Crafting Integrated Information Systems (across weather and climate timescales)

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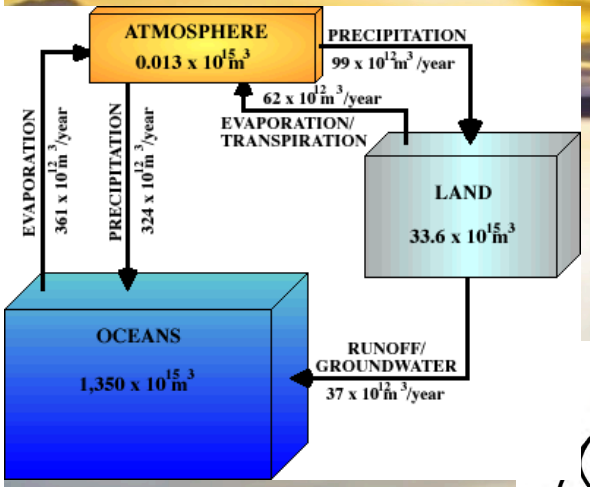
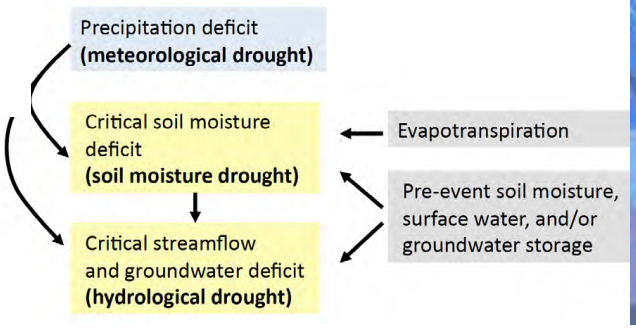




'No or low regrets' practices with demonstrated evidence of having integrated observed trends in disaster risks to reduce the effects of disasters

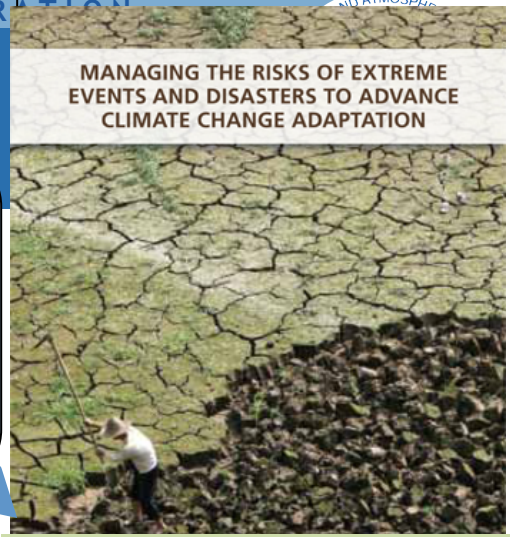
- Effective early warning systems and emergency preparedness (*very high confidence*)
- Integrated water resource management (*high confidence*)
- Rehabilitation of degraded coastal and terrestrial ecosystems (*high confidence*)
- Robust building codes and standards reflecting knowledge of current disaster risks (*high confidence*)
- Ecosystem-based/nature-based investments, including ecosystem conservation measures (*high confider*
- Micro-insurance, including weather- indexed insurance (*medium confide*
- Vulnerability-reducing measures suc pro-poor economic and human development, through for example improved social services and protec employment, wealth creation (*very confidence*)

Practices that enhance resilience to projected changes in disaster risk

- Integrated coastal zone management integrating projections of sea level risk and weather/climate extremes (*medium confidence*)
- National water policy frameworks and water supply infrastructures, incorporating future climate extremes and demand projections (*medium high*

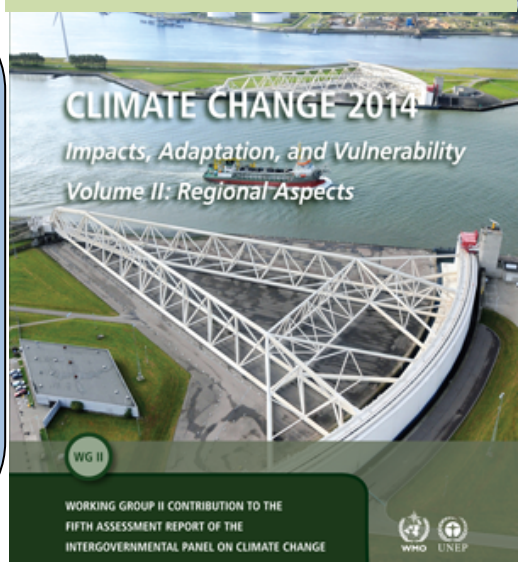
Effective early warning systems and emergency preparedness

Vulnerability reducing measures such as pro-poor economic and human development, through improved social services and protection

