

# Presentation to APCC 2009

## July 12, 2009

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Graduate Center



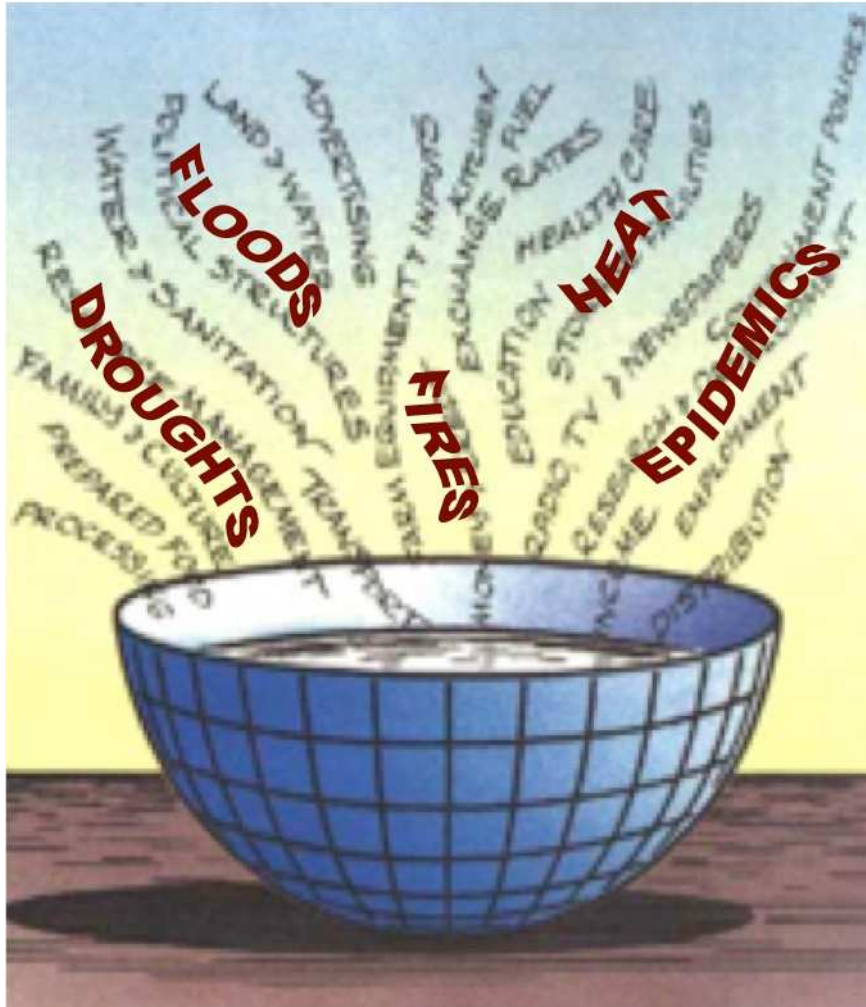
**Supported by the Rockefeller Foundation**

**and**

**A Clinton Global Initiative Commitment**



# Adapting to a changing climate as if the future matters



**Global stew**

21st Century

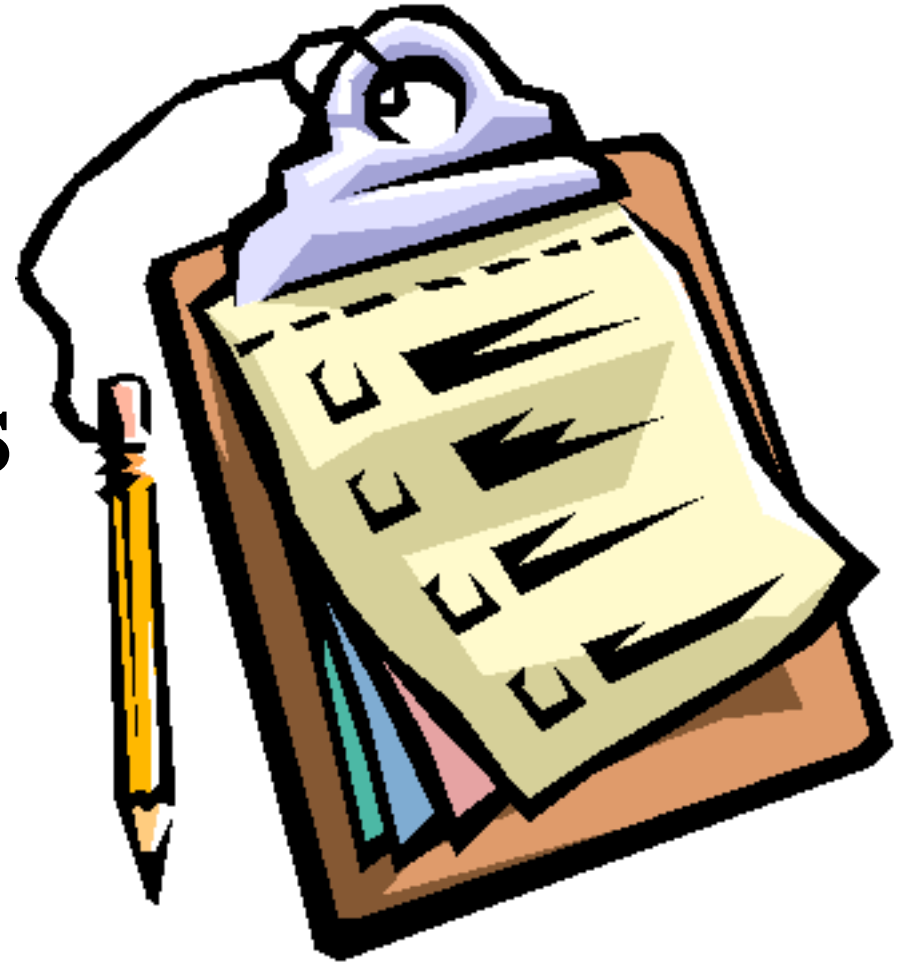
# TIME

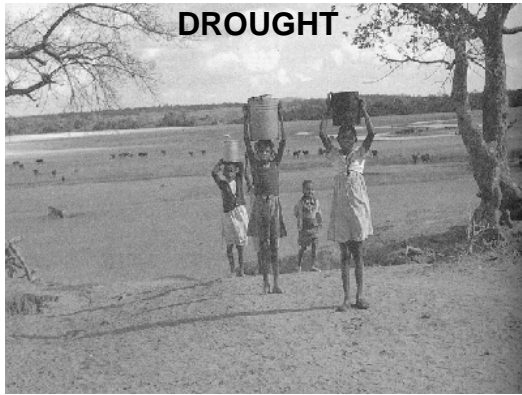
Could the  
21st Century  
Become  
"The Climate Century"

?

