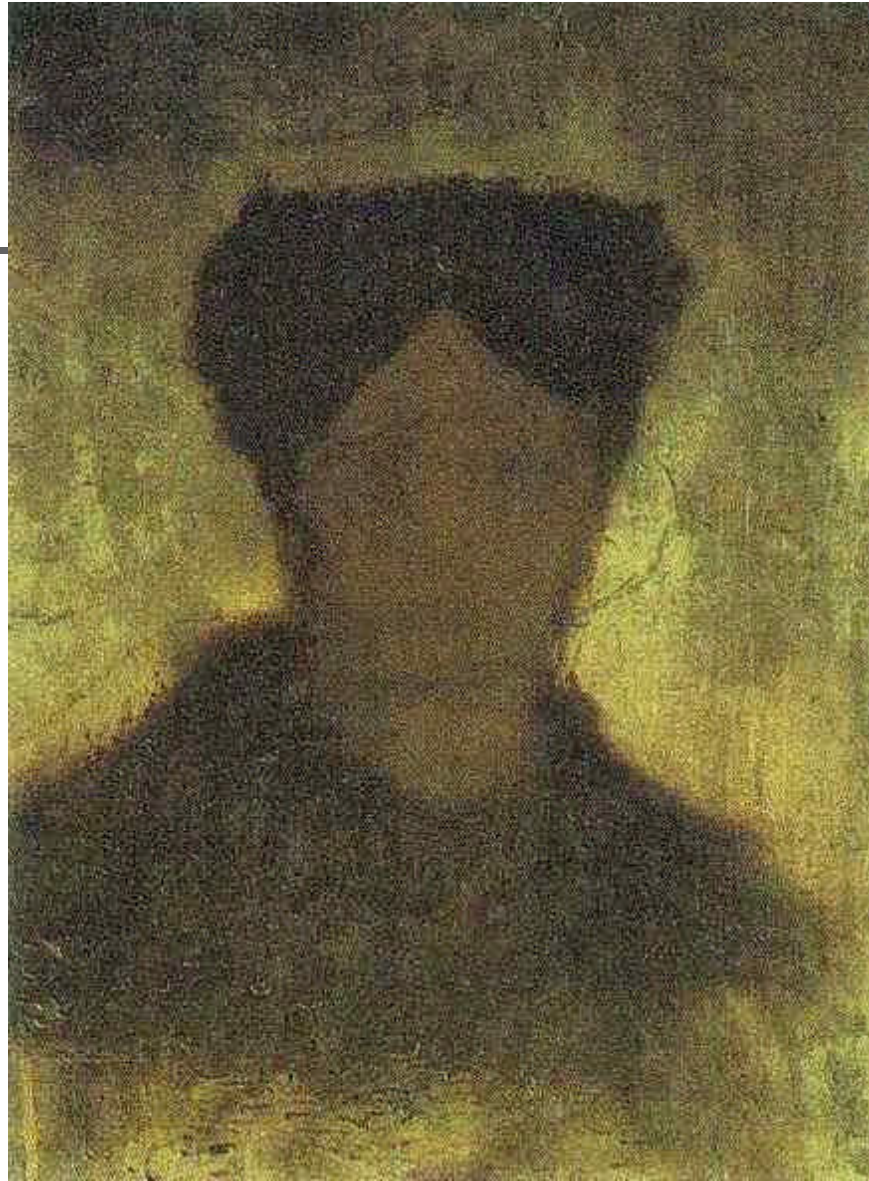
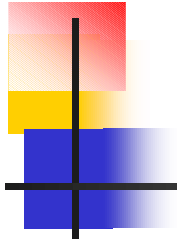
14. **Many adjustments are likely to be required** in the ways that societies operate **to make El Niño earliest warnings more effective.**

15. **“Looking back to plan ahead”** can provide disaster agencies an opportunity to review how well their contingency plans worked in 1997-98 and, if necessary, make adjustments.



Highlights continued

16. Educators at all levels in a country's educational and training system should encourage their students to study the interactions among climate, society, and the environment.