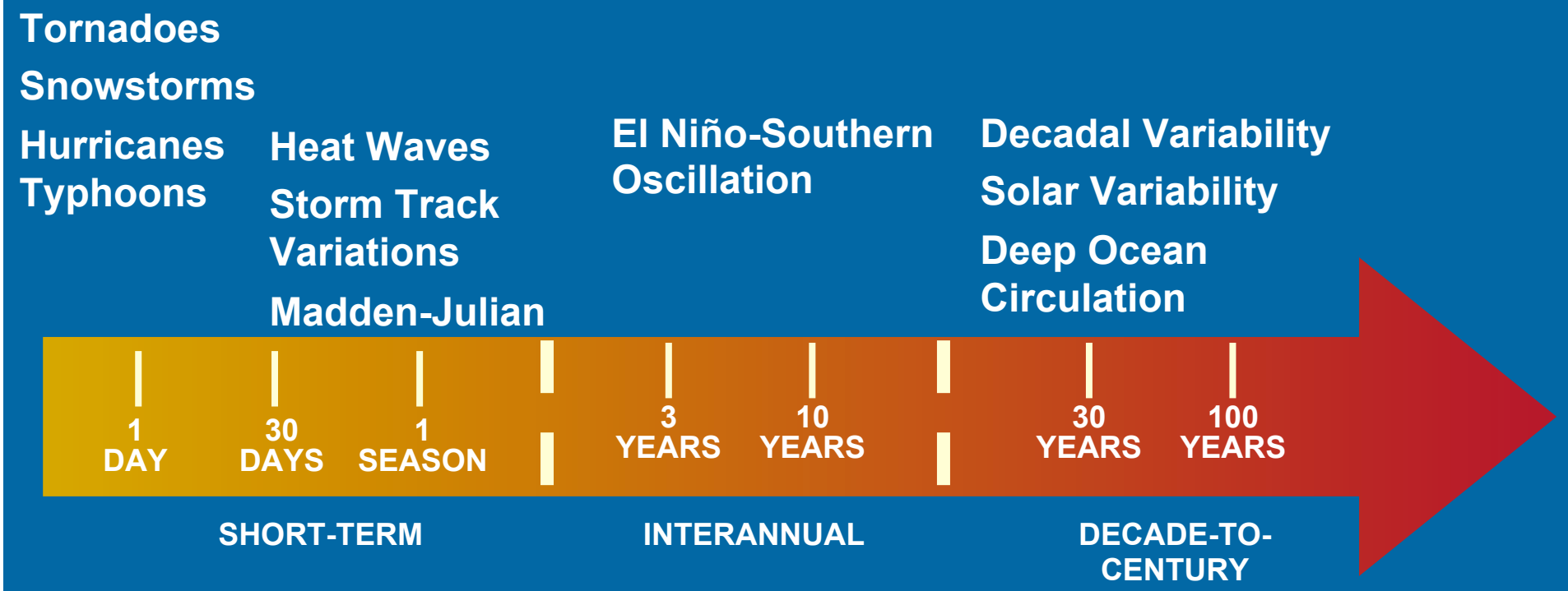


Risk Management

Resilience



Weather-Climate-a Continuum and an adaptation deficit…..



Early warning……resource allocation… Infrastructure Design

Mental models: What do people already know and believe?

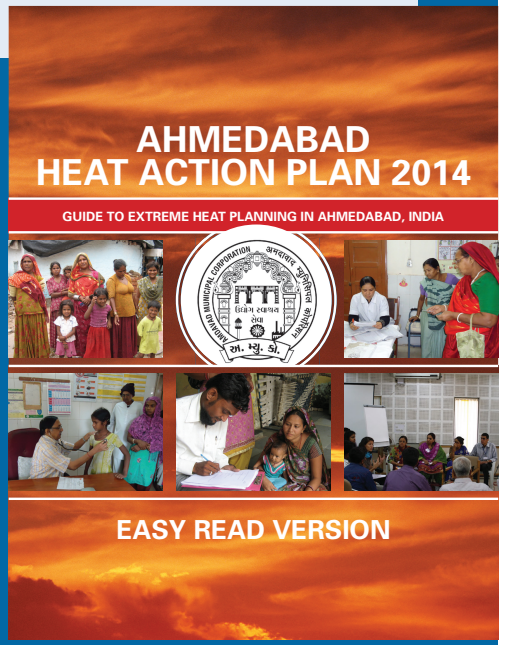
DWD

1. We are good to predict heat load at scales of day-to-day forecast on county level…
2. …by using a thermo-physiological impact model and inclusion of adaptation and indoor heat load
3. On longer time scales just temperature is used for heat pre-information so far
4. **<u>Forecast skill and user needs do not yet match very well</u>**
5. Adaptation to climate change in the health sector requires a combined assessment of downscaled climate projections and socio-economic information

Ahmedabad Heat Action Plan 2013-2014 – Key activities

- **Analysis of local data -2010 and setting cut-offs**
- **Public awareness** of the risks of extreme heat and actions to be taken

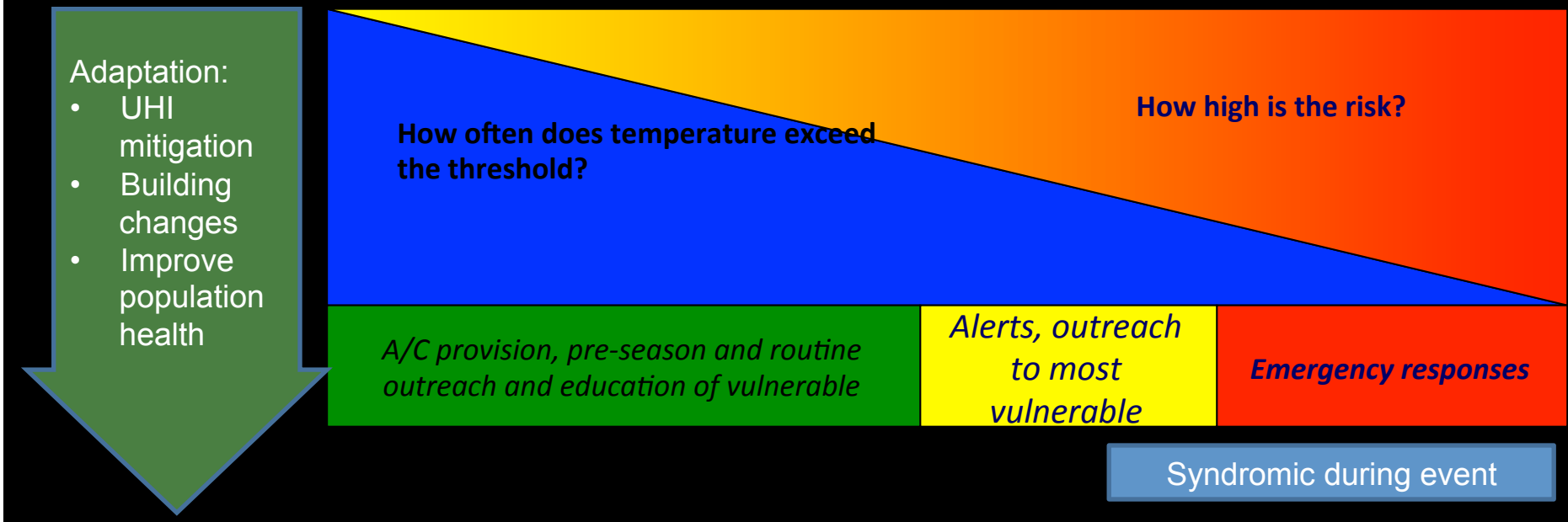
- **Training of medical officers** and hospital staff for better management of heat illness - supplies to hospitals



