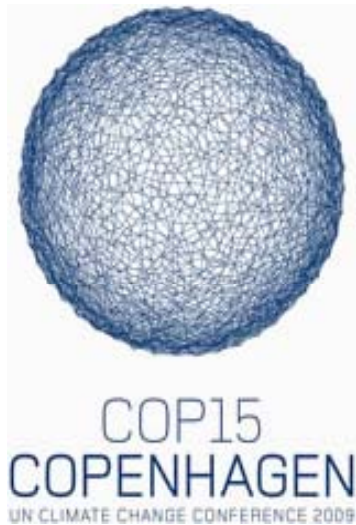


Inequality and Climate Change: Vulnerability, Responsibility, Action



Rutgers University
November 8, 2012

J. Timmons Roberts
Ittleson Professor of Environmental
Studies and Sociology
Brown University



Special acknowledgement
to Brad Parks, Dave Ciplet, Mizan Khan
And the Climate and Development Lab



**Bloomberg
Businessweek**

November 5 — November 11, 2012 | businessweek.com

IT'S GLOBAL WARMING, STUPID

pe



Vulnerability to climate change here



Over 106 died



...and vulnerability there



Cyclone Nargis, May 2, 2008, Myanmar (Burma)

An unknown number, over 138,000, died



Roadmap for today

I: Why global inequality matters

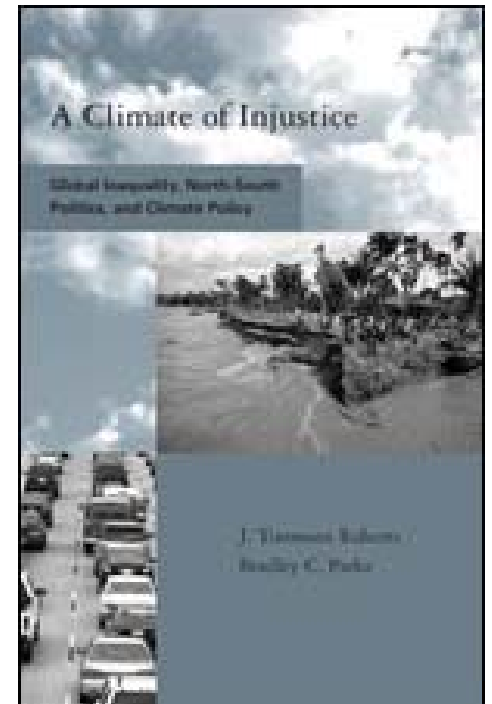
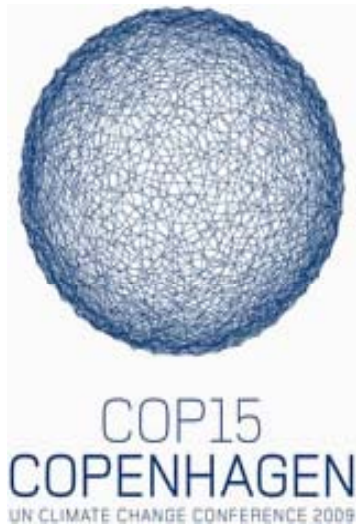
II: Who suffers worst and first?

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VI: Final Thoughts: What is to be done?



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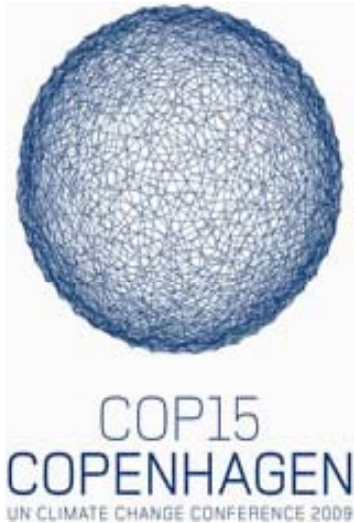
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Inequality and the Impasse (why inequality matters)

- **Inequality** within and between nations, of many sorts, **drives desperation** in the global South, (vulnerability)
- It **drives anger** at the injustice of the distribution of **goods** (wealth) and **bads** (emissions)
- And it **drives inability** and **unwillingness** to **participate** effectively in international efforts to address climate change (participation in Kyoto and other environmental treaties).

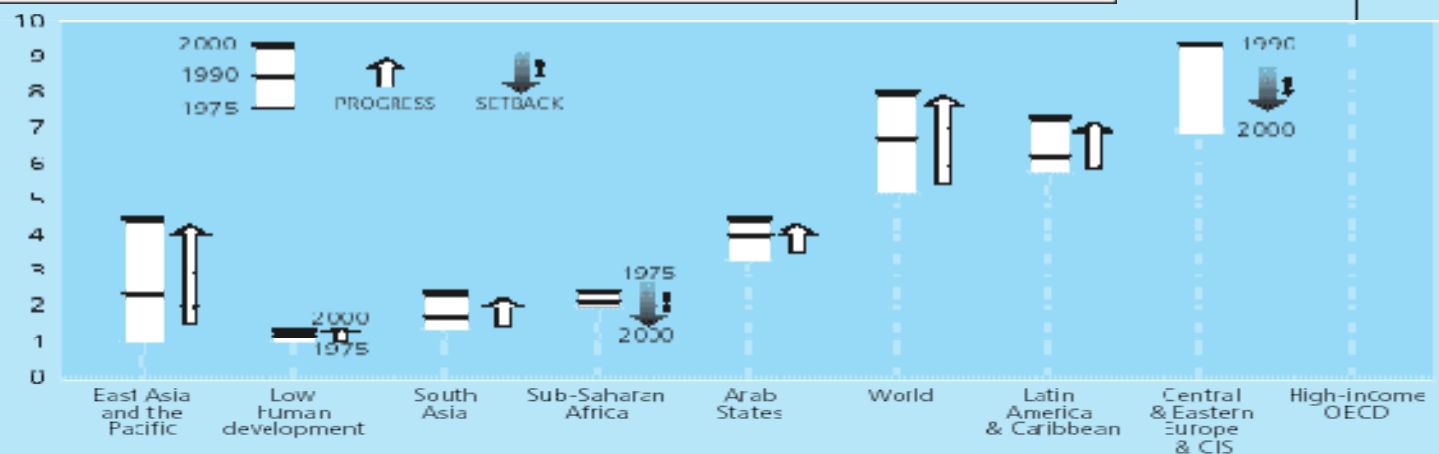
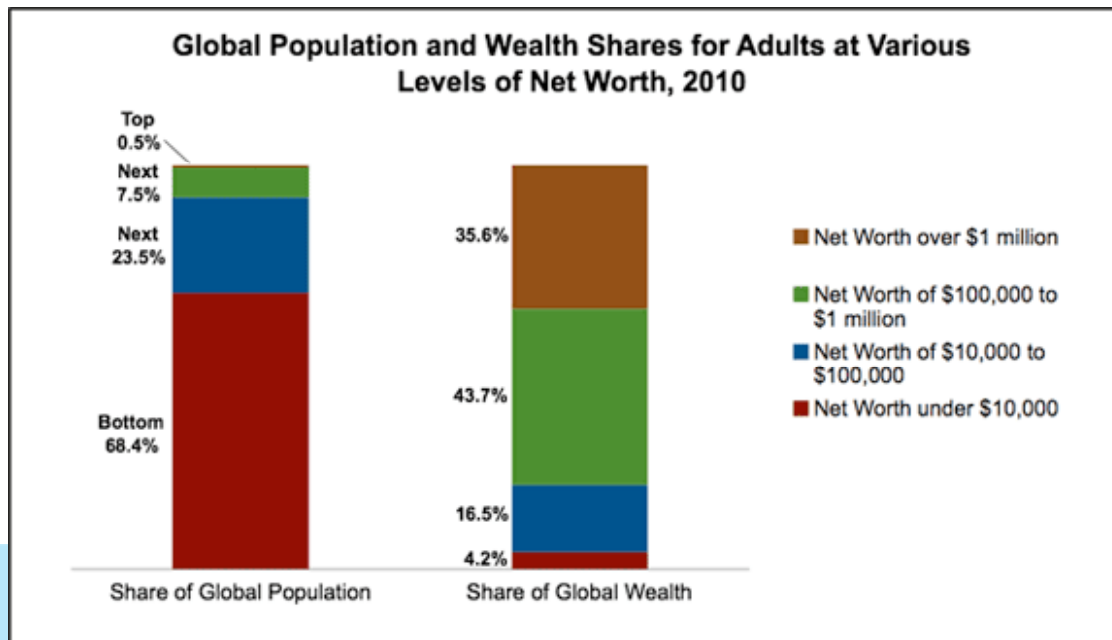


Inequality drives stalemate...

- Inequality reinforces **particularistic world views**
- Among the subordinated group (the poor especially), inequality supports “**structuralist**” **perspectives** (that they are without power to change the system, that the system is unfair)
- Savage inequality can lead to “**get-even**” or “zero-sum” approaches, even when they are self-defeating

Adil Najam: “It is tempting to dismiss the South’s persistent distrust of the North as the paranoia of historical baggage. However the South’s anger is directed...by what it sees as subjugation today, and its inability to influence what might happen in the future.”

Extent of Global Inequality



Source: Human Development Report Office calculations based on World Bank 2002e.

Spill-over

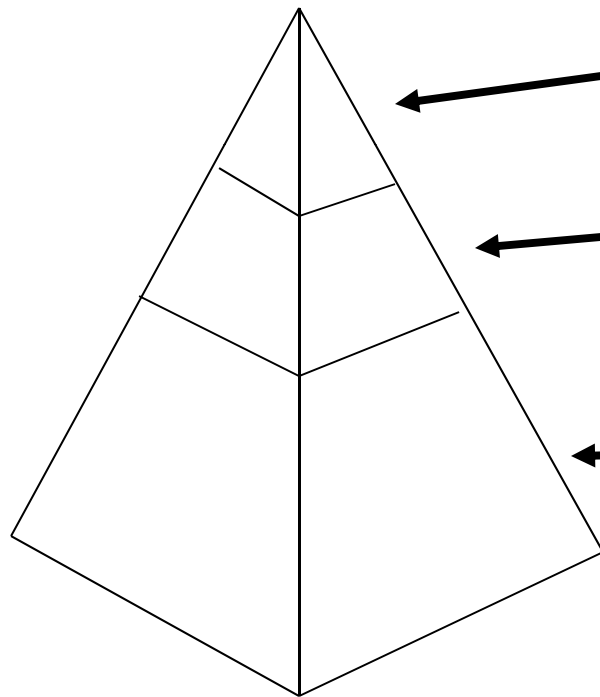
The core of the problem is the **spill-over** of economic **development** issues into **environmental** diplomacy

(E.g. colonial and post-colonial treatment by powerful nations, unkept aid promises, unfair trade arrangements like WTO and IMF/World Bank aid conditionality, outmatched negotiators at COPs)

Where does the inequality come from? Bad people? No, it is the product of

A World System of Inequality:

Development doesn't happen just in nations, it happens at the level of the whole world, and some countries develop at the expense of others. Class structure cannot be understood within nations, but only across the world.



