

2356-30

Targeted Training Activity: ENSO-Monsoon in the Current and Future Climate

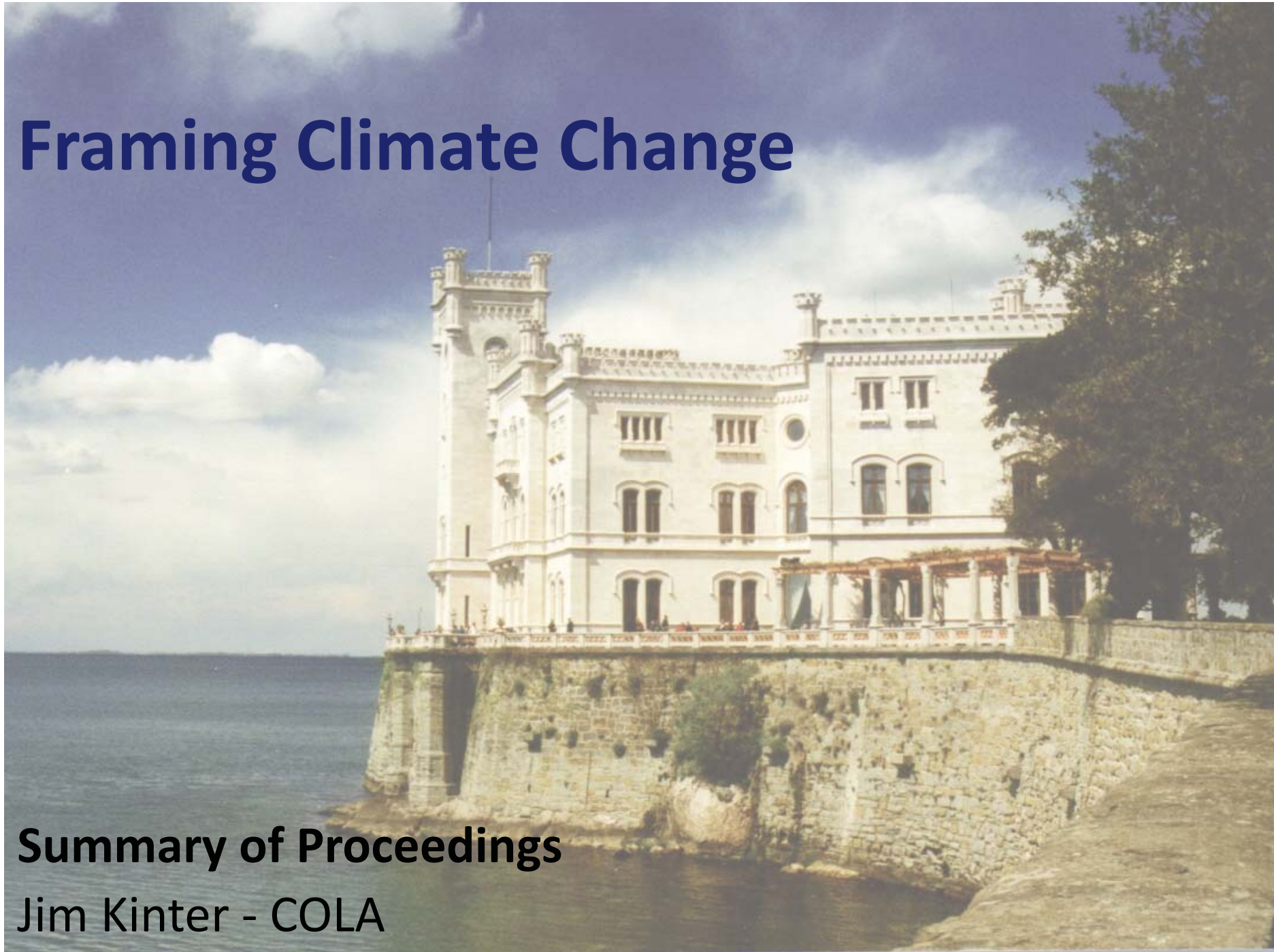
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Framing Climate Change

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Framing Climate Change

Summary of Proceedings
Jim Kinter - COLA



Workshop Goal

- Small scale experiment to discuss **how to think and talk about Human-Induced Climate Change (HICC)**
- Program
 - Review of science of climate change
 - Perspectives on climate change
 - Implications of framing (day 2)

Motivation

- **Climate change “is on the world stage”**
 - Gilding: *The Great Disruption*
 - Friedman: *Hot, Flat and Crowded*
 - McKibben: *Eaarth*
- World is looking to climate science to provide inspiration for how to address the problem
- **What should we tell them? How should it be framed?**
- Undercurrent: The IPCC process is unsatisfactory ... is it working? Is it workable?