- **Information network to inform various departments.**
- **Learning from international experiences and best practices**

- **Media engagement for public awareness**
- **Created advance 7-day forecast for heat early warning system -CFAN center at Georgia Tech. USA**

Continuum of risk, response, and surveillance



Periodic retrospective surveillance and research with vital records, ME, hospital data

Prospects for Subseasonal Heat Predictions

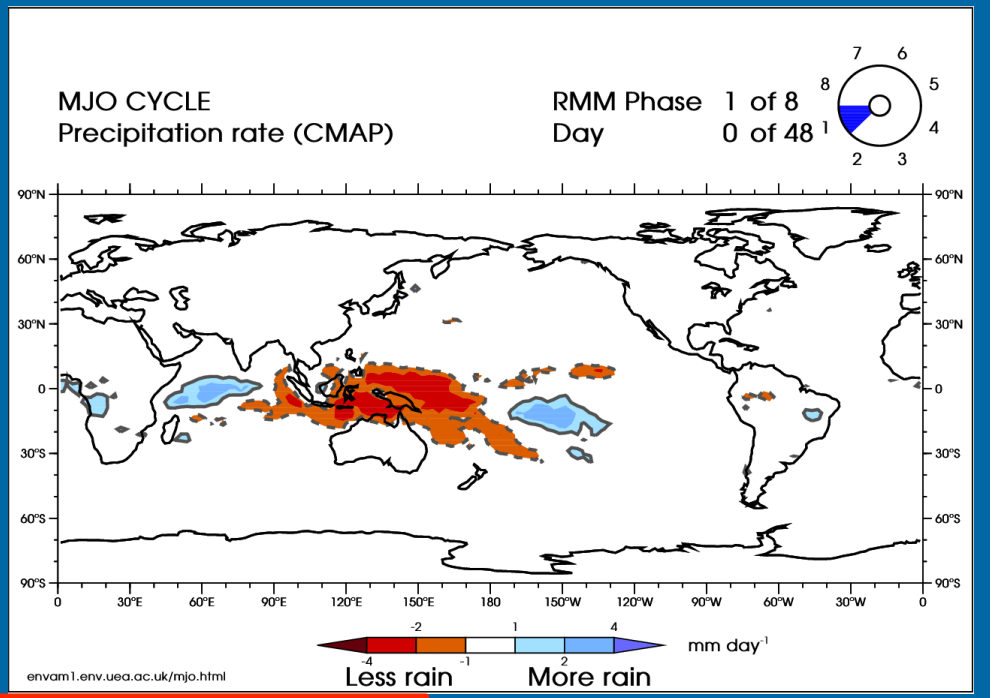
Predictable, slow varying, climate oscillations such as tropical variability (e.g. MJO)

Modulate the probability of occurrence of extreme weather events

Modulate probability of occurrence of critical impacts including the heat-health relationship

An important example:

The Madden Julian Oscillation (MJO) can impact the pattern of high and low pressure in the Extratropics and can result in high impact events



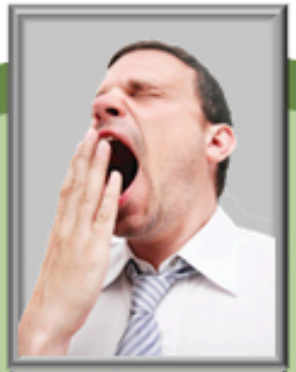
Courtesy: Augustin Vintzileos – University of Maryland ESSIC

Key issues: examples, others?

- Indices, energy balance: Triggers and thresholds
  - Relative roles of Tmax, Tmin. In different cities etc (Phoenix vs New York)
  - Preceding events e.g. July 2003 impacts prior August 2003 peak
  - Within city distribution of events
  - Bounded rationality-Too much warning –advisory, multiple pathways of communication
- Additional variables?: air quality measures
- Governance of heat as hazard –lead agency
- Evaluation

"Hydro-Illogical" Cycle

RAIN



Apathy

DROUGHT

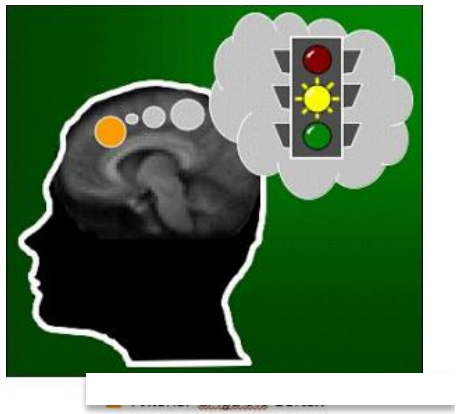
Panic

MORE DROUGHT

Concern

What is an integrated information system?

- The development and delivery of a forecast, projection……..