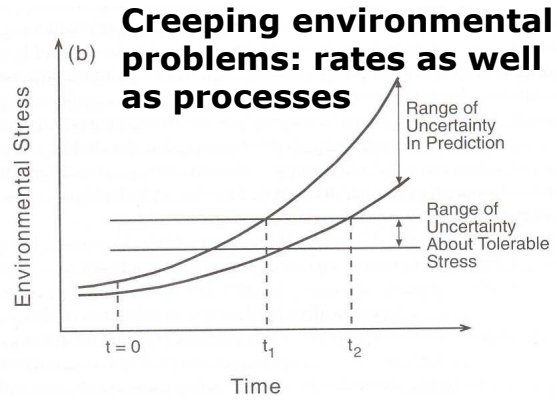
**But first ...**

**Some facts**





**DROUGHT**



**“Climate, Water & Weather Change: Ideas to think about” Michael Glantz, CCB**



**Floods**

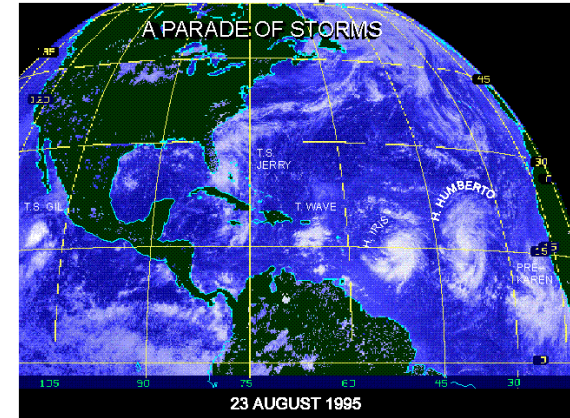
*Lessons learned about lessons learned*



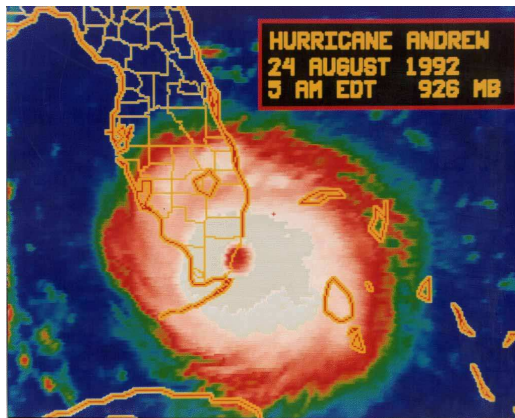
**Resilient Adaption**



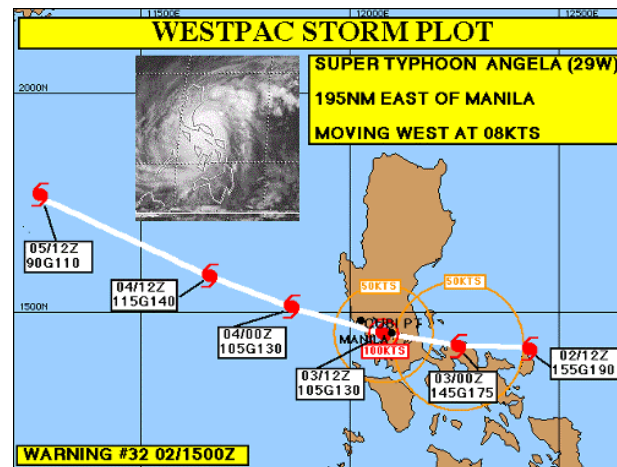
**Seasons of superstorms?**



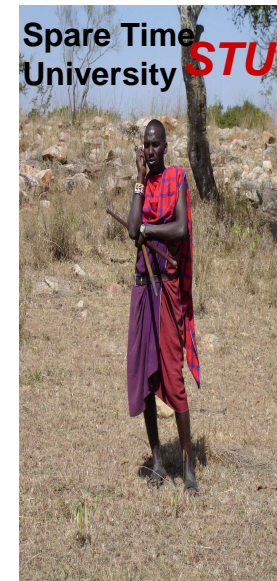
**Forecasting by analogy: history has a future**