- **Core:** *wealthiest nations, developed at expense of poor*
- **Semi-periphery:** *characteristics of both, serves as middleman*
- **Periphery:** *poor nations, natural resources and cheap labor exporters*

Prebisch, Frank, Cardoso and Faletto, Braudel, Wallerstein, etc.

A Central Idea of the Environmental Justice Perspective is that

Waste Flows Downhill.

(In the environment and in the social system.)

If there is unequal power and resources, environmental problems will be displaced geographically.

First NIMBY → PIBBY

then, with globalization, overseas
(LCDWITA)

***So, We Cannot Solve Environmental Problems
Without Addressing Inequality***

(Chavis, Bullard, Bryant, etc.)

Roadmap for today

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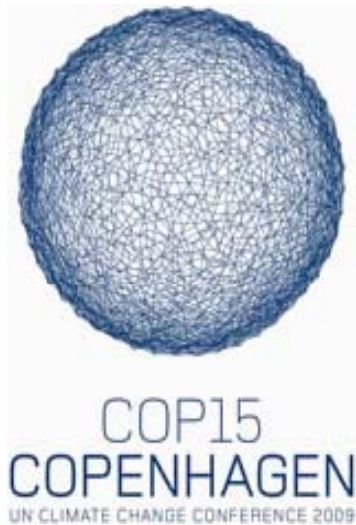
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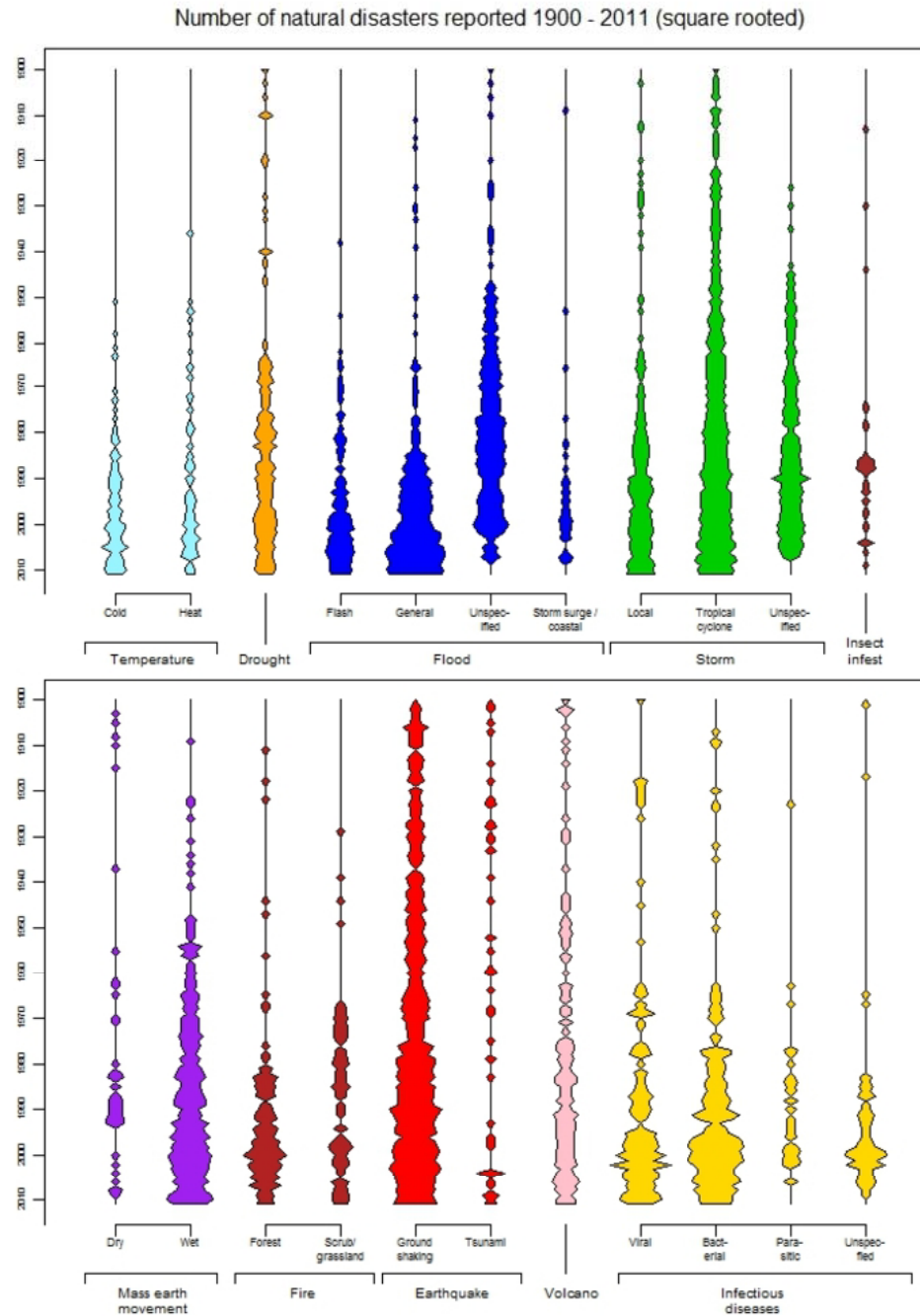
VI: Final Thoughts: What is to be done?



Top 20 hydro-meteorological disasters 1980-2011 CRED-EMDAT, (of 16,769 disasters; Nov. 3, 2012)

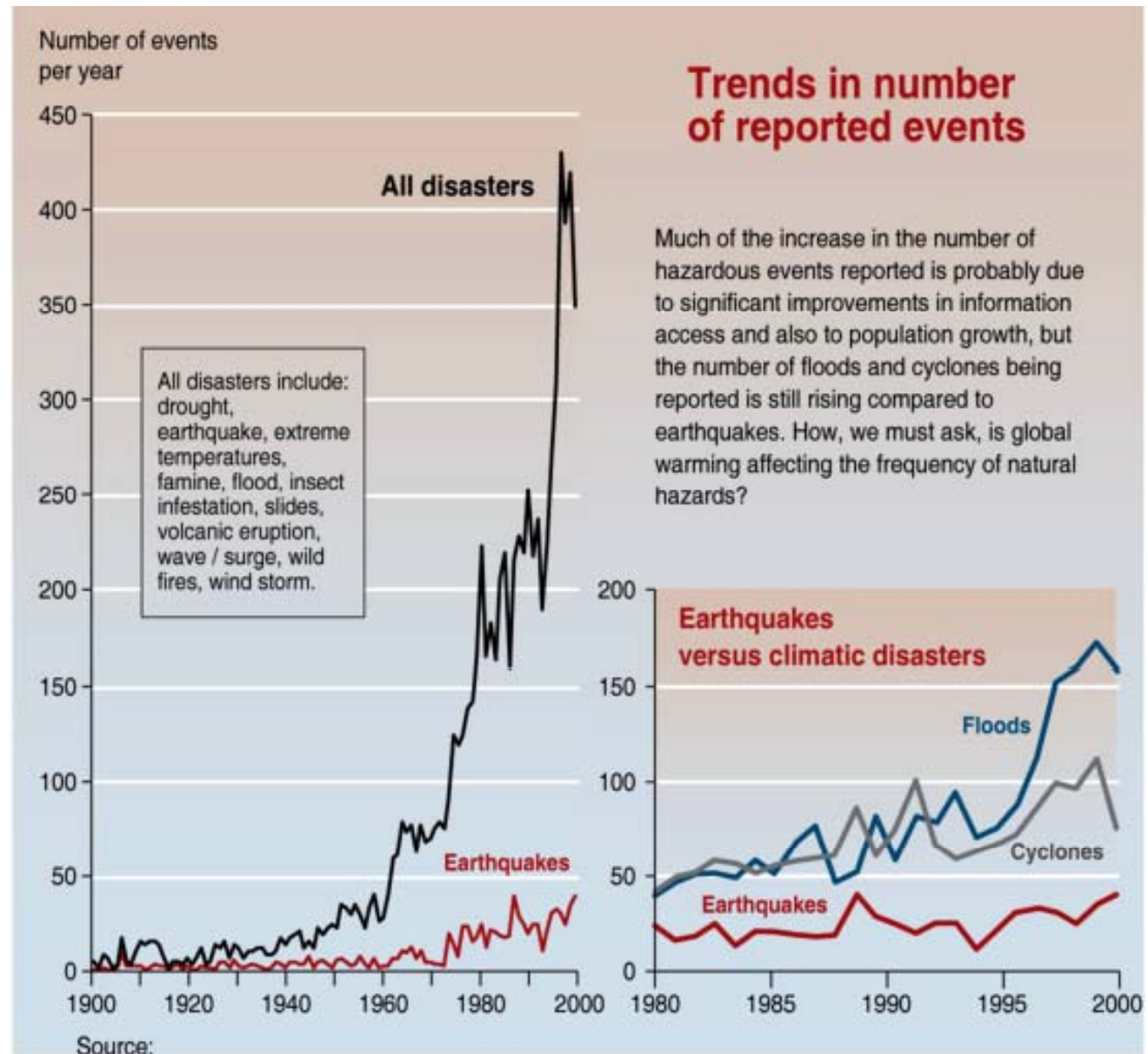
<u>Date</u>	<u>Country</u>	<u>Location</u>	<u>Sub Type</u>	<u>Name</u>	<u>Killed ↓</u>	<u>Tot. Affected</u>
00/05/1983	Ethiopia	Wollo, Gondar, Goe, Eritr ...	Drought		300,000	7,750,000
00/04/1983	Sudan	Northern Regions, Maban, ...	Drought		150,000	8,400,000
29/04/1991	Bangladesh	Cox's Bazar, Chittagong, ...	Tropical cyclone	Gorky (02B)	138,866	15,438,849
2/5/08	Myanmar	Ngapadudaw, Labutta, Mawl ...	Tropical cyclone	Cyclone Nargis	138,366	2,420,000
00/00/1981	Mozambique	South, Central, Maputo, G ...	Drought		100,000	4,750,000
00/06/2010	Russia	Moscow, Volgograd, Lipesk, ...	Heat wave		55,736	
15/12/1999	Venezuela	Federal district Caracas, ...	Flash flood		30,000	483,635
16/07/2003	Italy	Milan, Turin (Piémont), M ...	Heat wave		20,089	
1/8/03	France	Paris region - all countr ...	Heat wave		19,490	
1/8/03	Spain	Andalousia	Heat wave		15,090	
24/05/1985	Bangladesh	Urir, Jabbar, Bata, Darbe ...	Tropical cyclone		15,000	1,810,000
25/10/1998	Honduras	Coastal Area	Tropical cyclone	Mitch	14,600	2,112,000
28/10/1999	India	Kendrapara, Jagatsinghpur ...	Tropical cyclone	05B	9,843	12,628,312
00/06/1980	China P Rep	Sichuan, Anhui, Hubei			6,200	67,000
5/11/91	Philippines	Bago, La Cariota, Bacalod ...	Tropical cyclone	Thelma (Uring)	5,956	647,254
15/11/2007	Bangladesh	Khulna-Barisal coast, Ba ...	Tropical cyclone	Sidr	4,234	8,978,541
2/11/97	Viet Nam	Ca Mau, Soc Trang, Ben Tr ...	Tropical cyclone	Linda	3,682	1,081,127
1/7/98	China P Rep	Hubei, Hunan, Sichuan, Ji ...	General flood		3,656	238,973,000
25/10/1998	Nicaragua	Chinandega and Esteli	Tropical cyclone	Mitch	3,332	868,228
9/6/98	India	Kutch, Porbandar, Jamnaga ...	Tropical cyclone	03A	2,871	4,600,893