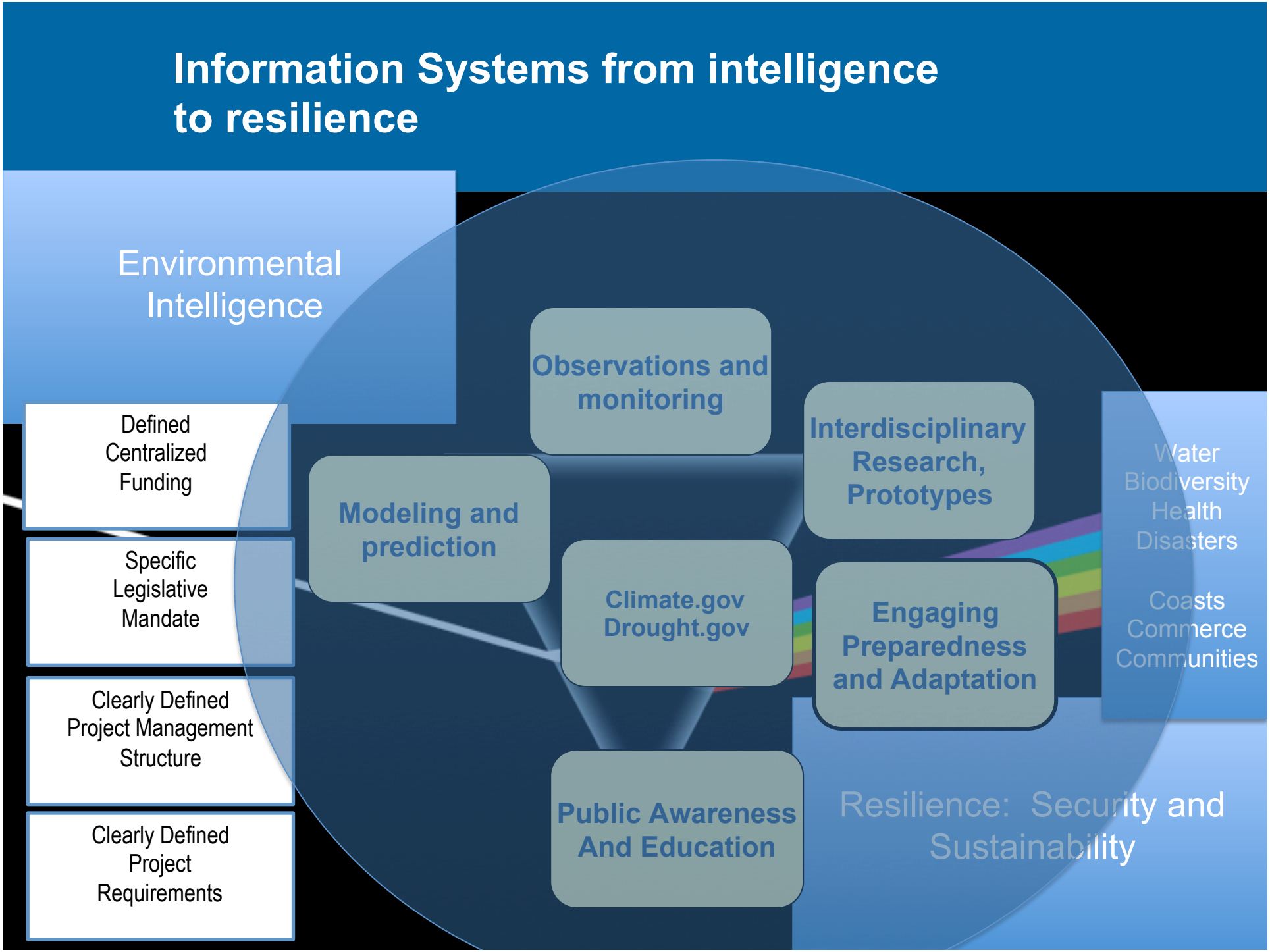
Early warning to early action

The systematic collection and analysis of relevant information about and coming from areas of impending risk that:

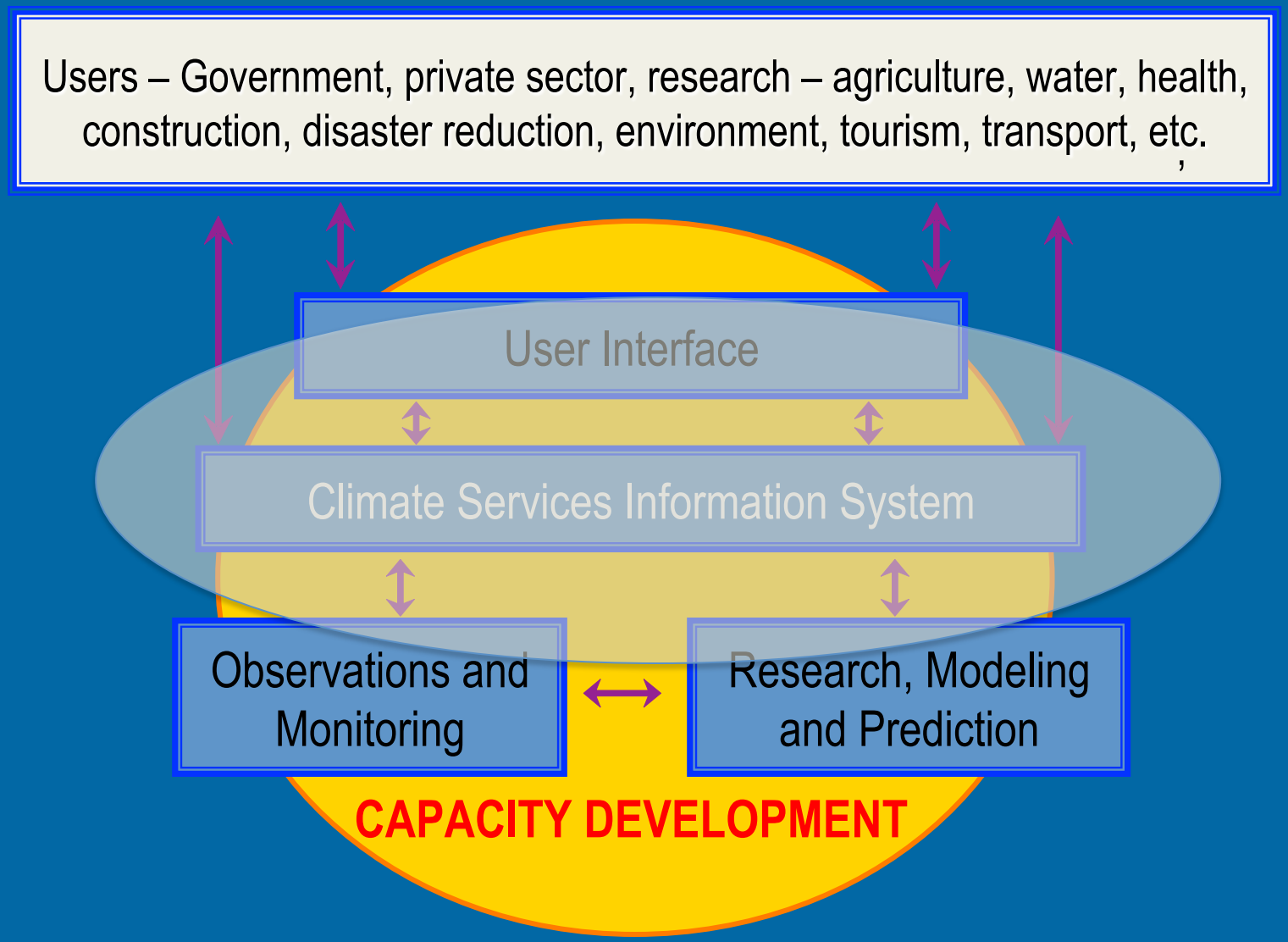
(a) Inform the development of strategic responses to anticipate risks and opportunities and their evolution; and
(b) Communicate options to critical actors for the purposes of decision-making and response

An "investment" not an "expenditure"

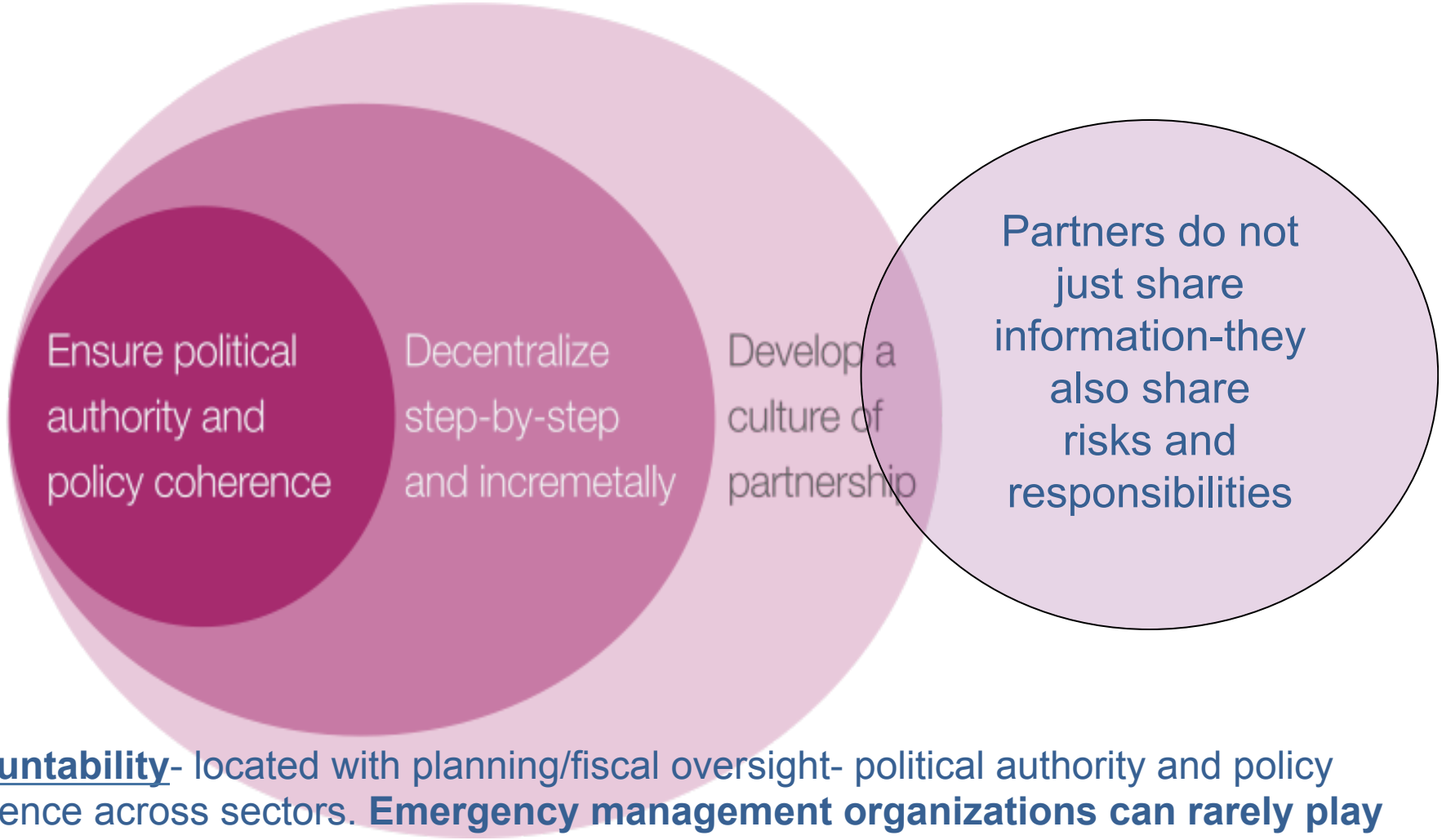
Information Systems from intelligence to resilience