Seven Things People Ought to Know About El Niño

- 1. El Niño does not represent unusual behavior of the global climate.**
- 2. El Niño is part of a cycle.**
- 3. Every weather anomaly throughout the world that occurs during an El Niño year is not caused by that El Niño.**
- 4. El Niño has a positive side as well.**
- 5. There will continue to be surprises associated with future El Niño events.**
- 6. The impact of global warming on El Niño is not as yet known, speculation notwithstanding.**
- 7. Forecasting El Niño is different than forecasting the impacts of El Niño.**



Nine El Niño “Traps” That People Ought to Know About

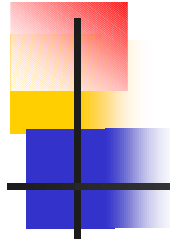
- 1. Scientists do not agree on the list of El Niño years.**
- 2. Forecasting El Niño onset does not tell us much about its other characteristics (e.g., magnitude, frequency, duration).**
- 3. Monitoring El Niño is different than forecasting it.**
- 4. When viewed as an event, El Niño evokes different concerns than when it is viewed as part of a process.**
- 5. We have not witnessed enough El Niño events to know all the ways they can develop and play out. The same applies to El Niño’s impacts on societies and on ecosystems.**



Nine El Niño “Traps” That People Ought to Know About – cont’d

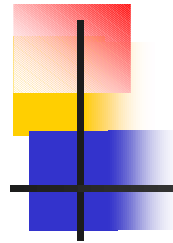
- 6. A pretty website does not El Niño expert make.**
- 7. The media do not have a neutral interest in reporting El Niño.**
- 8. Beware of the use of El Niño analogies (e.g., this event is like the 1972-73 or 1982-83 event).**
- 9. It is very tricky, risky, and potentially misleading for the public, the media, or policy makers to blame any specific weather event on El Niño.**

Climate Affairs Programs



(Is the timing right?)

- **Climate Issues:**
 - increasingly important to governments, corporations, the public
- **Perceptions:**
 - climate anomalies getting more frequent, costly and deadly
- **Global Warming:**
 - looming in the 21st century



Societal Areas of Concern

- Food Production & Security
- Water Resources
- Energy
- Public Health
- Public Safety
- Economy
- Environment



Climate Affairs: aspects of climate

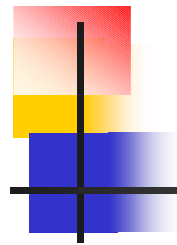
- **Climate Variability**
(seasonal to inter-annual)
- **Climate Fluctuations**
(decade scale)
- **Climate Change**
(new global climate state)
- **Extreme Meteorological Events**
(where weather meets climate)
- **Seasonality**
 - **(societies live by the flow of the seasons)**



Climate Affairs Programs

(the purpose)

- Encourage education on climate issues
- Understand how climate affects societies
- Make climate information “**usable**”



What's Needed?

- Climate Science
- Climate Impacts
- Climate Policy & Law
- Climate Politics
- Climate Economics
- Climate Ethics



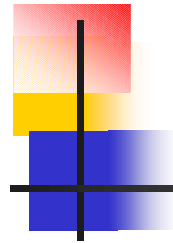
Climate Science

- Understand the Climate System
- Understand its components
- **Society is a component of the climate system**



Climate Impacts

- **On ecosystems**
(terrestrial & marine)
- **On societies**
(industrialized & agricultural)
- **Human impacts on the atmosphere**
(direct & indirect)
- **Methods to assess impacts**
(quantitative & qualitative)



Climate Policy & Law

Air pollution, acid rain, ozone depletion,
global warming

Energy consumption, landuse practices,
GHGs emission controls

Transboundary water issues, coastal
ocean issues, air-shed management

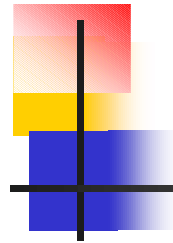


Climate Politics:

how you get to policy and law

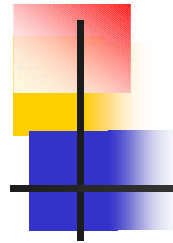
- Greenhouse effect vs White House effect
- Greenpeace vs. Wise-Use
- Conservation vs. Exploitation
- Technophiles vs. Technophobes
- Dependence on market mechanisms

Local, national, regional, global politics



Climate Economics

- Risk analysis
- Discount rates
- Externalities --- “Polluter Pays”
- Present vs. future generation welfare
- Forecast value
- Free market vs government intervention
- Prevent, mitigate or adapt



Climate Ethics

- Inter- vs. Intra-generational Equity
- Environmental Justice
- Natural Disasters and Poverty
- North-South views on Climate Change
- Polluter Pays Principle
- Nature's Bank Analogy