Climate Disasters Are Increasing



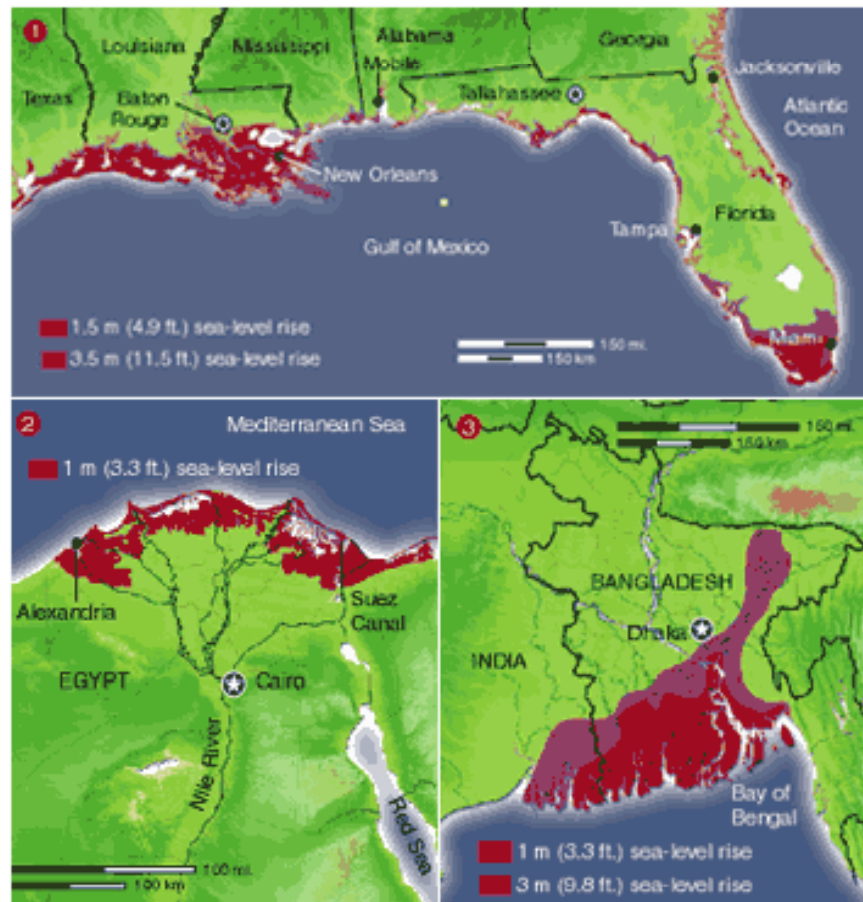
CRED-EMDAT
2012

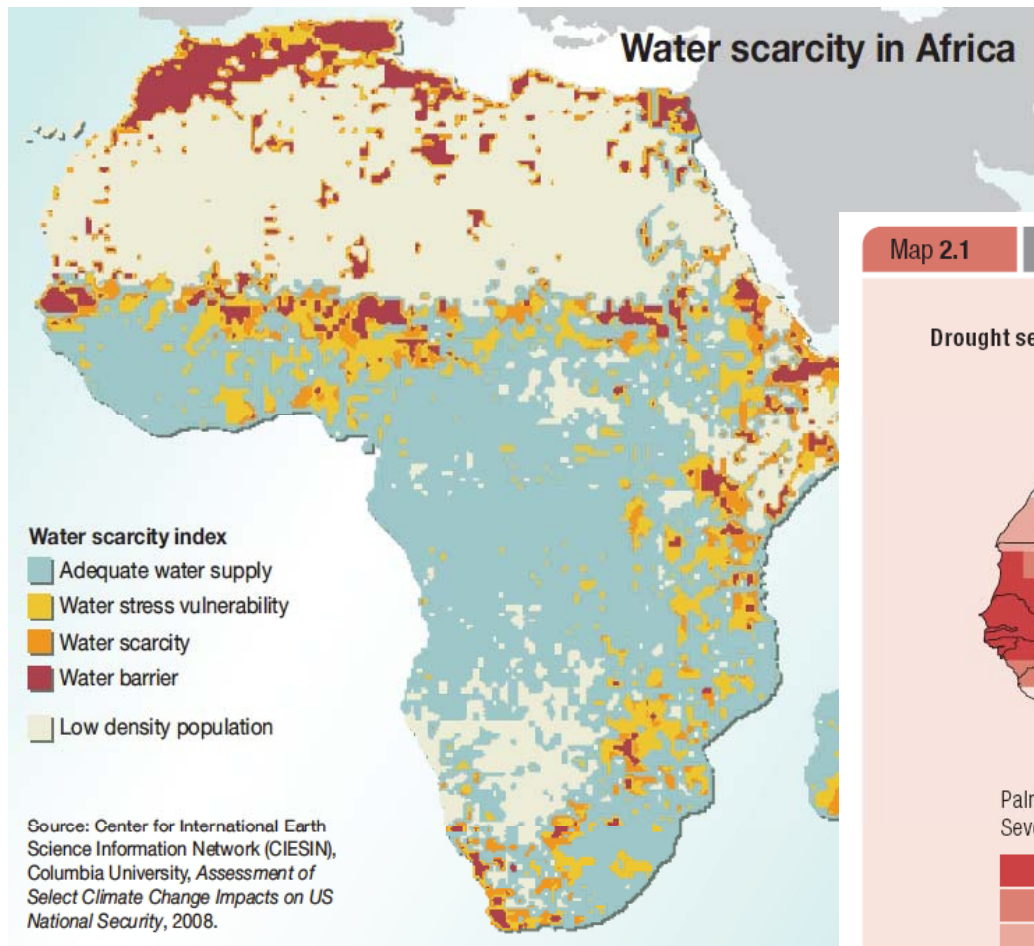
Is the increase in disaster reporting just the result of improved information flow?



UNEP/GRID-Arendal. Trends in natural disasters. UNEP/GRID-Arendal Maps and Graphics Library. 2005. Available at: <http://maps.grida.no/go/graphic/trends-in-natural-disasters>. Accessed April 02, 2008.

It is crucial to understand vulnerability,
such as to Flooding



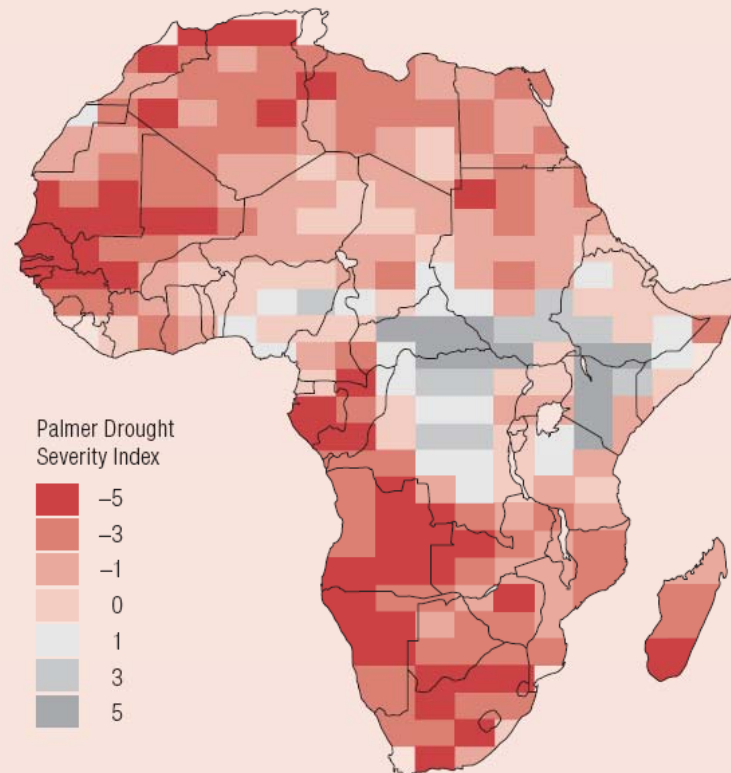


And to drought...

Map 2.1

Drying out: Africa's drought area is expanding

Drought severity under IPCC scenario A2 (change relative to 2000 by 2090)



Note: The boundaries shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

IPCC scenarios describe plausible future patterns of population growth, economic growth, technological change and associated CO₂ emissions. The **A1 scenarios** assume rapid economic and population growth combined with reliance on fossil fuels (A1FI), non-fossil energy (A1T) or a combination (A1B). The **A2 scenario**, used here, assumes lower economic growth, less globalization and continued high population growth. A negative change in the Palmer Drought Severity Index, calculated based on precipitation and evaporation projections, implies more severe droughts.

Source: Met Office 2006.

Exposure

WorldRiskReport 2012



UNITED NATIONS
UNIVERSITY

UNU-EHS

Institute for Environment
and Human Security

In cooperation with

The Nature
Conservancy



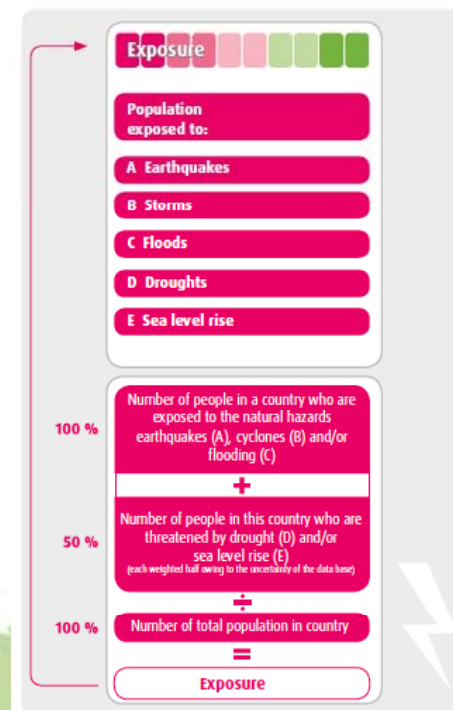
Protecting nature. Preserving life.™

Exposure

Exposure of the population to the natural hazards earthquakes, storms, floods, droughts and sea level rise.

very low	0,28 – 9,12
low	9,13 – 11,41
medium	11,42 – 13,85
high	13,86 – 17,45
very high	17,46 – 63,66
no data available	

Max. exposure= 100%,
Classification according to the quantile method



WorldRiskReport 2012

Vulnerability =
(Susceptibility,
Coping
Capacities,
and Adaptive
Capacities)