**Early warning systems**



**Spare Time University STU**



**High impact weather**

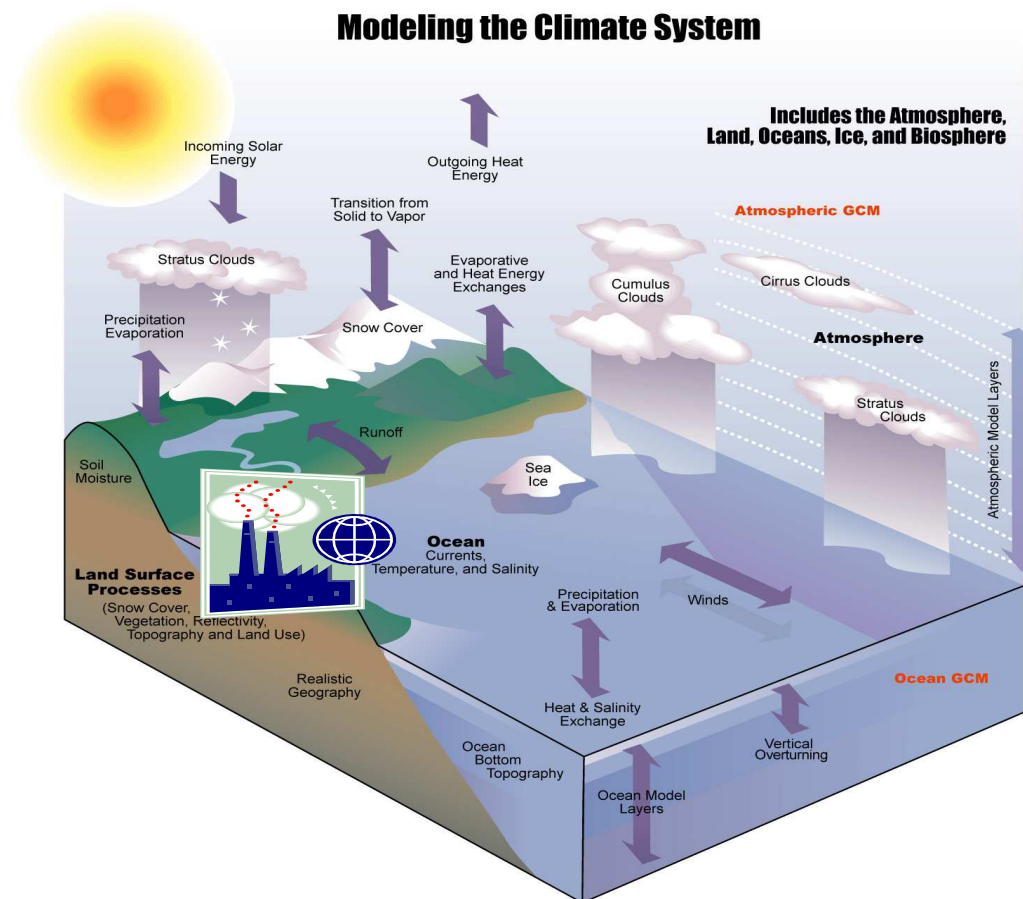


# Humans and the Climate System

Society is an integral part of the climate system and not apart from it

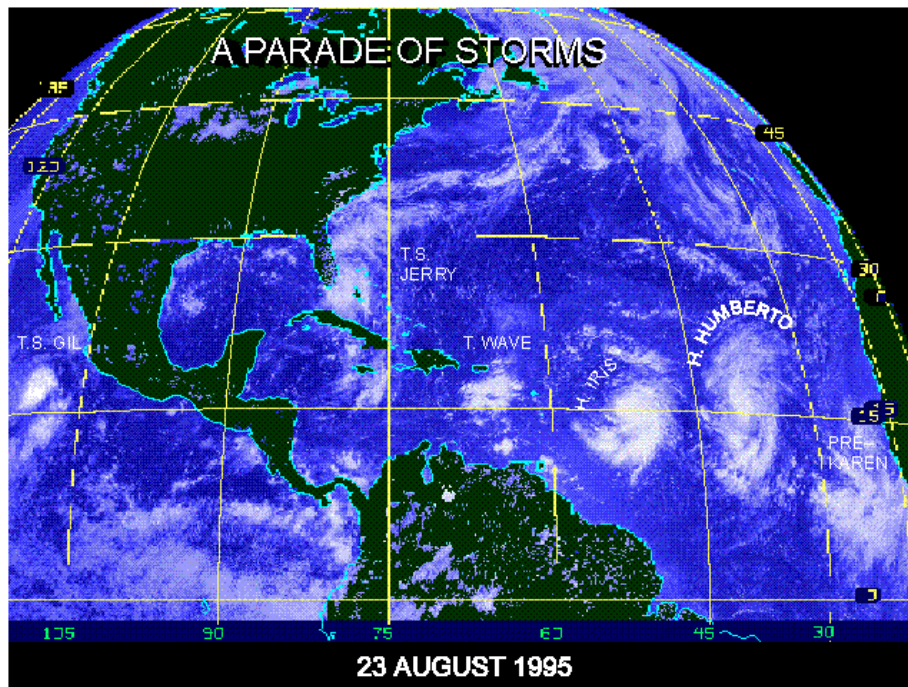
*Are we in the Anthropocene?*

Suggested by:  
Paul Crutzen, Nobel Prize winner

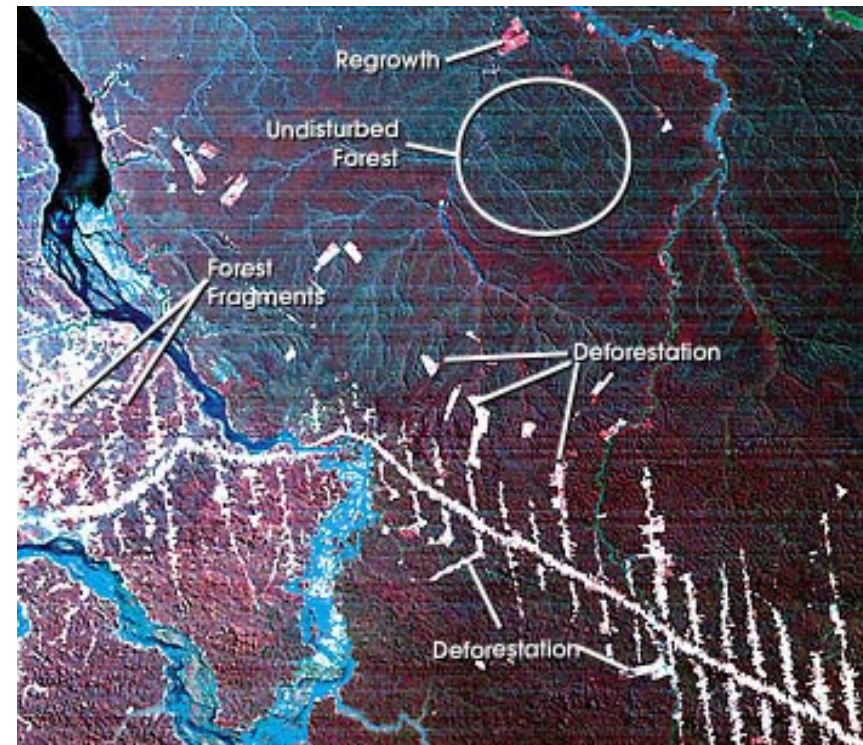


Climate Change Impacts on the United States, USGCRP, 2000

**Physical changes are  
to be expected**

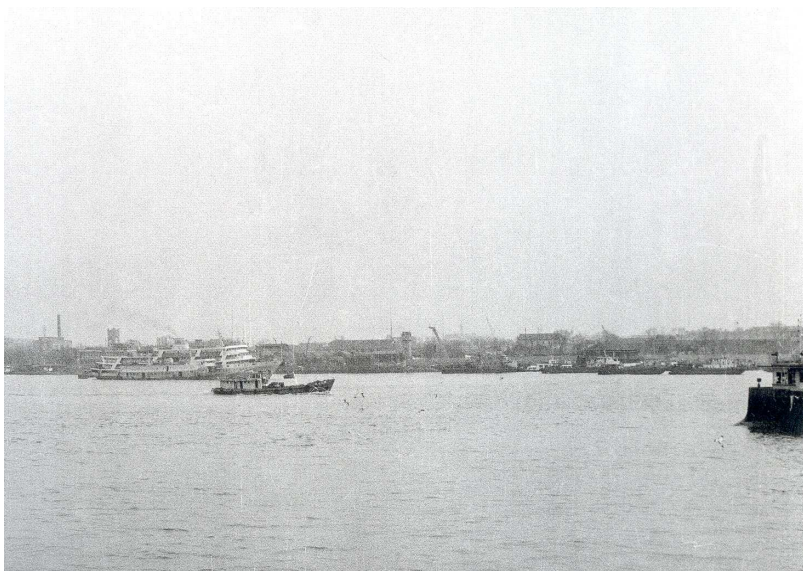


**Societal changes are  
also to be expected**



**Climate is not the only thing that changes**

# Shanghai Harbor



**1988**

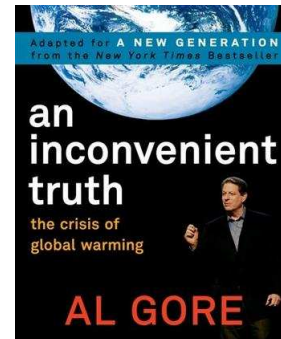
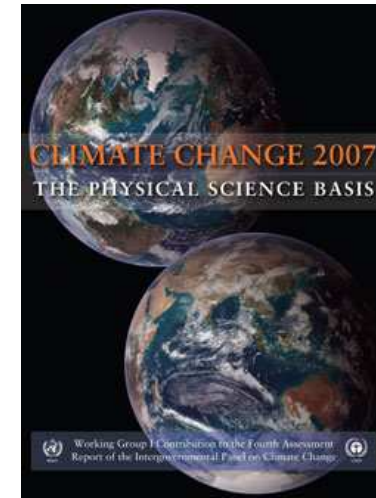


**2004**



# Global warming's political “Tipping points”

- IPCC 1st to 3rd Assessment
- IPCC 4th Assessment
- Inconvenient Truth
- Nobel Prize



# The Spotlight has shifted



- From ...