Participants

- L. Bengtsson, U. Reading
- J. Grantham, Grantham Foundation
- * B. Hoskins, Imperial College
- E. Maibach, George Mason U.
- G. North, Texas A&M U.
- S. Rayner, U. Oxford
- * J. Shukla, George Mason U.
- A. Szollosi-Nagy, UNESCO IHE
- * M. Wallace, U. Washington
- Other commenters (Goswami, Kang, Kucharski, Quevado, Sarachik, ...)

Three Frames

- **Serious, long-term issue on century time scale**
 - **traditional IPCC view** focusing on projections for 2100
 - Solid, rigorous (read conservative) way to present science
 - May not convey the sense of urgency
- **HICC is *already* a serious issue**
 - **Taking a large toll** in terms of human impacts
 - **May emerge as #1 environmental issue** by the time of our grandchildren's generation
- **HICC is part of a broader set of concerns**
 - **Resource depletion** (groundwater, topsoil, potassium, phosphate), nitrogen poisoning of agricultural areas and wetlands, etc.
 - all happening on scale of growth in population **and global GDP**
 - **food security and energy security** will be serious issues before climate change issues are in their own right
- “Climate change” → “Global change” → “Sustainability”
- Should we change what we observe, how we adapt (to climate change? to multiple drivers?), how we organize our research, how we train our students, and what future we envision for the developing world?
- Is there just one “right” way to frame global change?

Sense of Urgency?



This fellow's plight was mentioned no fewer than 3 times!

Science of Climate Change

Just the facts, ma'am. Just the facts.



Sergeant Joe Friday, LAPD, *Dragnet*

Science of Climate Change

- Keeling curve – fundamental; ominous to climate scientists; *hard to acquire for non-specialists*
- Observed global mean temperature record since 1870: trend over entire period consistent with trend in CO₂ – *nobody lives on the global mean*
- Steadiness of global mean temperature over past decade is within the range of uncertainty about FAR, SAR and TAR – *are we arguing over details (Inside Baseball)? Do they matter?*
- Global sea level rising ~3 mm/y
- Arctic sea ice decreasing at all times of the year; marked decrease at time of sea ice minimum; canary in coal mine – *does anybody but the polar bears care?*
- Different scenarios separate by end of century but indistinguishable through mid-century

Science of Climate Change

- “**Dangerous** climate change” – *value-laden language*
 - Limits on CO₂ emissions? Concentrations?
 - Don’t forget the other GHG (CH₄, O₃ etc.)
 - Total cumulative world emissions target?
 - High sensitivity to GHG emission “floor”
- Related to more general questions of tipping points and thresholds
- Attribution of extremes
- Haven’t said much about aerosols

Science of Climate Change

- Inside Baseball ...
 - Regional patterns of warming could be artifacts of models
 - Subtle changes in temperature gradients → changes in baroclinity → changes in storm tracks
 - Regional climate models: supporting assessment or detailed crap?
 - Transition to chaotic vs. stable mode of Indian monsoon?
 - Analogue method for attribution of extremes
 - Many, many others not mentioned yesterday ...
- We air this out in our own journals AND in the IPCC reports. We take credit for openness – is it helping?

Science of Climate Change

- Very strong evidence that we are performing a very dangerous experiment with our planet – *have we made that point forcefully enough?*
- Very long time-scales of CO2 and ocean imply **climate commitment**, and **very long-term sensitivity to the GHG emission floor** for next century – *this has implications for mitigation policy; adaptation?*
- Emissions reductions in next few decades **important only after 2050** – *this has multiple implications in a policy context*
- Thresholds probably exist in the climate system but we do not know where they are – *see later comments about uncertainty*
- For societies thresholds will exist
- **Extreme weather events may be increasing** more than simple shifts of distributions suggest but this has **not yet been shown conclusively** – *is this kind of wobble-room language persuasive enough? Should it be?*
- Uncertainties in climate models and the predictions of natural variability will be **reducible to some extent** – *see wobble-room remark*
- Hard targets are not based on scientific evidence but softer ones to guide policy can be posed

NEED MORE RESEARCH!!

Focus on Water Resources and Hydrological Cycle

- There will be less water available for more people
- Exponential growth in human population drives other exponentials
 - total real GDP, damming of rivers, water use, fertilizer consumption, urbanization, ...
- Most significant manifestations of climate change will take place through changes in water resources
- *Isn't this ultimately an energy problem?*
- *Are there national or international policy implications? How should climate science inform those?*

“Whiskey is for drinking and water is for fighting over.” – Mark Twain

Is it true? When was the last time nations fought over water? Will it happen again?