In cooperation with



UNITED NATIONS
UNIVERSITY

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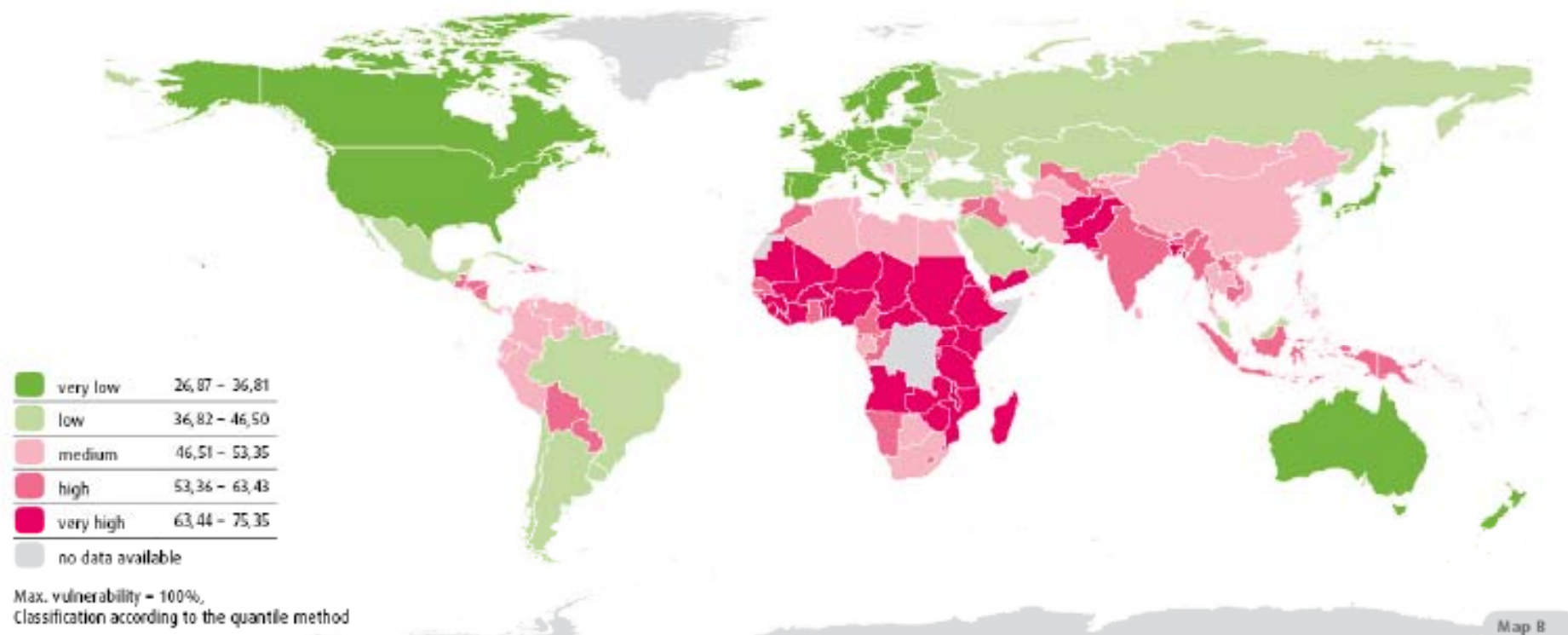
The Nature
Conservancy



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Vulnerability

Vulnerability of society as the sum of susceptibility, lack of coping capacities and lack of adaptive capacities



Rank	Country
1.	Vanuatu
2.	Tonga
3.	Philippines
4.	Guatemala
5.	Bangladesh
6.	Solomon Islands
7.	Costa Rica
8.	Cambodia
9.	Timor-Leste
10.	El Salvador
11.	Brunei Darussalam
12.	Papua New Guinea
13.	Mauritius
14.	Nicaragua
15.	Fiji
16.	Japan
17.	Guinea-Bissau
18.	Viet Nam
19.	Chile
20.	Jamaica
21.	Haiti
22.	Niger
23.	Gambia
24.	Guyana
25.	Dominican Republic

on with

The Nature Conservancy
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WorldRiskReport 2012

Risk Index =
Exposure x
Vulnerability
(Susceptibility,
Coping
Capacities, and
Adaptive
Capacities)

Exposure to natural hazards



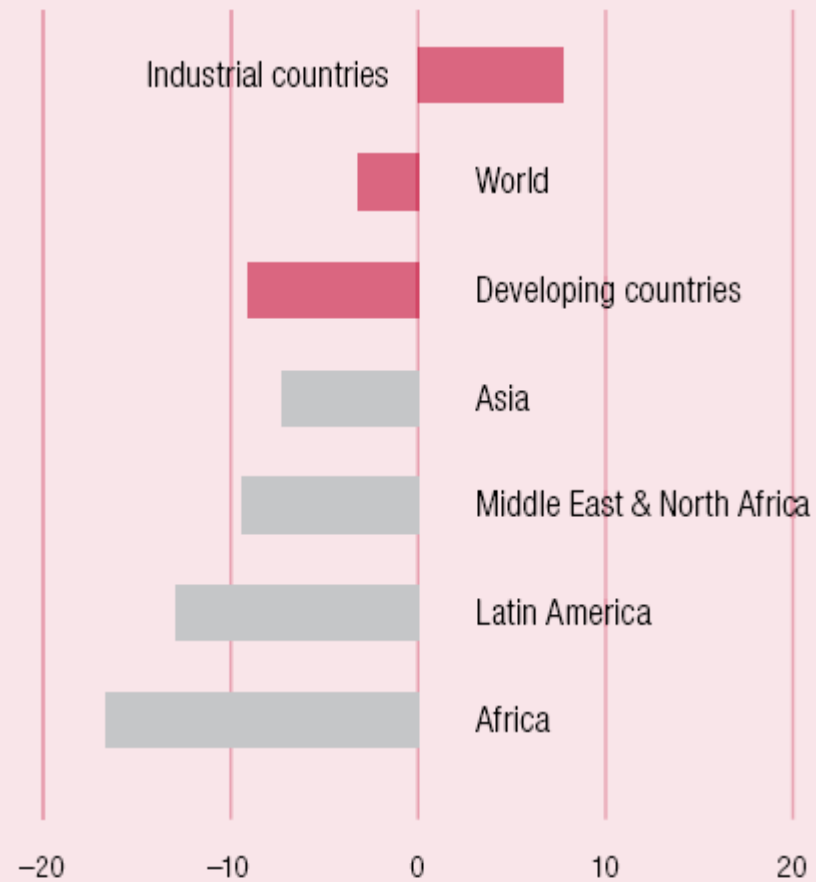
Note: data = 100%

Classification according to the quartile method

Figure 6

**Climate change will hurt
developing country agriculture**

**Change in agricultural output potential
(2080s as % of 2000 potential)**



Source: Cline 2007.

Vulnerability to Climate Disasters: Population Adjusted Rates 1980-2007

		1980-2007
Rank	Country	Total Climate-Disaster Related Deaths
1	Ethiopia	302,285
2	Indonesia	174,338
3	Bangladesh	172,399
4	Sudan	150,623
5	Mozambique	101,706
6	India	88,924
7	China P Rep	55,449
8	Sri Lanka	36,354
9	Venezuela	30,580
10	Philippines	27,458
17	United States	10,276
	Total Climate-Related Deaths	1,383,791

		1980-2007
		Death Rates/pop * 1000
1	Mozambique	6.42
2	Ethiopia	5.35
3	Sudan	5.13
4	Honduras	2.76
5	Sri Lanka	2
6	Bangladesh	1.48
7	Venezuela	1.39
8	Vanuatu	1.16
9	Haiti	1.06
10	Indonesia	0.9
98	United States	0.04

Vulnerability to Climate Disasters: Population Adjusted Rates 1980-2007

		1980-2007
Rank	Country	Total Made Homeless from Climate Disasters
	1 China P Rep	54,273,170
	2 Zimbabwe	11,189,125
	3 India	10,984,630
	4 Pakistan	8,905,475
	5 Philippines	6,226,961
	6 Bangladesh	5,954,625
	7 Viet Nam	4,141,644
	8 Sri Lanka	3,126,601
	9 Sudan	1,243,480
	10 Korea Dem P Rep	1,198,390
	20 United States	453,495
	Total Climate-Related Homelessness	222,378,250

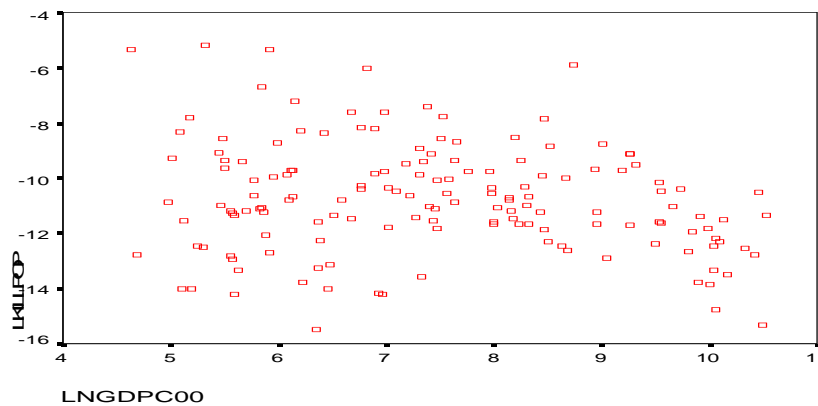
		1980-2007
Rank	Country	Homelessness Rates/pop Rate
	1 Zimbabwe	0.95
	2 Tonga	0.52
	3 Lao P Dem Rep	0.21
	4 Samoa	0.17
	5 Solomon Is	0.17
	6 Sri Lanka	0.17
	7 Virgin Is (US)	0.17
	8 Maldives	0.15
	9 Marshall Is	0.12
	Antigua and Barbuda	0.11
	10 Barbuda	0.11
	195 United States	<0.01



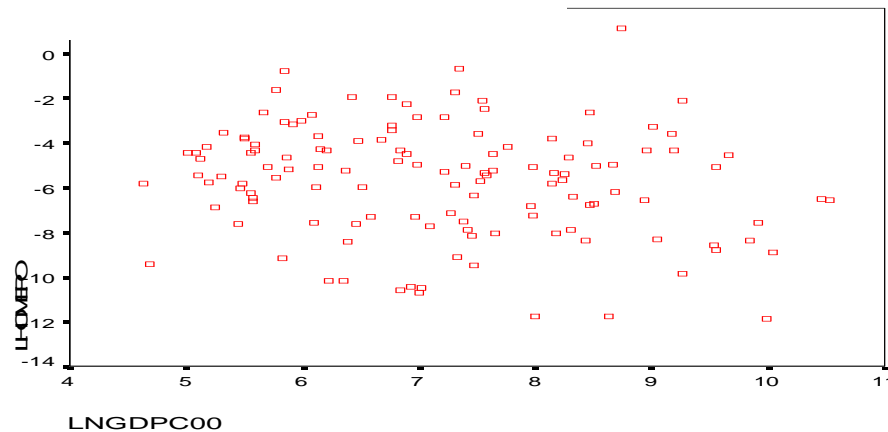
BROWN



Is Vulnerability to Climate Disasters Simply a Result of National Lack of Income (GDP)?