- WG 1 IPCC SCIENCE

- To ...

- WG 2 IPCC IMPACTS

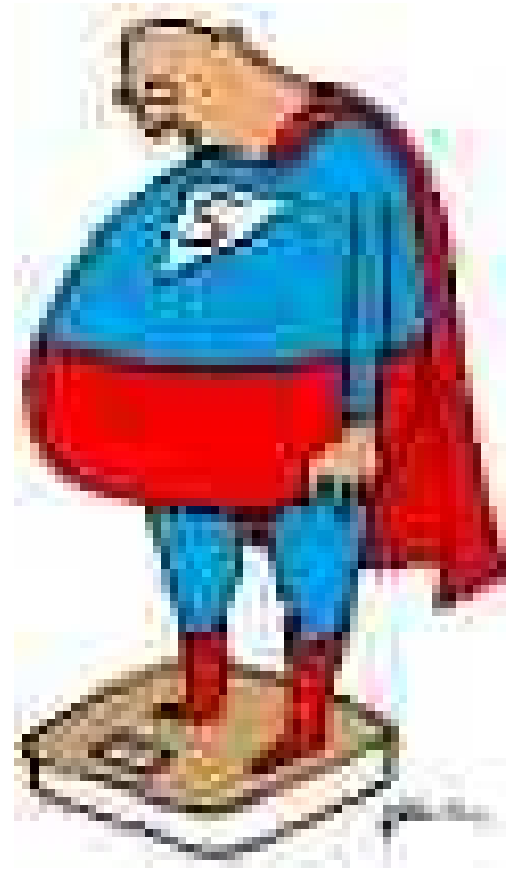
“Impacts Research Seen as New Frontier”

Science Magazine (October 10, 2008)

# What can't be done about climate change:

**“You can't go home again”**

- **We are subjected to global warming for the rest of this century**
- **Return to an earlier CO<sub>2</sub> level will not likely return to the climate we'd like**



**A “weighty” analogy**

# “4 Laws of Ecology”

1. **Everything is connected to everything else.**
2. **Everything has to go somewhere or there is no such place as away.**
3. **Everything is always changing.**
4. **There is no such thing as a free lunch.**



[rekkerd.org/img/random/citarum\\_pollution.jpg](http://rekkerd.org/img/random/citarum_pollution.jpg) Citarum River, Indonesia

**What can be done?? Remember these laws!**

# Definitions of Resilience:

## 3 variations on a theme

- The **ability** of the community, services or infrastructure **to withstand** the consequences of an incident.

□ [www.preparingforemergencies.gov.uk/more\\_info/glossary.shtm](http://www.preparingforemergencies.gov.uk/more_info/glossary.shtm)

- The **power of recovery** to original shape and size after removal of the strain which caused the deformation.

[www.llamapaedia.com/wool/glossary.html](http://www.llamapaedia.com/wool/glossary.html)

- The **capacity to adapt** without harm

– [from Rayner and Malone “Climate change, poverty, and intragenerational equity: the national level”, *Int. J. Global Environmental Issues*, Vol. 1, #2 (2001), pp. 175-202]

**We may not know what resilience is,  
But we do know what it isn't !**

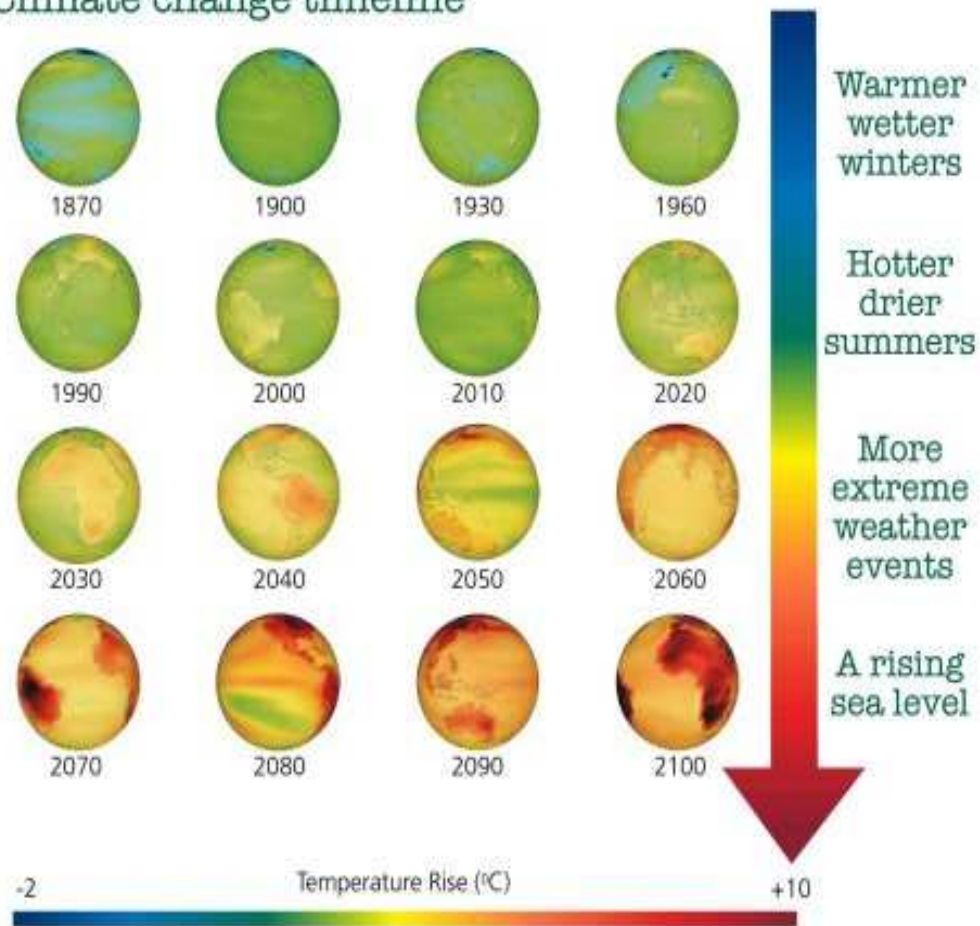
**Dynamite  
fishing  
in the  
Philippines**