Components of the GFCS



Sustaining services: Climate knowledge and risk management governance



Accountability- located with planning/fiscal oversight- political authority and policy coherence across sectors. **Emergency management organizations can rarely play that role**

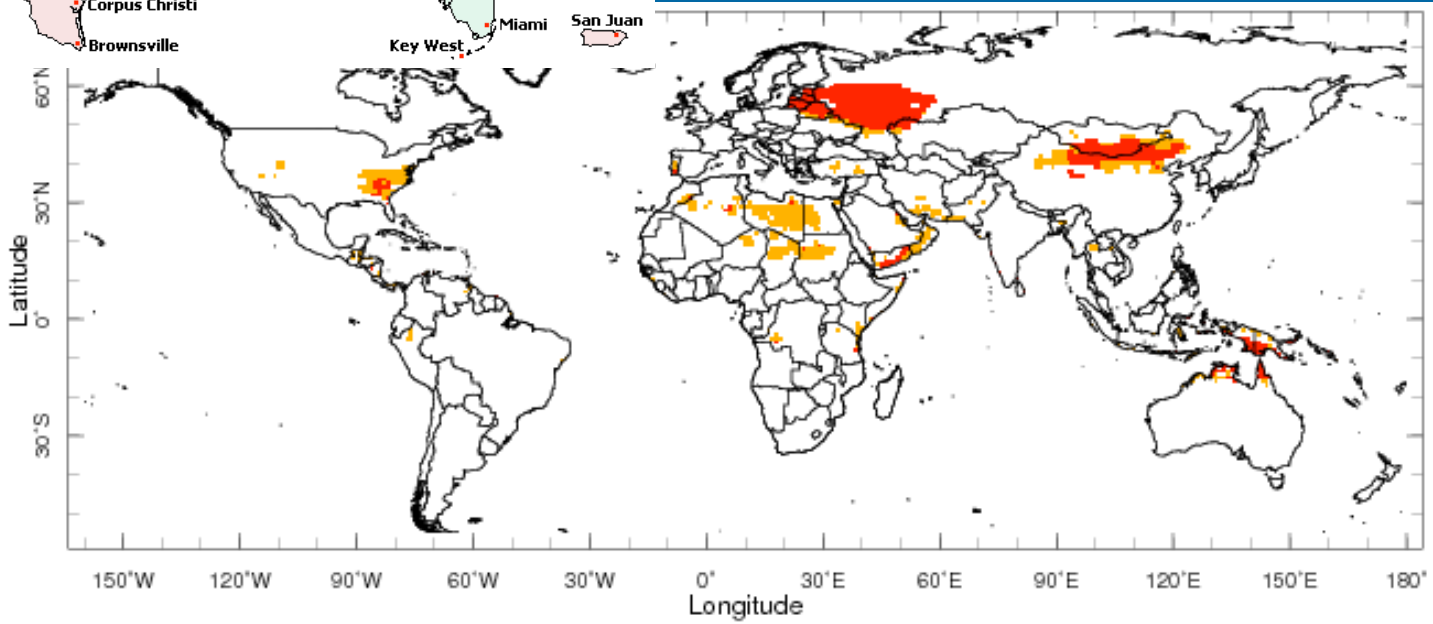
Efficiency- achieved in partnership with at-risk sectors and local communities and organizations that represent them-

What next? Crafting and Implementing National Heat-Health Information System(s) for emergent risks

Pilots-Objectives

- Unit of analysis-urban, watershed, state, national, transboundary
- Champions/constituencies
- Focusing event(s)
- Temporal-spatial scales
- National and International partners: Learning from cases
- Resources, Timelines

Why, What, Where, How, and, with Whom?