$R=-0.19$



BROWN



Roadmap for today

I: Why global inequality matters

II: Who suffers worst and first?

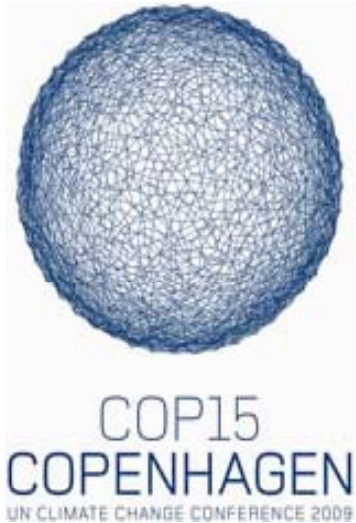
WHAT EXPLAINS THIS?

III: Who caused the problem?

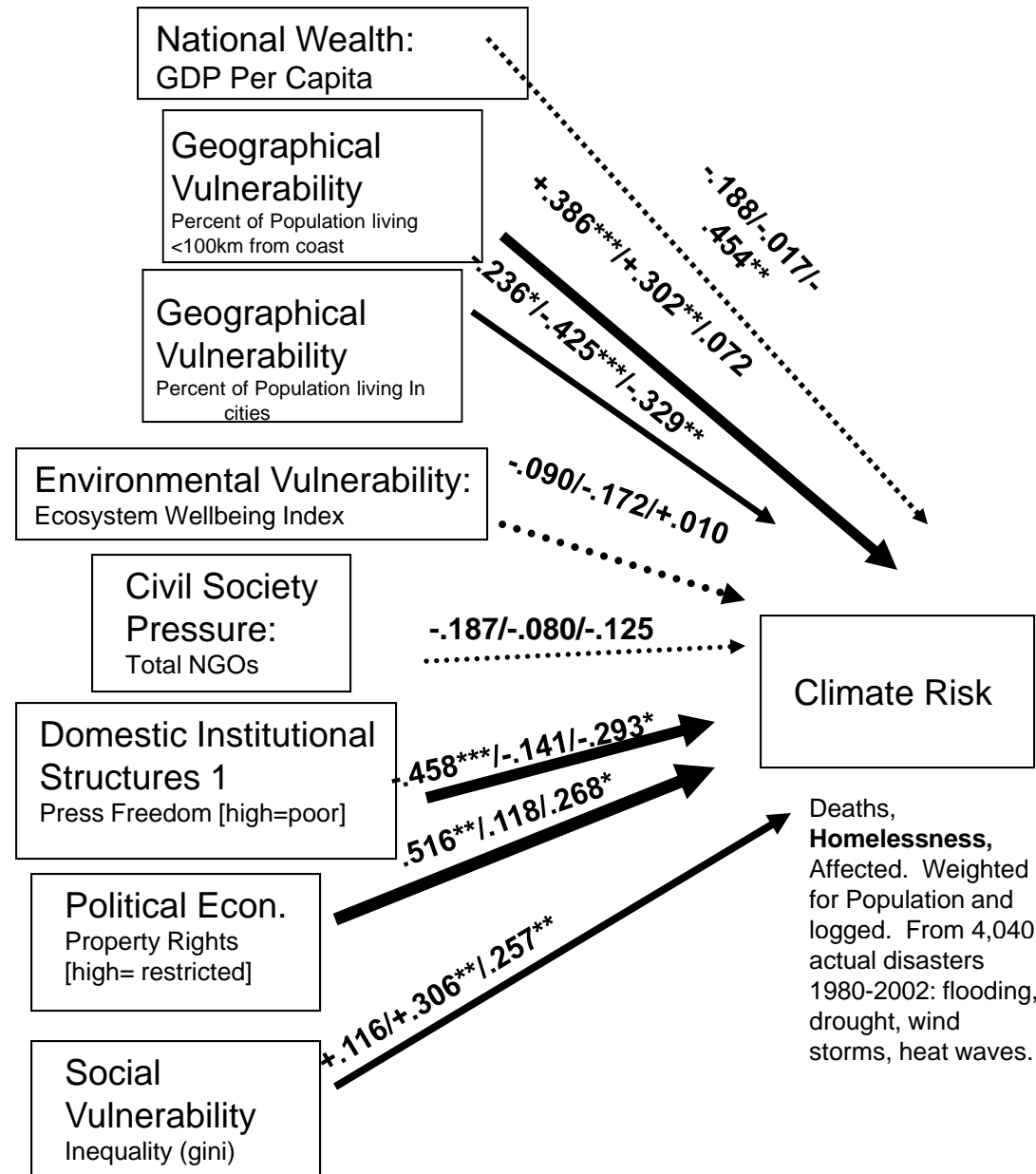
IV: Who is taking action?

V: Understanding Inaction

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Proximate Explanations Of Vulnerability To Climate Disasters

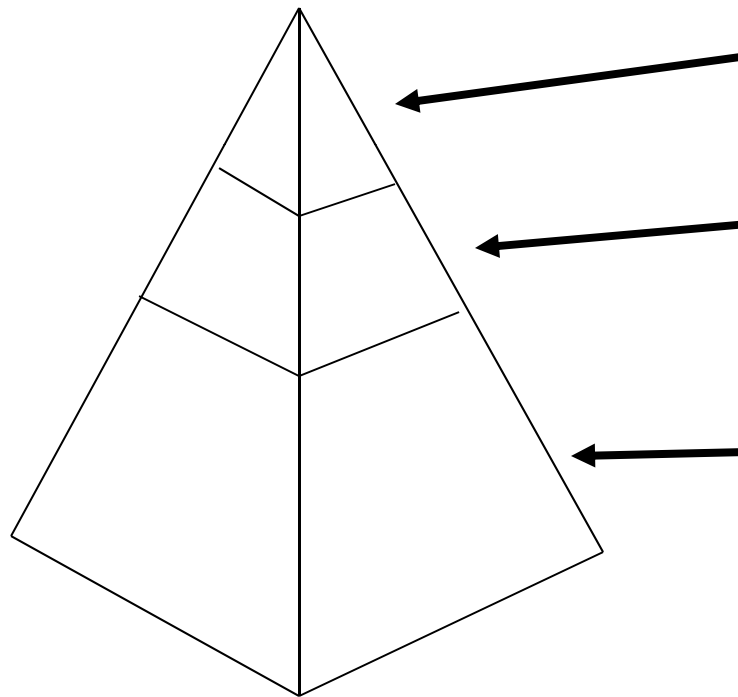


Killed/pop $r^2=.17$
 Homeless/pop $r^2=.33$
 Affected/pop: $r^2=.38$

Where does the inequality come from? Bad people? No, it is the product of

A World System of Inequality:

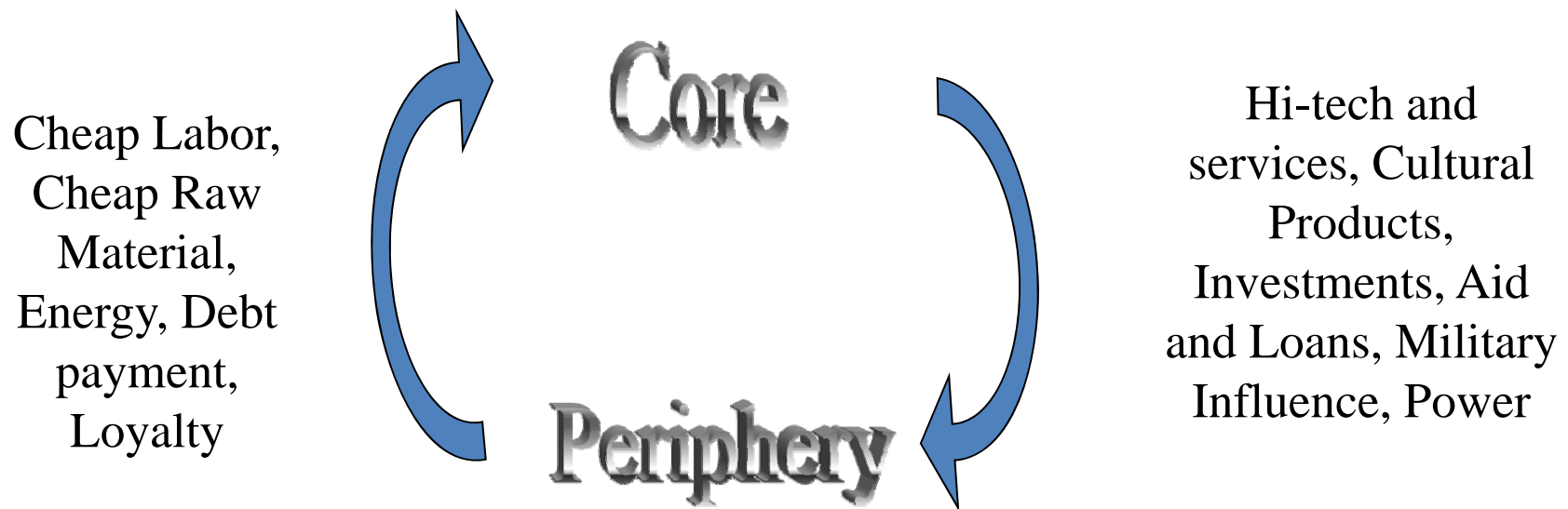
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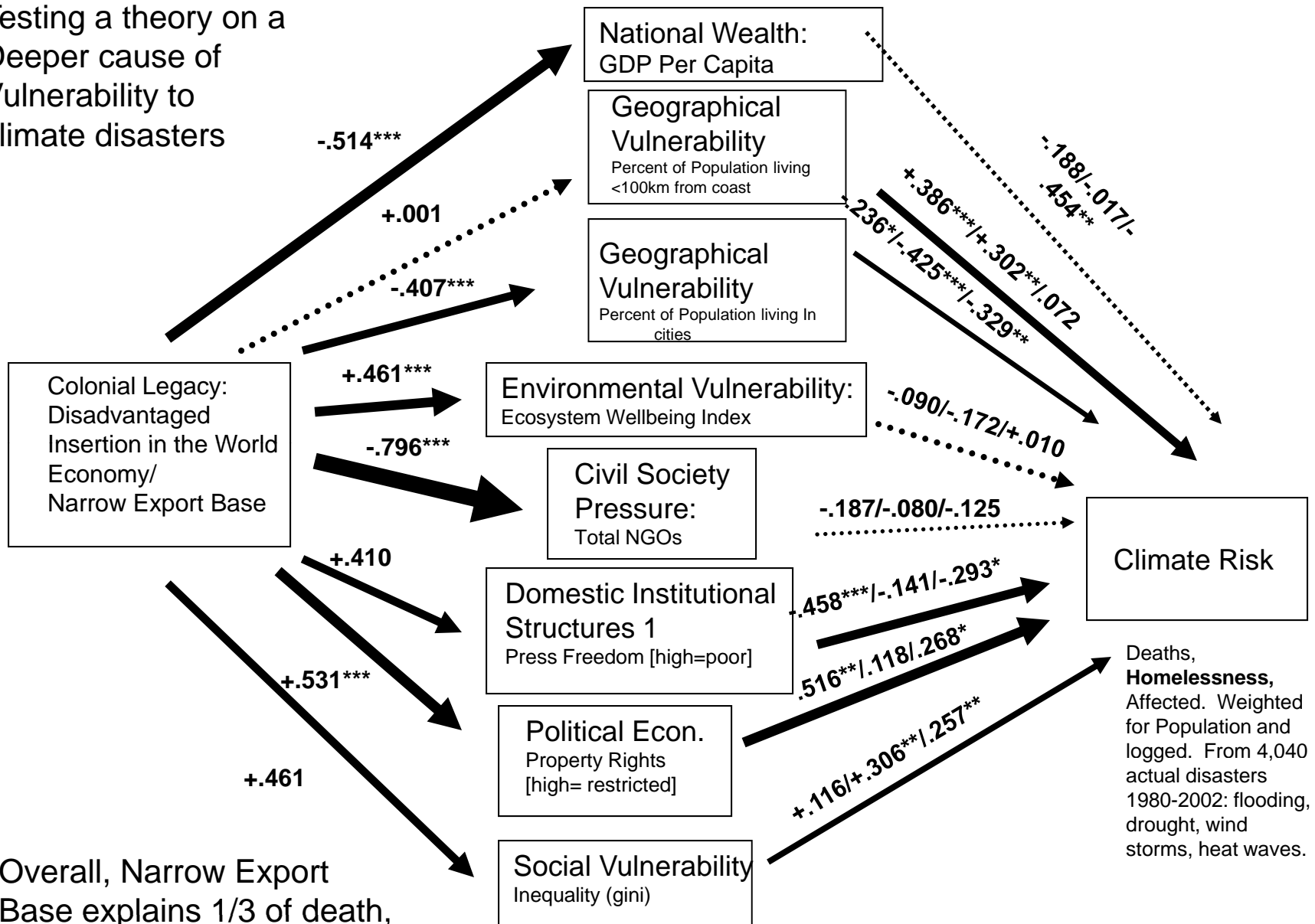
Prebisch, Frank, Cardoso and Faletto, Braudel, Wallerstein, etc.