# Expected global progression of global warming

Climate change timeline



# Definitions of adaptation:

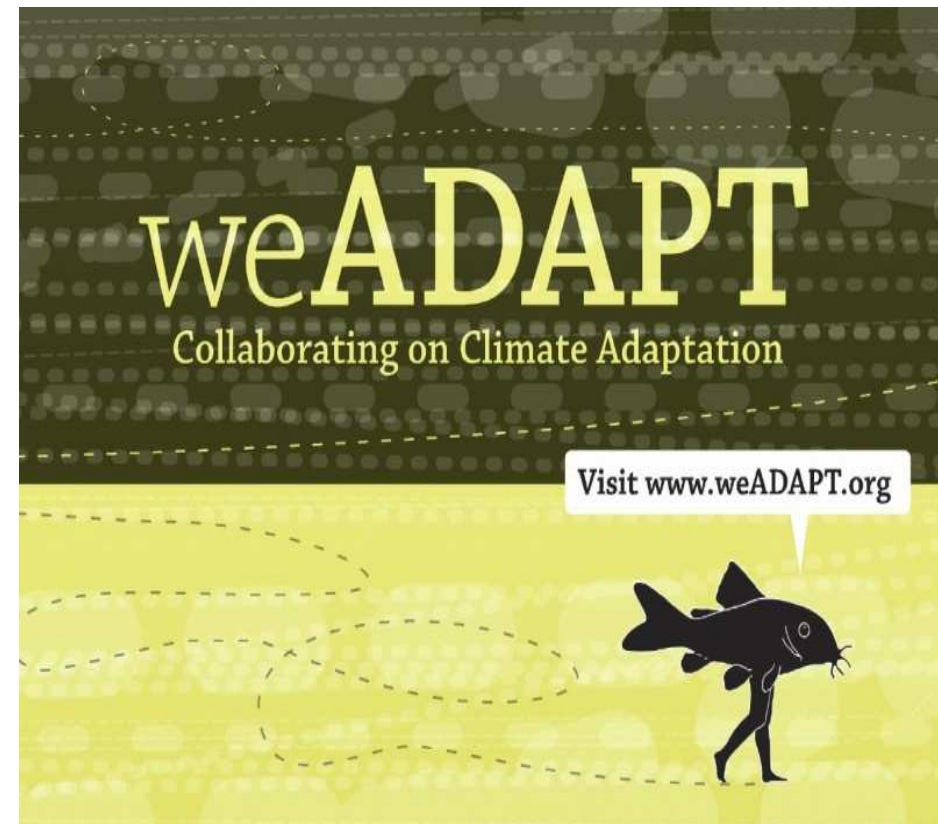
- **UNFCCC: adaptation refers to climate change related impacts**
  - Under the FCCC definition, "adaptation" refers only to new actions in response to climate changes that are attributed to greenhouse gas emissions. It does not refer to improving adaptation to climate variability or change that are not attributed to greenhouse gas emissions.
- **IPCC: adaptation refers to any changes**
- **Adaptation can be passive or pro-active**
- **Grotan suggests**
  - **adaptation = anticipation, attention and response**



# Aspects of Adaptation

- **Adaptation includes knowledge via AAR :**
  - **Anticipation** (what to expect)
  - **Attention** (what to look for)
  - **Response** (what to do)

[Grotan et al 2008]



# **We must consider mitigating the impacts of adaptation**



- **Adaptation is an on-going process, not just a one-time event.**
- **Each adaptive strategy or tactic will generate its own set of impacts.**
- **Societies must identify second- and third-order impacts of adaptation (downstream impacts).**

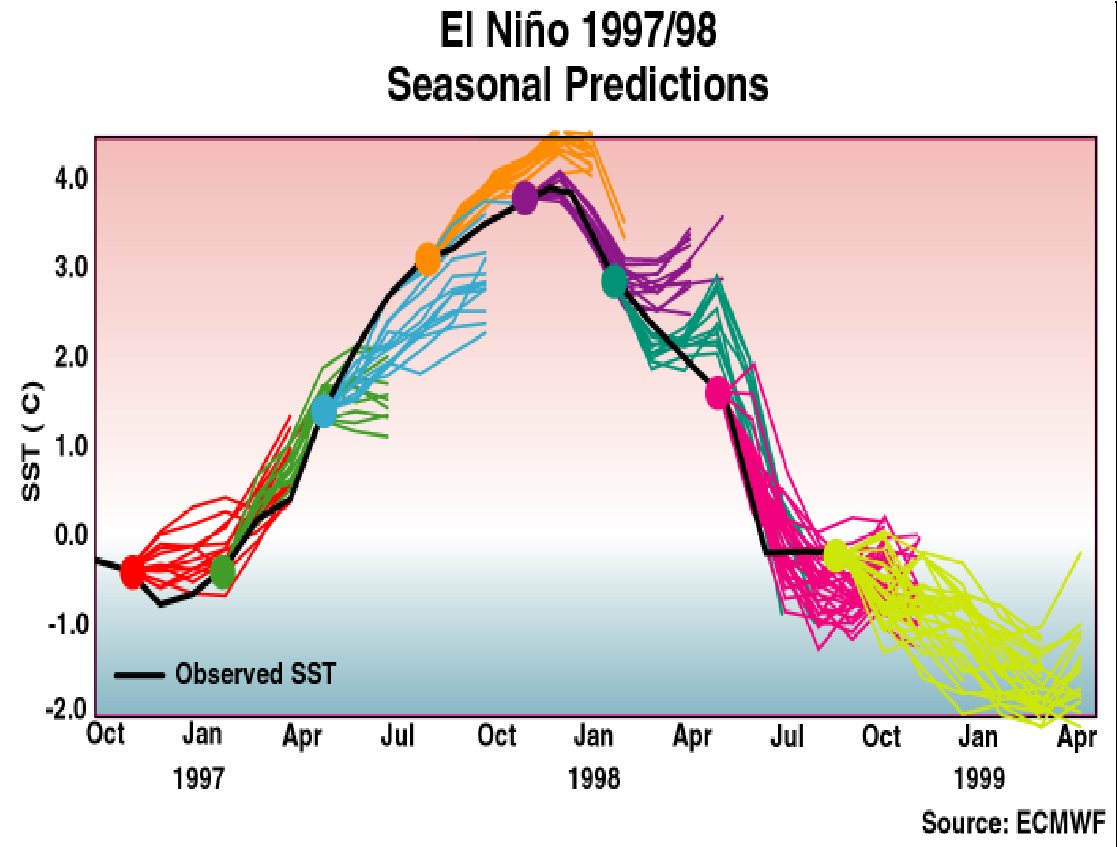
# Mal-adapting to meet economic wants: (decision making as if the future did not matter)



**Demise of the Aral Sea, Central Asia (1960-present)**

# Introducing → Resilient Adaptation as a “social invention”

- Flexible, shifting interventions
- Plasticity
- Requires innovation
- Requires improvisation
- It attempts to “glimpse” the future
- It brings stability while coping with changes in resilience



# Resilient Adaptation as “usable social science”

- RA is best used as a “guiding principle”
  - Much like the “Precautionary Principle”
- Indicators can be chosen to evaluate whether a societal act or process of adaptation to climate change meets certain explicit criteria that increases the likelihood that the act will be viewed as a resilient aspect of adaptation.