Communicating Climate Change

- Truism of communication: **Simple, clear messages repeated often by trusted sources have impact**
- Beliefs (*catechism?*):
 - **It's real** (Climate change is really happening).
 - **It's us** (Climate change is human-caused).
 - **It's bad** (Climate change is harmful to people).
 - **We agree** (Scientists have come to consensus on these points).
 - Start communicating what we all agree on, expressed in simple clear terms, rather than the things we find debatable (more interesting to us experts)
 - If there is insufficient agreement about a given point among the scientists, then it is not a message that should be delivered
 - **We can fix it** (Climate change is solvable).
 - **It's here and it's now.**
 - Where is here? Earth?
 - When is now? Next year? Decade?

Communicating Climate Change

- Explain it to me as though I were a very intelligent 5-year-old. This is not dumbing down our communication, but smartening up our communication.
- Treat communication like an onion: the outer facing layer (closest to public) should be simplest message, and it should encourage people to keep their minds open and therefore seek more information. For example, details like probabilities of certainty or likelihood should not be the outermost layer.

(False) Dichotomies

- Mitigation vs. Adaptation
 - Can't we do both? Isn't it the case that we *must* do both? Should climate scientists advocate both?
 - Does inaction on one imply/compel inaction on the other? Does action on one (e.g. adaptation by transition to natural gas) obviate action on the other?
 - Does the high politicization (and associated polarization) of mitigation make it impossible? Is it a *Tragedy of the (Unregulated) Commons* and, since it is global, and therefore possibly unregulatable, mitigation is untenable?
 - Is one the right thing to do (and the other the wrong or less important one)?
 - Mitigation is getting all the (bad) press, but adaptation is happening, quietly

(False) Dichotomies

- Scientific Uncertainty vs. Public Perception of Uncertainty
 - Scientists are trained in precise language of error bars and uncertainty (sampling issues, probabilities etc.) – we are all climate skeptics!
 - But the public at large is not
 - There is full recognition of uncertainty and flaws in climate science, but the discussion in policy circles represents climate models as “bullet-proof” → relatively minor problems seem to damn the models entirely
 - Confronting confirmation bias: liberals and conservatives have opposing world views, so they take from science what they wish

(False) Dichotomies

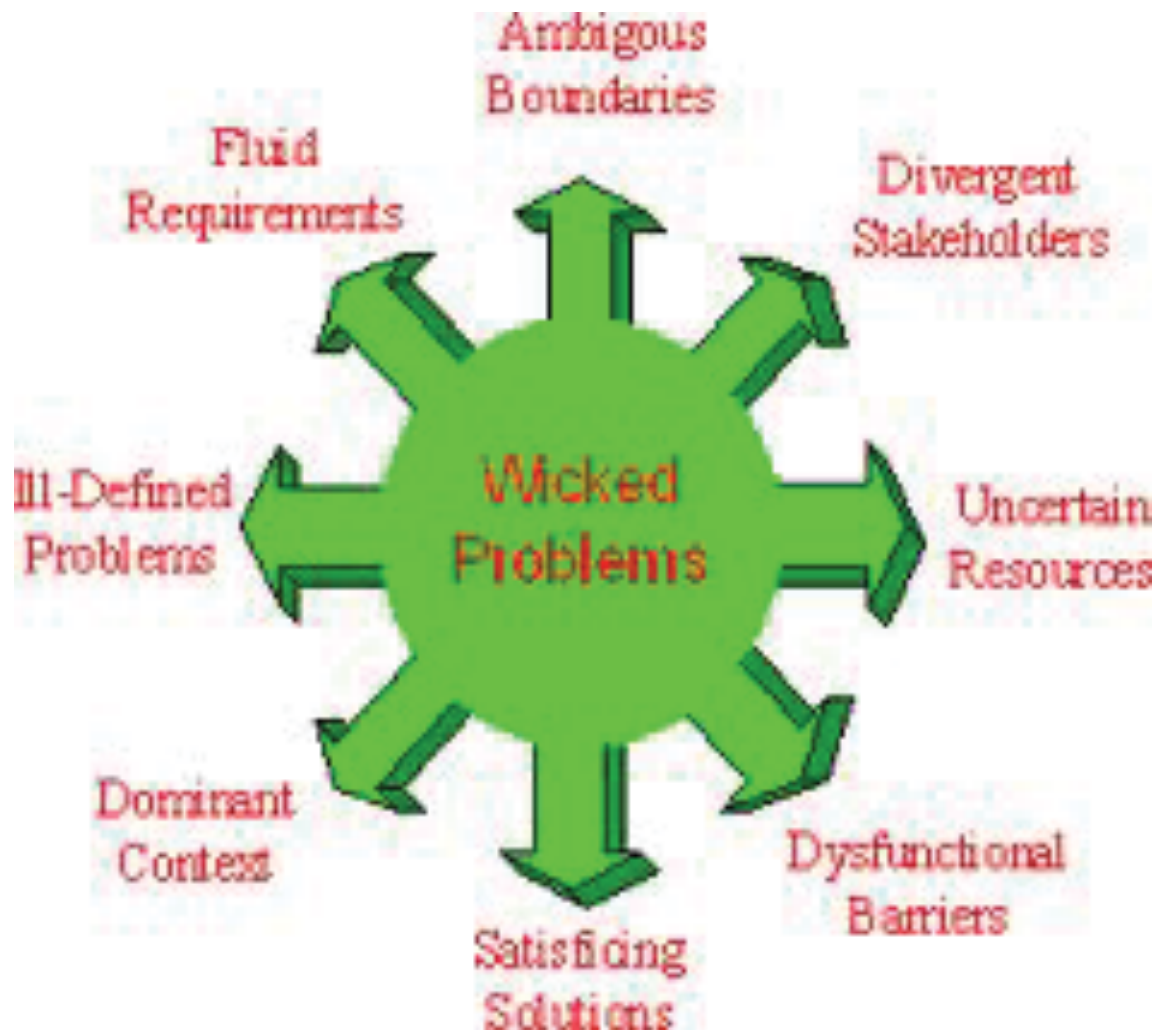
- Reporting Facts vs. Speaking Passionately
 - Should climate scientists both report scientific facts and advocate particular solutions to the identified problem when speaking to the public (e.g. US Congress)?
 - Can we really stand behind “It’s here and now”? If not, are our reservations more important than communicating urgency?
 - Should the uncertainty in ascribing extreme events to global change be the foremost message in attribution reports?
 - Are climate scientists managing their careers rather than speaking passionately about what their data tell them?
 - Do we risk apocalypse fatigue and fatalism if we speak too vehemently about the downsides? Social science suggests that apocalyptic language discourages people from adaptation – telling people scary stories doesn’t change their behavior or, more importantly, their values