Flows of Materials, Energy and Power Create and Maintain the Inequality



This is an old idea (Amin, Emmanuel, Bunker), adapted in a new literature on ecologically-unequal exchange (Martinez-Alier, Giljum)

Testing a theory on a
Deeper cause of
Vulnerability to
climate disasters



Deaths,
Homelessness,
Affected. Weighted
for Population and
logged. From 4,040
actual disasters
1980-2002: flooding,
drought, wind
storms, heat waves.

Overall, Narrow Export
Base explains 1/3 of death,
homelessness and number
affected by climate
disasters

Summary of Findings on Vulnerability to Climate Disasters

- *Vulnerability to Climate Disasters is Savagely Unequal in the World-System.*
- Climate Vulnerability is Related to Wealth: Disasters **worst for poorest** nations. But there is substantial *variation*
- **Coastal** populations at greater risk from climate disasters, urban populations safer
- **Civil society strength** reduces climate risks
- **Democratic** societies reduce risks
- **Inequality** increases climate risks
- **Property rights** decrease risks
- These in turn are conditioned by insertion in the world economy

Roadmap for today

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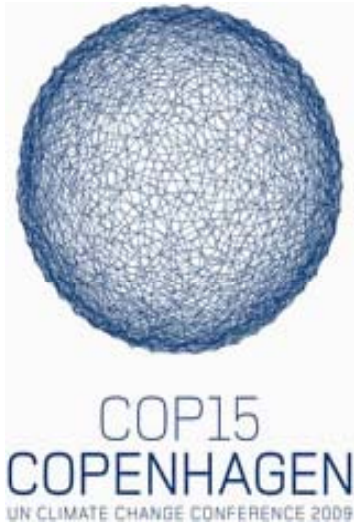
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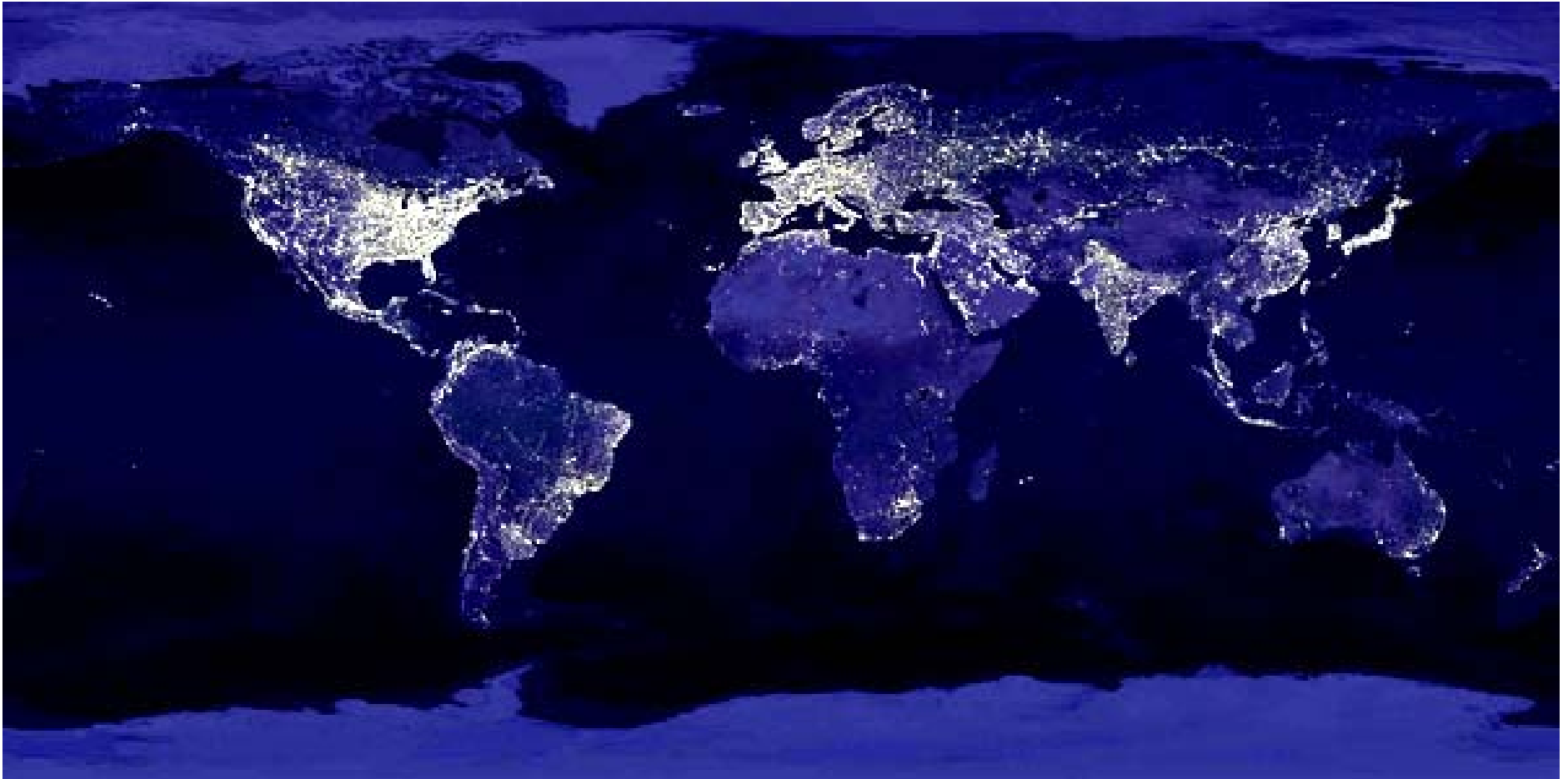
V: Understanding Inaction

VI: Final Thoughts: What is to be done?



Who are the debtors? The energy case (I)

The environmental impacts caused by the extraction of natural resources necessary for the production of energy are not compensated in any form



Who owes who?

Amigos de la Tierra Int. y
Acción Ecológica 2002.

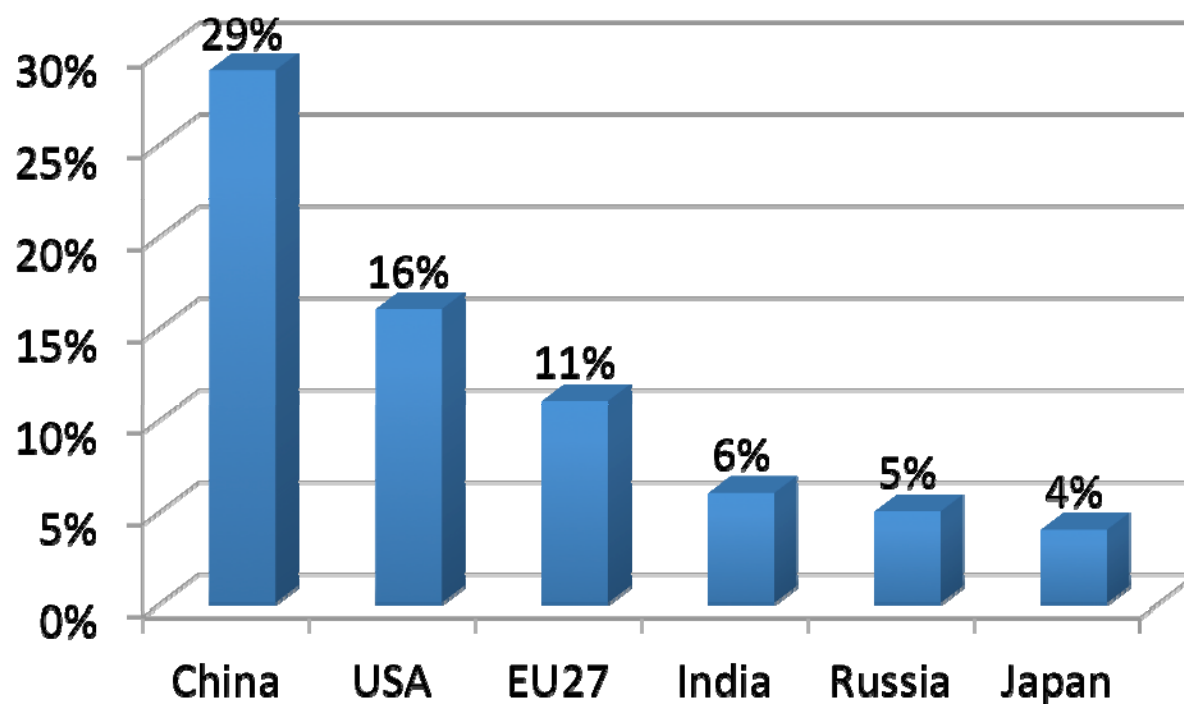


European
Commission

JRC NEWS RELEASE

Ispra, 18 July 2012

Emissions in 2011--Total



[http://edgar.jrc.ec.europa.eu/TRENDS IN GLOBAL CO2 EMISSIONS 2012.pdf](http://edgar.jrc.ec.europa.eu/TRENDS%20IN%20GLOBAL%20CO2%20EMISSIONS%202012.pdf)