# Defining resilient adaptation

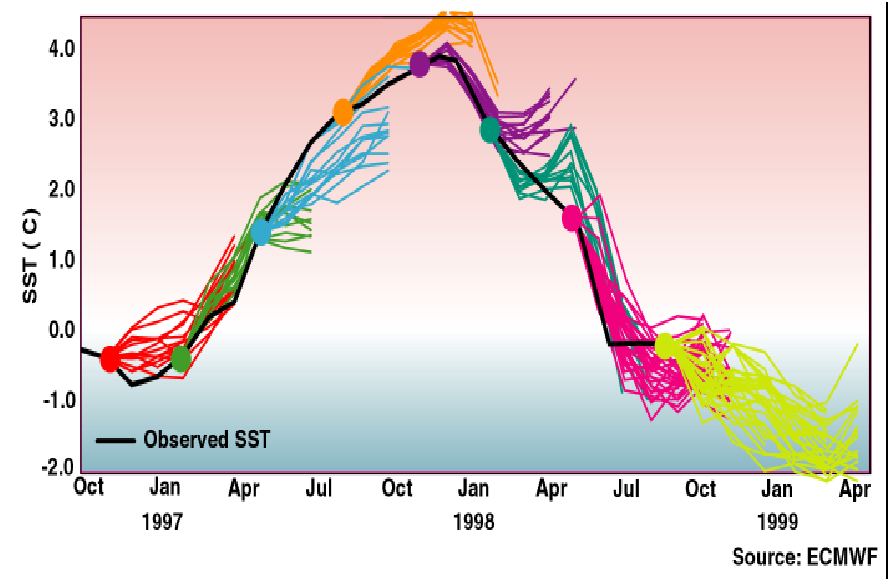
A flexible, incremental process to adjusting (acclimatizing, really) to the foreseeable impacts (adverse or beneficial) of an a changing climate with changing uncertainties

.....

Similar to ...

- “Rolling plans” (military)
- “Design as you go” (engineering)

## The symbol for Res. Adapt.?

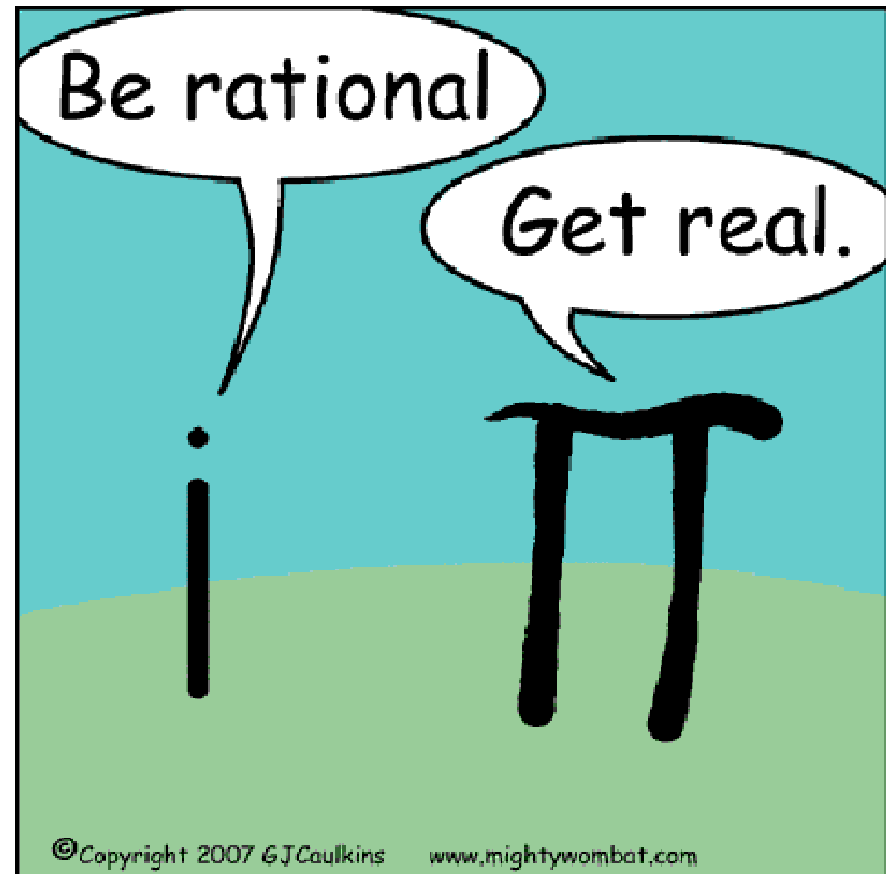


# Resilient Adaptation ... in theory and in practice

- **What ought to be:**
  - “the manifestation of positive adaptation despite significant life adversity”

(S. Lothar, Ed. 2003. Resilience & Vulnerability. Cambridge U.P.)

- **What actually happens:**
  - Internal constraints
  - External uncontrolled factors
  - Changing societal goals



# Improvisation

key aspect of Resilient Adaptation

- **Improvisation is ...**
- **The “engine of resilience”**
- **Part of resilience**
- **‘Interplay between impact and interpretation of events’**
- **Depends on the constant awareness and flexibility**
- **Flexible behavior**



[Grotan, et al 2008]