(False) Dichotomies

- Climate Science vs. Social Science
 - Methodologies, language, jargon, subjects and objects are all very different
 - Nevertheless, both are sciences, meaning that they proceed from observations/measurements to theory to experiment, and repeat
 - Both are also constrained by having little or no data from an Earth that is “nastier” (warmer, more extreme etc.)
 - People, like seed, have evolved both genetically and culturally in a period of remarkable stability of the climate system

(False) Dichotomies

- Climate Change vs. Broader Agenda including Resource Depletion
 - Broad environmental concerns may appeal to anti-climate partisans, so enlarging the package can motivate action
 - Thinking broadly can lead to adaptation policies that can really happen, while thinking about 50-year climate change may not
 - Broader problem involving inter-connectivity between climate and society may be less well understood than the climate itself → harder to solve – Wicked Problem



Examples:

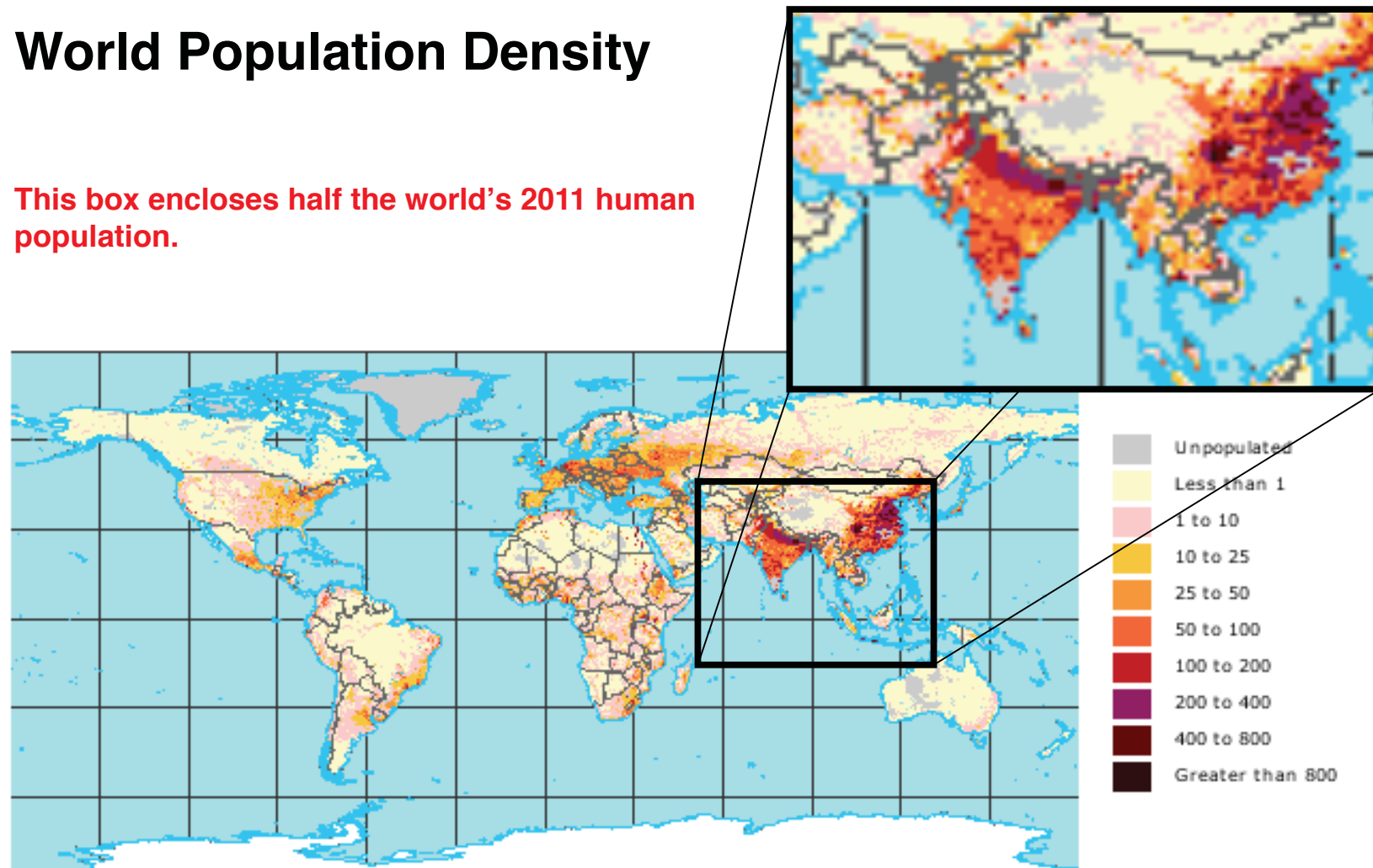
War on drugs

War on poverty



World Population Density

This box encloses half the world's 2011 human population.



| | | | | | |
|-------------|---------------|-----------------|-------------|---------------|----------------------|
| India: | 1,200 million | Nepal + Bhutan: | 31 million | China: | 1,344 million |
| Bangladesh: | 150 million | Myanmar: | 48 million | SE Asia: | 264 million |
| Pakistan: | 300 million | Indonesia: | 242 million | Total: | 3.579 billion |

Resource Depletion

- **All bubbles burst** - conclusion of exhaustive examination of wide range of commodities over a very long time
- Human nature is inclined to believe good news and disbelieve bad news