For more information

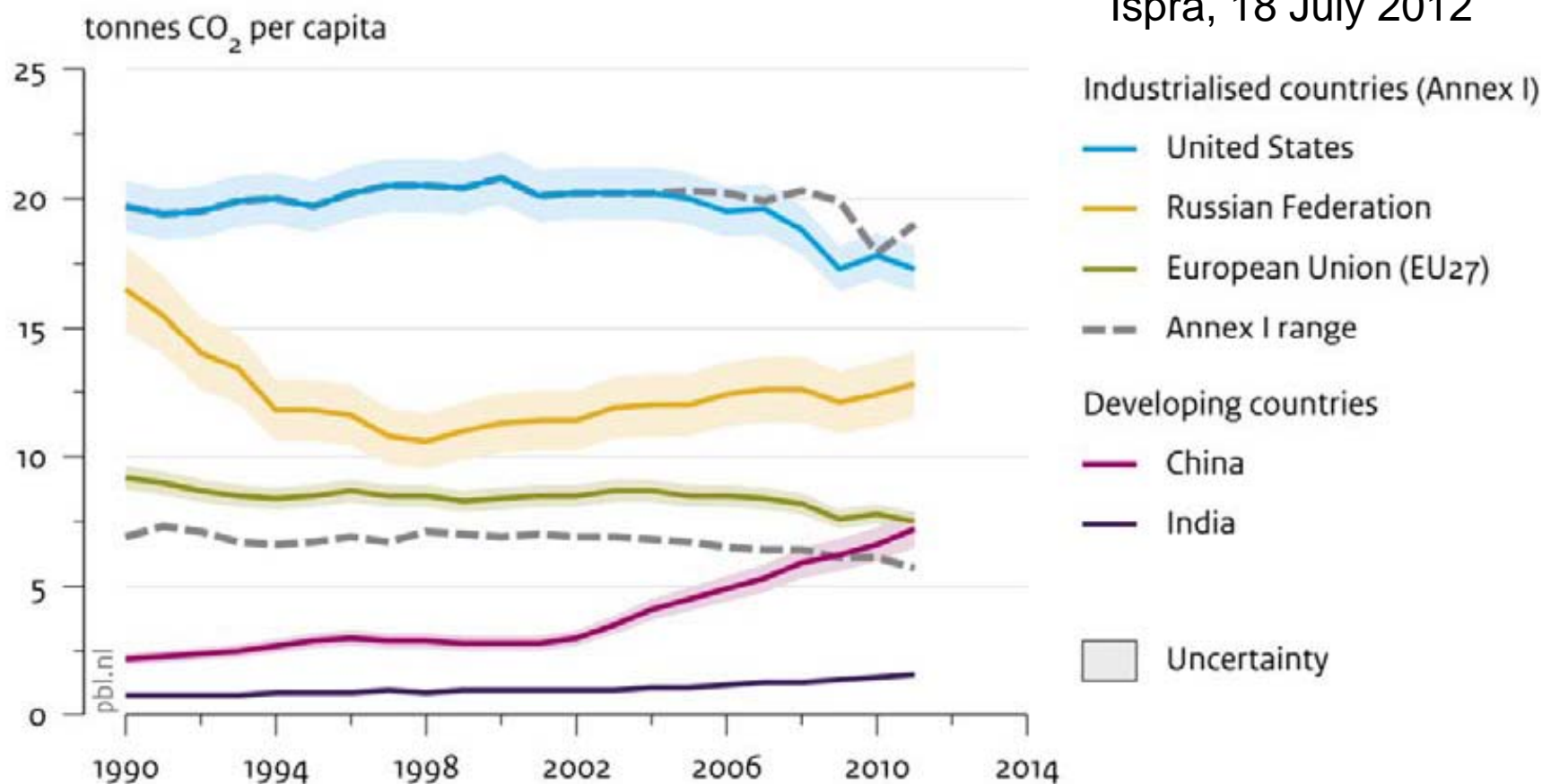
<http://edgar.jrc.ec.europa.eu>



European
Commission

JRC NEWS RELEASE

Ispra, 18 July 2012



http://edgar.jrc.ec.europa.eu/TRENDS_IN_GLOBAL_CO2_EMISSIONS_2012.pdf

For more information

<http://edgar.jrc.ec.europa.eu>

Accounting for carbon dioxide emissions: A matter of time

Ken Caldeira¹ and Steven J. Davis

Department of Global Ecology, Carnegie Institution, Stanford, CA 94305

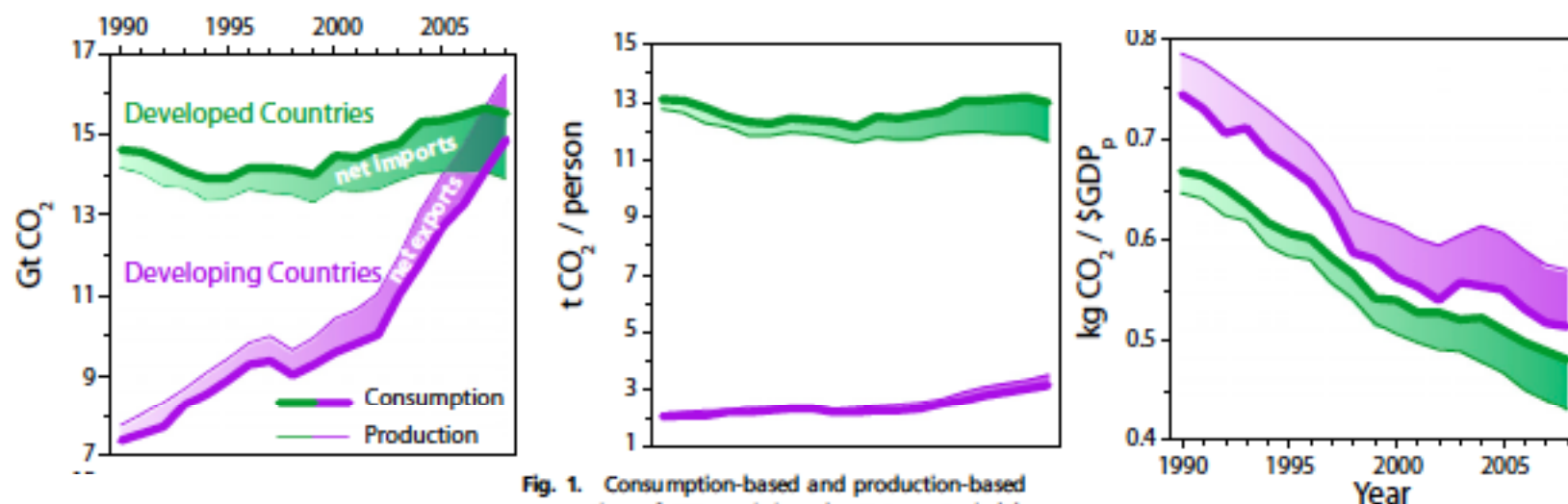
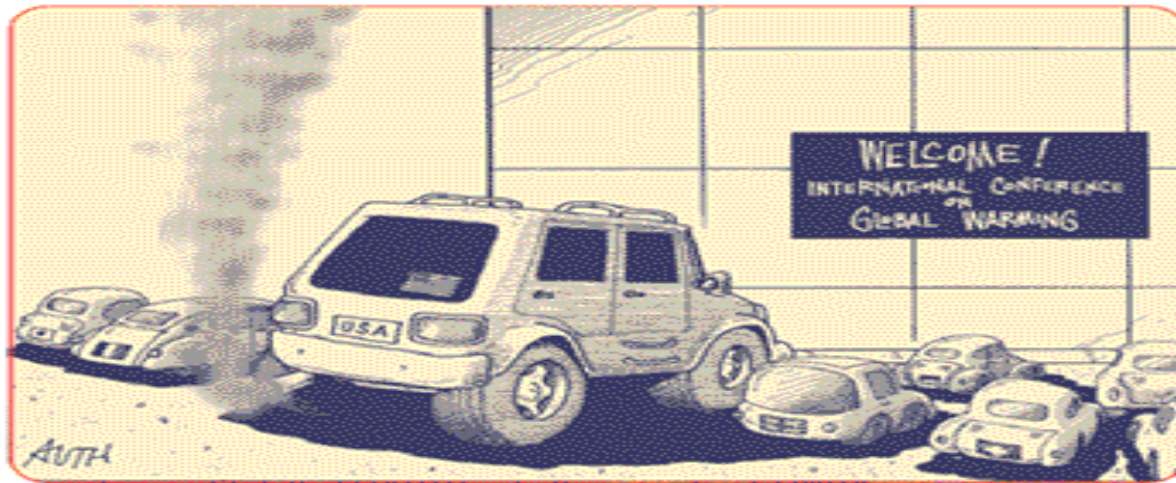


Fig. 1. Consumption-based and production-based accounting of CO₂ emissions by Peters et al. (2), divided into industrialized and industrializing countries (detailed in the text). (Top) CO₂ emissions to support consumption in developed countries exceeds CO₂ emissions to support consumption in developing countries, despite the fact that more CO₂ emissions are produced within the territory of developing countries. (Middle) On a per-capita basis, there is great disparity in consumption emissions between developed and developing countries. (Bottom) Consideration of a consumption-based perspective produces less of a difference in carbon intensity of economic activity (adjusted for purchasing power parity) between developed and developing countries.

National Averages Hide Even Greater Inequality

- U.S. citizens with incomes over \$75,000 emit nearly four times the amount of carbon as those whose income is under \$10,000.
- We lack analysis on this inequality within other nations, but if the average American emits 16,000 times that of the average Somali, 100,000 or more poor Somalis probably emit as much as one millionaire in the U.S.