# PASWIRO

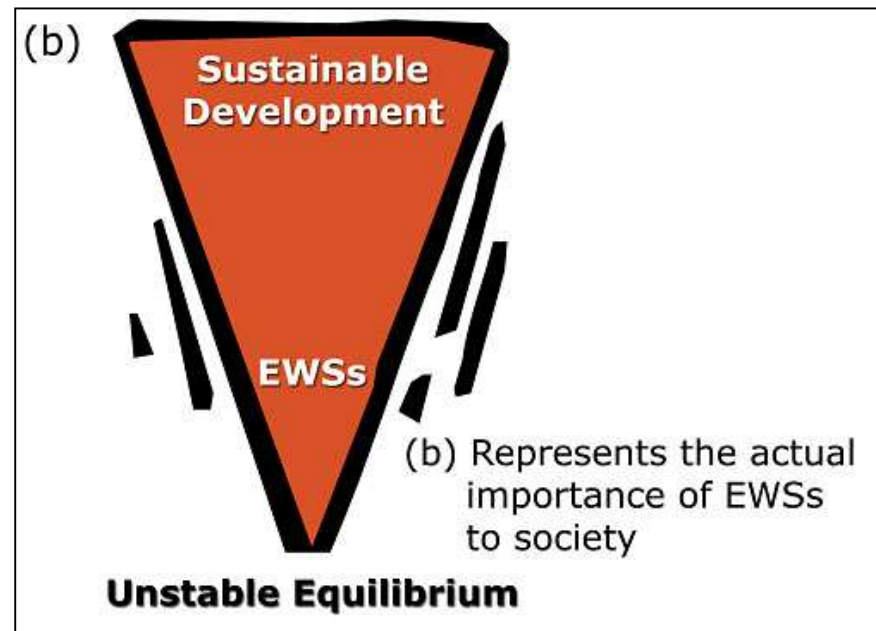
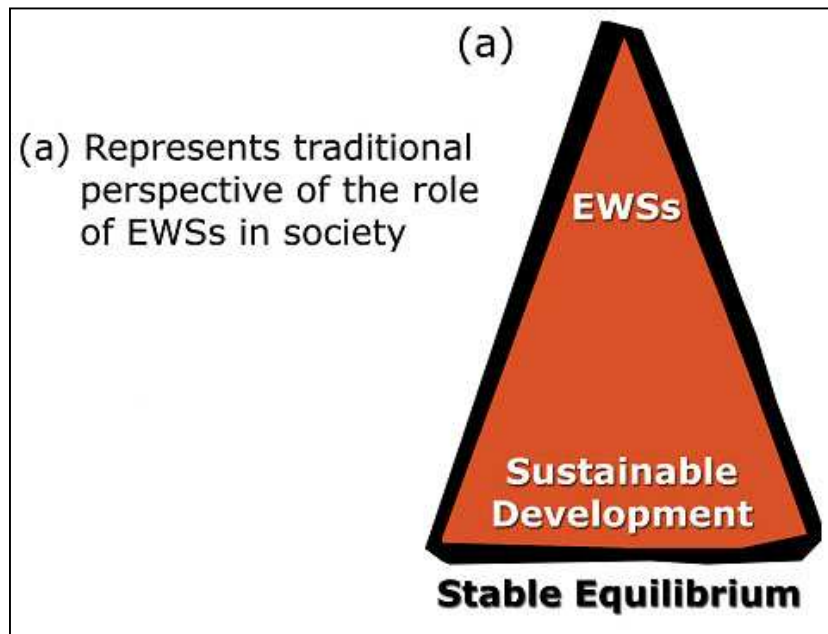
## and adjusting to a changing climate

- **P:** Problem identification (underlying and catalyst)
- **A:** Adaptation idea to cope with changing climate
- **S:** Strength (benefit) of the adaptation
- **W:** Weakness of the adaptation
- **I:** Impacts of the adaptation (social, ecological)
- **R:** Resiliency level for the short-, mid- and long-term
- **O:** Opportunities expected from this adaptation

# **What is essential for effective resilient adaptation?**

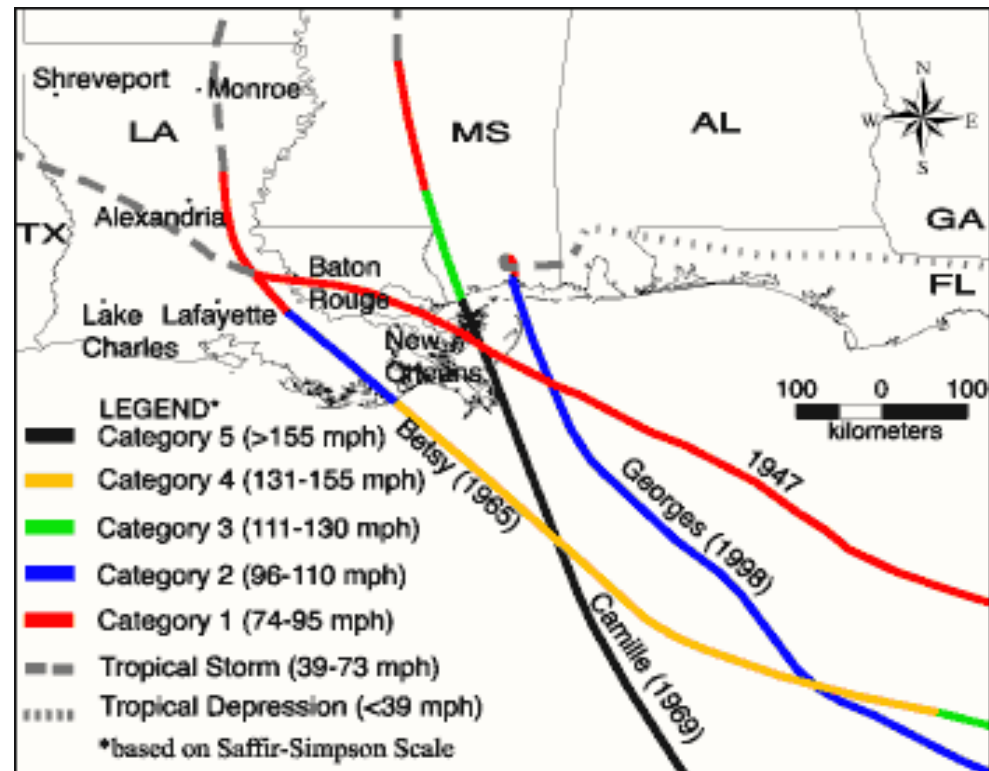
- **Enhance Early Warning systems**
- **Expect surprises**
- **Follow the Precautionary Principle**
- **Distinguishing types of hazards**
  
- **Others?**

# Heightened value of early warning systems



# Expect climate surprises

- A key element of “surprise” is the “unexpected”.
- However, not all ‘surprises’ are ‘unexpected’.
  - I was “semi-surprised”, “almost surprised”, “hardly surprised”, “a little surprised”, “sort of surprised” “somewhat surprised”