- **Paradigm shift in mid-2000s**: reversal of trends in commodity prices quite unlike speculative bubbles → **explanation: we're running out of resources**
- For example, the stocks of commodities necessary for farming have been nearly wiped out and the rate of growth of productivity has been reduced, so agriculture is now at the mercy of the weather

Resource Depletion

- Characteristics of early 21st C agriculture
 - Productivity gains in top wheat producers have gone flat
 - 300-500 million people are fed by over-pumping groundwater
 - Eroding top soil at 1%/year
 - Pests are becoming pesticide-resistant
 - Depletes phosphorus and potassium, which are essential to grow anything
 - Energy-intensive – tilling, pesticide production etc.
- The big drivers of grain prices are growing population, corn-based ethanol (“lunacy”), market speculation, and adverse weather conditions. The important marginal player is adverse weather.

Policy Framework

- Liability principle – the guilty must pay
 - Does it apply to nations as it does to individuals?
 - Does it apply across generations?
 - *What is the crime: over-emission? Over-population? Over-indulgence?*
- Alternative approach – deep pocket approach (those who can pay, should)
 - *Will it resonate with capitalists? Communists?*
 - Marx: From each according to his ability, to each according to his need (depends on abundance of goods and services)

Policy Framework

Values drive view of what should be done



Pithy Remarks

Democracy is not about getting people who think differently to think the same thing, but to get them to do the same thing
- Rayner



Pithy Remarks

- Scientists are wimpy – they deplore overstatement as a crime second only to faking one's data. - Grantham
- Can we appeal to the optimism and creativity of humans, particularly young people?
- Bengtsson