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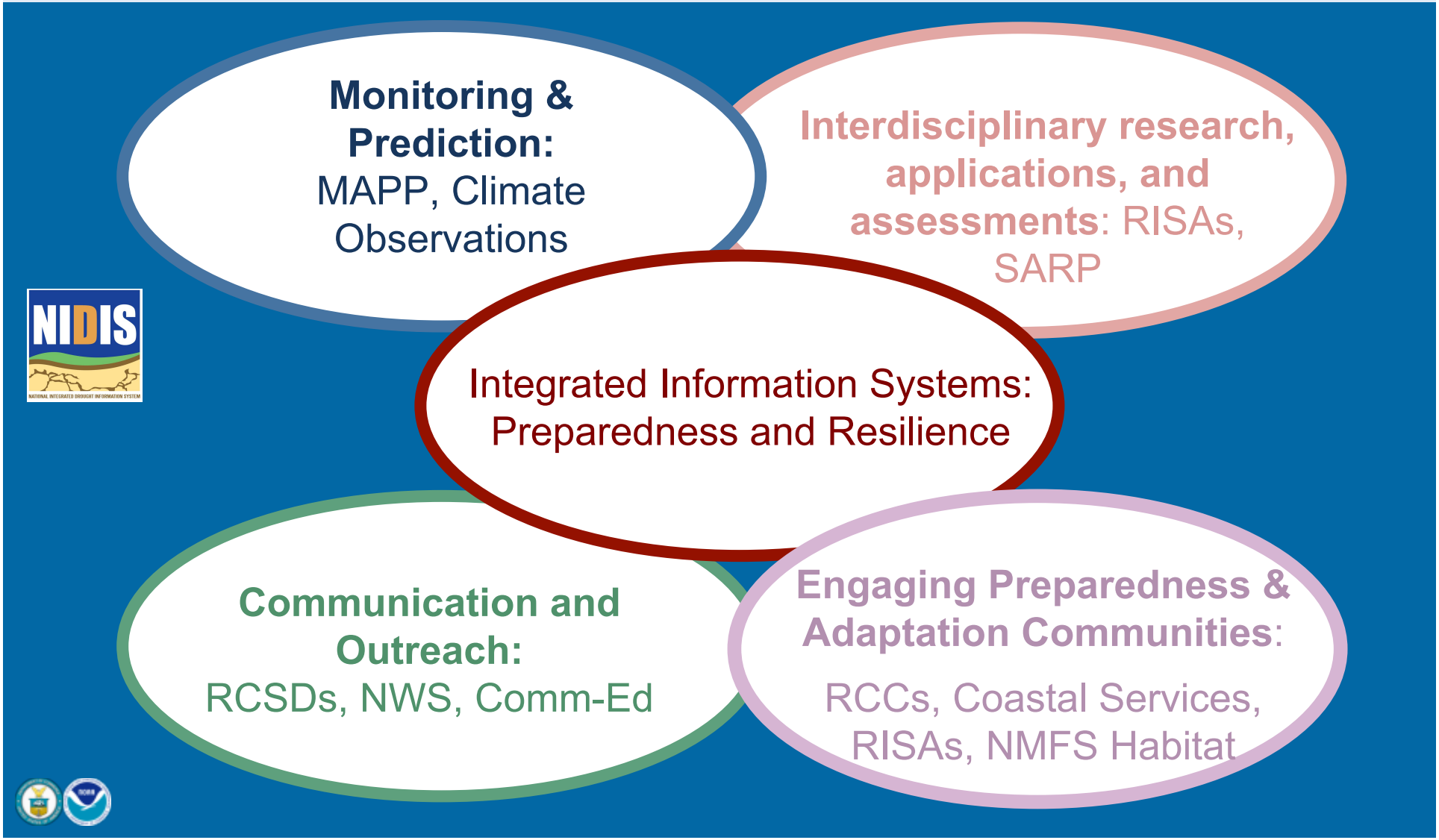
Lyon and Barnston (2014)

0000 23 Jul 2010

Mutual priorities, resource dependencies and responsibilities across programs



Perfect Heat Health Warning System

Perfect Heat Health Warning System

reliable	easy to handle	effective
• Forecast skill • Health relevance	• No complicated modelling • Easy to implement • Low requirements for input data • universal	• Trigger interventions to prevent heat related health impacts • communication • sufficient lead time

Single & multi-parameter indices

Picture Source: Fotalia

-Improving scientific and institutional knowledge, agility and alignment: Integration Team leads

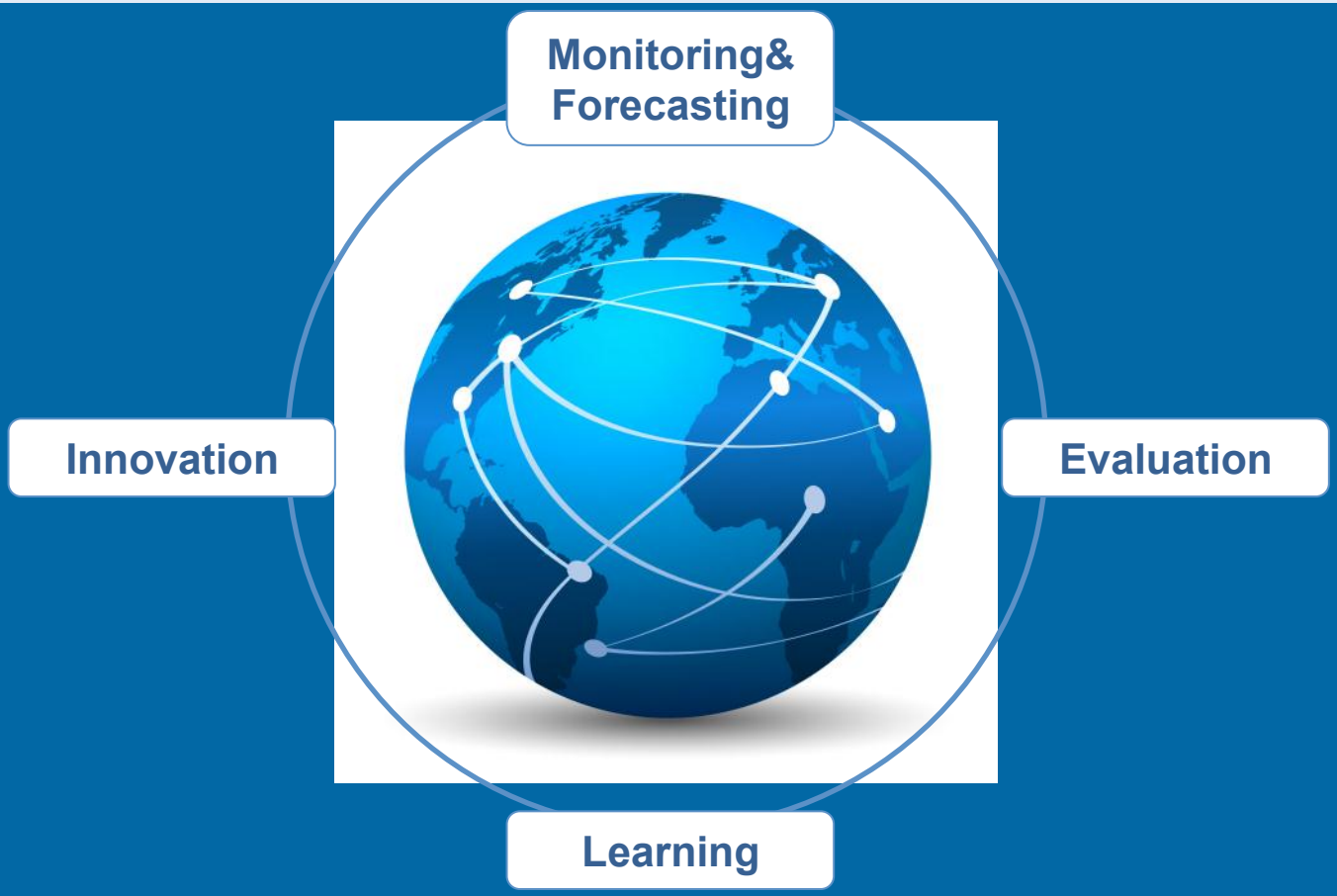
- Integrate into existing networks
- Quality: climate research and information services that match user requirements
- Assess impediments to the flow of knowledge among existing components
- Policies and practices that can limit or facilitate research-partner networks working as a system
- Opportunities for learning and institutional innovation and identifying priorities back up the research chain