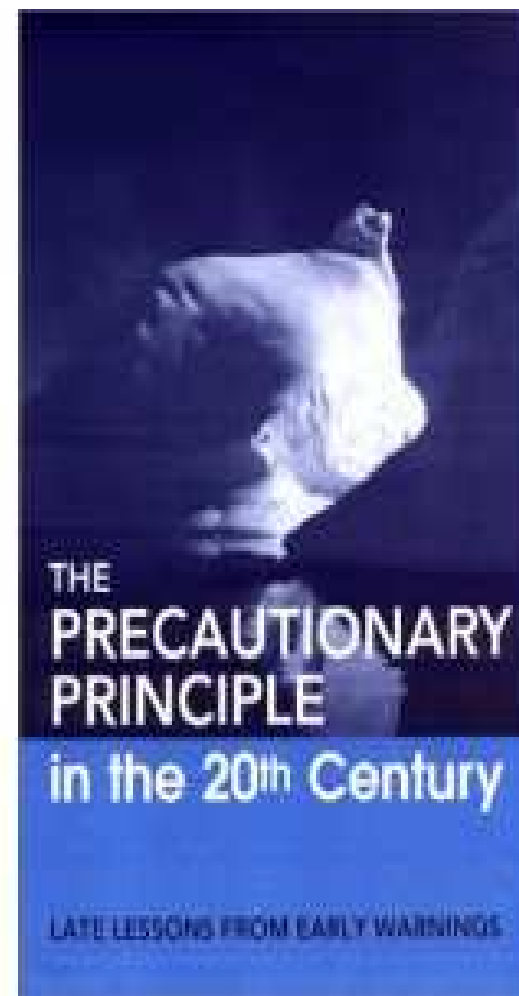
There are “foreseeable surprises”  
Hurricane Katrina 2005, USA

# “Precautionary Principle”

- “Governments should not use the lack of full scientific information as a reason to postpone action to prevent serious irreversible environmental damage”

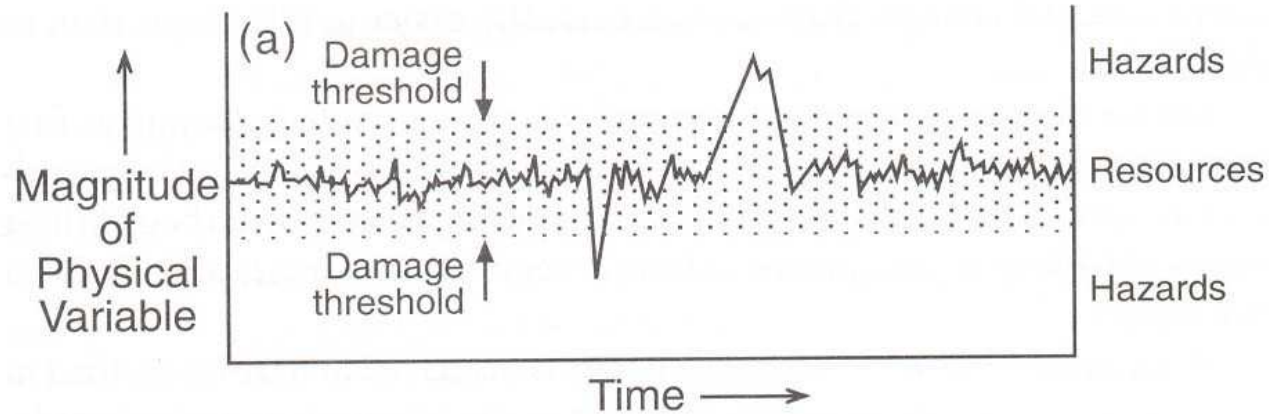
» World Lake Vision Committee

**This is a dilemma:  
“Look before you leap” vs.  
He who hesitates is lost”**

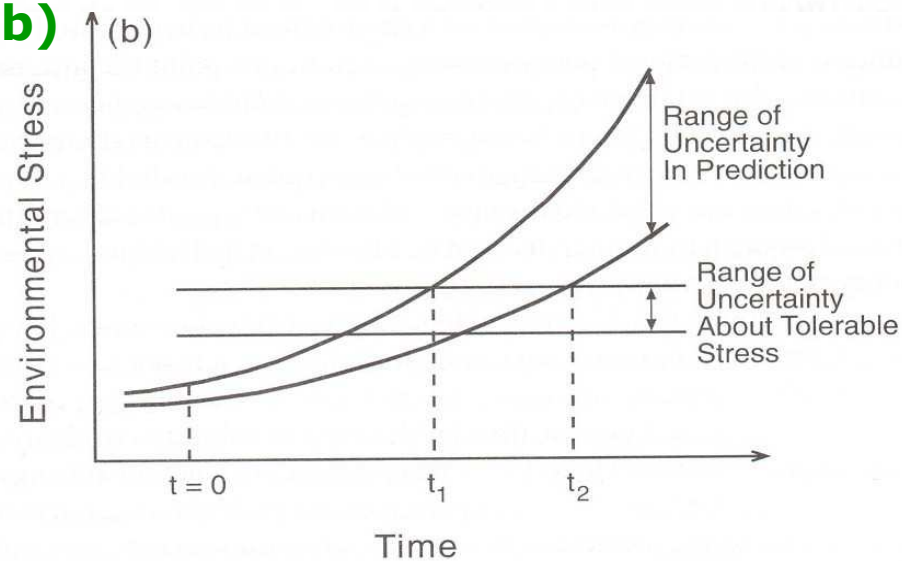


# distinguish the types of hazards: quick onset (a) and creeping (b)

(a)

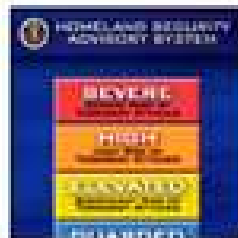
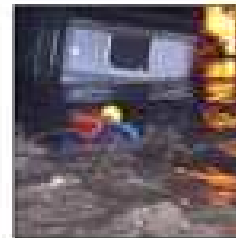
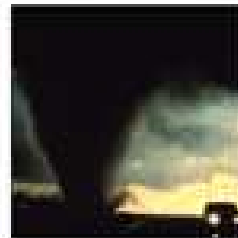
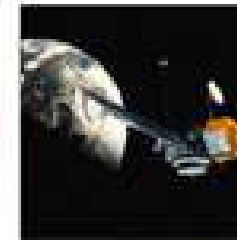


(b)



# Most environmental changes are of the creeping kind

- Air pollution
- Acid Rain, Global warming
- Ozone depletion
- Tropical deforestation
- Soil erosion
- Water quality & quantity
- Glacier retreat
- Sea level rise
- Waste disposal/landfills
- Infectious disease spreading
- Nuclear waste
- Marine pollution, etc.



# Resilient Adaptation: a step toward climate proofing

- **Similar to other idealistic goals**
  - Eradicating poverty
  - “No child left behind”
  - MDGs by 2015
  - Sustainable development
- **It is a ‘feel safe’, ‘feel good’ that is a usable concept**



[www.grist.org/etc/  
gristlist/2005/12/09/](http://www.grist.org/etc/gristlist/2005/12/09/)