Creating integrated *information* systems: "The "last mile" is by far the longest…"

	Sub-Saharan Africa	South Asia	Caribbean
Underpinning Science and Data	Considerable gaps in data availability and monitoring	Gaps in science for drought & landslides, vulnerability & exposure	Gaps in science for floods & droughts, vulnerability & exposure
Risk Assessment Warnings Tools	Some systems in place but major gaps, particularly for flooding	Generally, systems in place for main hazards but some gaps	Generally, systems in place for main hazards but some gaps
Communication/ Dissemination	Major gaps in communication to the most vulnerable	Major gaps in communication to the most vulnerable	Generally, systems in place for main hazards but some gaps
Response	Information (risk assessments/warnings) does not always lead to action	Information (risk assessments&warnings) does not always lead to action	Information (risk assessments&warning) does not always lead to action

Ranger etc,, Birkmann et al, Pulwarty and Verdin etc.

Focus on <u>capacity and improving decisions-not just information delivery</u> : Learning from Chicago, Germany, Ahmedabad-



How often should criteria for "robustness" be (re)considered?

How should learning (among the cases) take place?

Coordination

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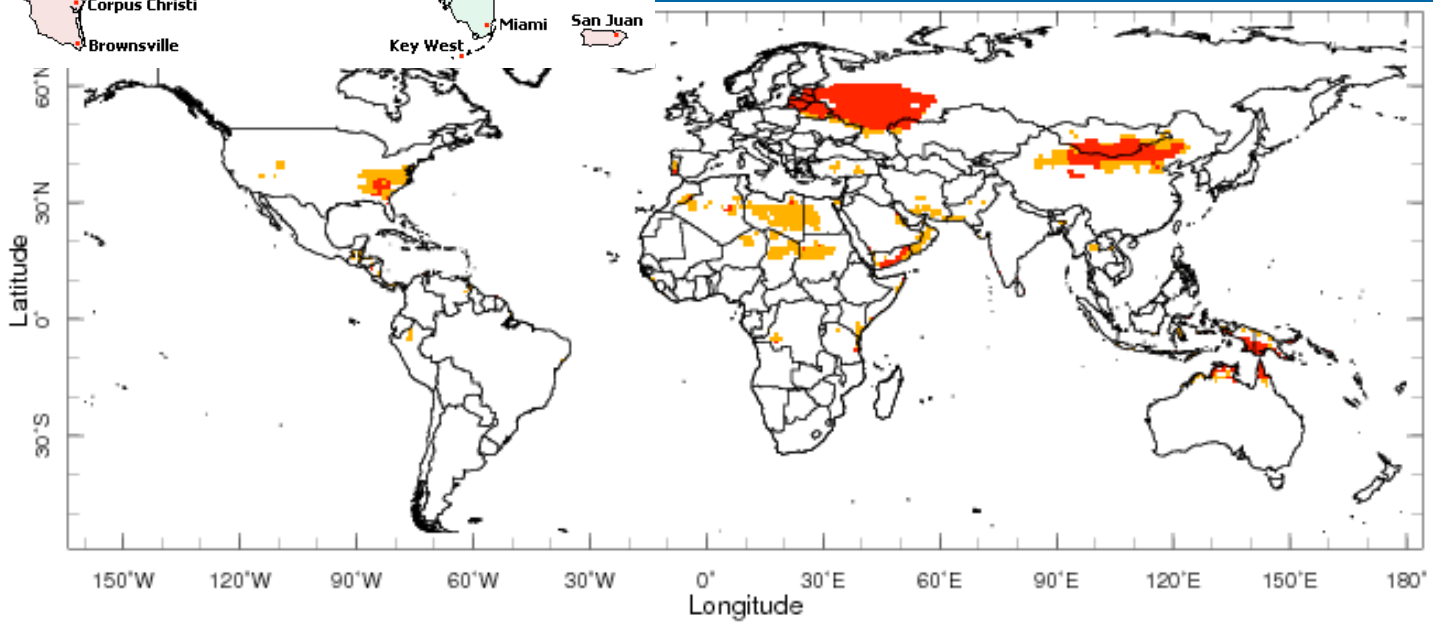

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Climate Information products

Historical Data	Climatologies Special Publication	Indices Analyses for CC Metadata	Status reports Reviews	Near real time data/ analysis	Web accessible statistics, visualization

Relative status of information

STATIC……DYNAMIC

Structural	Management	Operations	Public information	Planning
Design Safety factors Energy	Site planning Community health and well being Climate related standards	Siting designs Hazards and health Streamflow	National drought planning Resource allocation Agriculture Hazards and health	Monthly/ seasonal Planning Internationa Markets Demand

Zillman, Pulwarty others