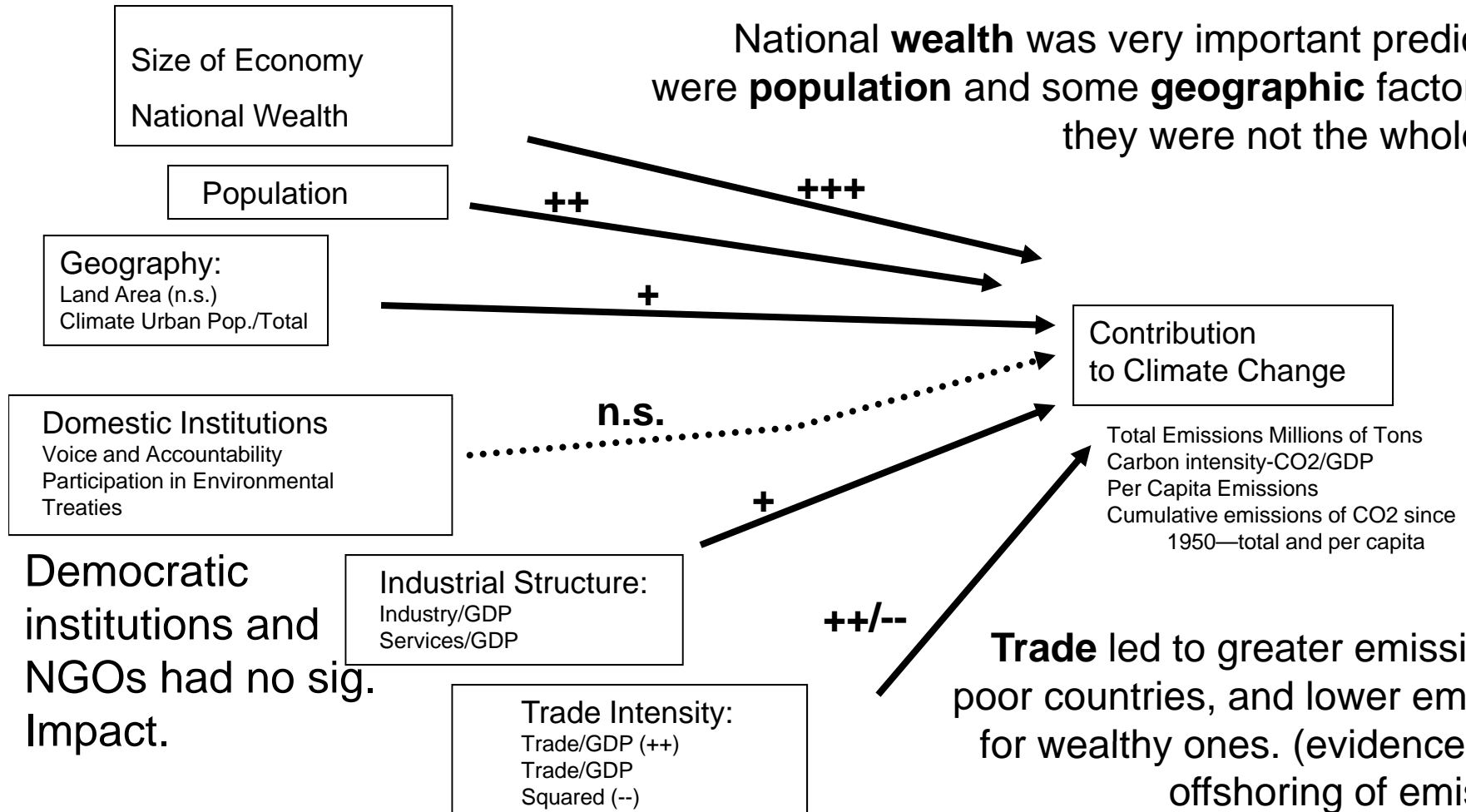


Theorizing the Carbon Economy: some hypotheses on **why some nations emit more**

- *CO2 emissions (as measured by the four indicators) might be explained by a series of factors:*
 - National **geography** (cold climate, land area, density of population, urban/rural)
 - Size of **population**
 - National **wealth** (GDP/capita)
 - **Industrial structure** (industry/GDP; services/GDP; fuels/GDP; etc.)
 - **Trade dependency**/level of globalization (Neumayer: poor nations more carbon intense due to trade, rich nations less: quadratic term)
 - **Democratic institutions** and civil society strength

A **summary** of our findings on national attributes and emissions...

National **wealth** was very important predictor, as were **population** and some **geographic** factors. But they were not the whole story.



Trade led to greater emissions for poor countries, and lower emissions for wealthy ones. (evidence for the offshoring of emissions)

Industrial structure was important: manufacturers high; service exporters were not sig. lower than average

ALL argue for national circumstances in hybrid proposals

Going further

- A nation's “insertion in the world economy” (it's main exports, its dependence on these, etc.) determines its carbon emissions and its development pathway (in social and economic benefits).
- This points to the value of research on pathways of development.

Roadmap for today

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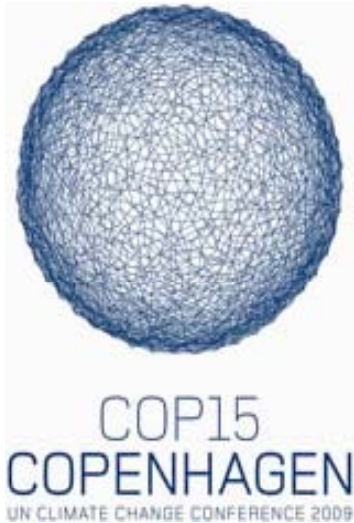
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Atiq Rahman

Director of the Bangladesh Centre for Advanced Studies, Berlin 1995



“If climate change makes our country uninhabitable, we will march with our wet feet into your living rooms.” [\[ii\]](#)

- [\[ii\]](#) Athanasiou and Baer 2002: 23.

Twenty years of diplomacy, for what?



1. **UNFCCC** signed at the UN Conference on Environment and Development in Rio in 1992: Broad language committing to avoid “dangerous climate change”, based upon Parties’ “common but differentiated responsibilities and respective capabilities.”
2. **Kyoto Protocol** agreed 1997: mandatory emissions reductions by 2012 of avg. 6% by “Annex 1” countries
3. **The Copenhagen Accord** agreed in 2009 , voluntary targets “pledge and review.” Fast Start Finance and \$100b/year pledge



World Bank: Climate Aid Needed: \$500b+ a Year

Estimates of cost:

“climate-proofing” aid \$30-90b/y
(adaptation)

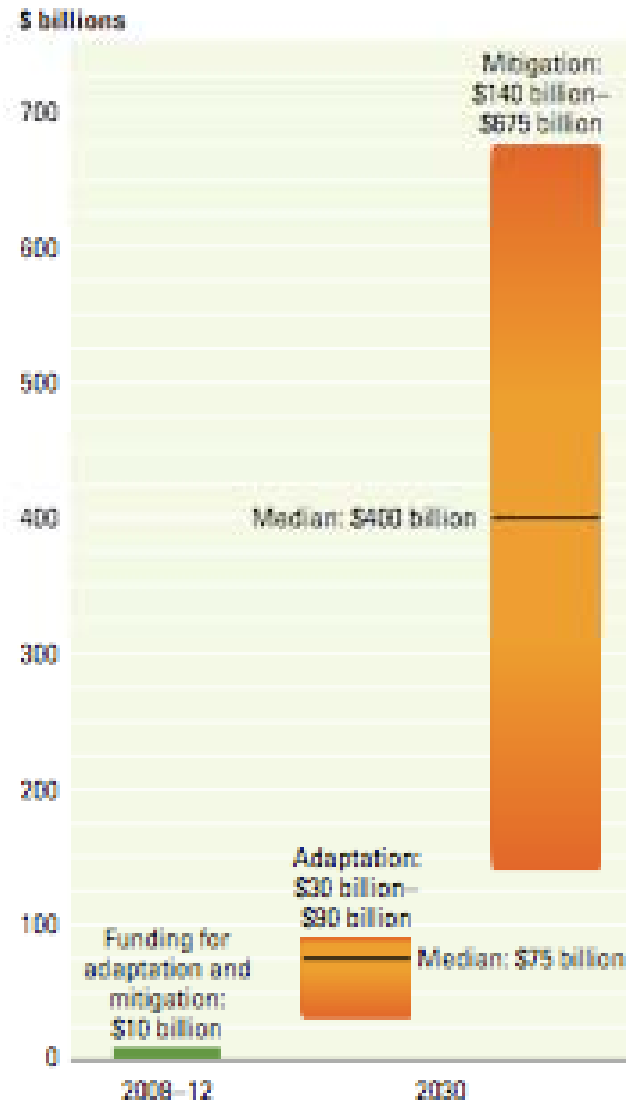
assisting developing
nations avoid high-
carbon growth \$140-675b/y
(mitigation)

actual \$10b/y?

Source: *World Development Report*
2010

Advance Draft 15 Sept 2009

Figure 6.2 The gap is large: Estimated annual climate funding required for a 2°C trajectory compared with current resources

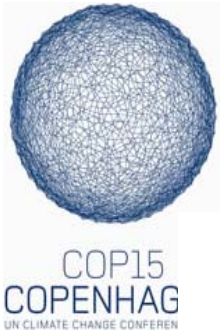


Source: See table 6.1.

The Promises and the Reality of Adaptation finance

Promise	Reality
1. Adequate funding	<p>Not adequate, predictable, or clearly new and additional:</p> <ul style="list-style-type: none"> ■ Adaptation finance not clearly new or additional to ODA. ■ Funds cannot meet even basic needs related to climate change. ■ Lack of transparency and uncertainty about future finance.
2. Fair burden sharing	<p>No agreement on fair burden sharing:</p> <ul style="list-style-type: none"> ■ No consistent or transparent allocation formula. ■ Developed countries unwilling to discuss adaptation finance in terms of 'responsibility' or 'capability'.
3. Balance between adaptation and mitigation	<p>Imbalance:</p> <ul style="list-style-type: none"> ■ 19–25 per cent of fast-start climate finance is for adaptation.
4. Needs-based targeting	<p>No agreed allocation protocol:</p> <ul style="list-style-type: none"> ■ Formulas used inequitably distribute funds and do not prioritise most vulnerable. ■ Ambiguity and lack of guidance on assessing vulnerability. Least Developed Countries, Small Island Developing States and African countries have been identified in the Cancun agreements as the "most vulnerable" developing countries. However, beyond this basic categorisation, allocating funds based on the assessment of vulnerability is a process fraught with ambiguity. Explicit criteria to determine how vulnerability should be assessed in order to allocate adaptation funds have yet to be fully developed.
5. Transparent, recipient-driven governance	<p>Not transparent or recipient-driven:</p> <ul style="list-style-type: none"> ■ Inconsistent reporting prevents summing and comparison. ■ Less than a quarter of NAPAs projects have been funded. ■ UNFCCC-led funds have received only one per cent of climate finance. ■ Little evidence that adaptation finance is sensitive to the particular needs of women or other marginalised groups.

[Ciplet, David](#), J. Timmons Roberts, Mizan Khan, Linlang He and Spencer Fields. 2011. "Adaptation finance: How Durban Can Deliver on Past Promises." International Institute for Environment and Development, UK.



What have we got so far?



NOVEMBER 2012

Policy pointers

- **Finance is not adequate.**
Funding needs to be scaled up, provided as grants that are new and additional to Official Development Assistance, and targeted at the most vulnerable countries.
- **Fewer than half of**
contributors are delivering their 'fair share' of climate finance. Commitments should reflect both

The eight unmet promises of fast-start climate finance

Wealthy nations are still not meeting their Copenhagen climate finance pledges. Reports submitted to the UNFCCC in 2012 show that fewer than half of the contributors committed their 'fair share' of fast-start climate finance, assessed on their capability and their responsibility for the problem. The United States and Iceland committed less than half of their fair share. Only one-fifth of climate finance supports adaptation in developing countries, in spite of promises to 'balance' it with mitigation funding. No contributor received a 'pass' in this year's transparency scorecard. Less than half of committed funds are the grants critically needed for climate adaptation. Only five percent of fast-start funds are flowing through the UN, where they could strengthen trust between contributor and recipient nations. It is past time to meet the long-agreed principles: new and additional, predictable, and adequate climate finance.



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Roadmap for today

I: Why global inequality matters

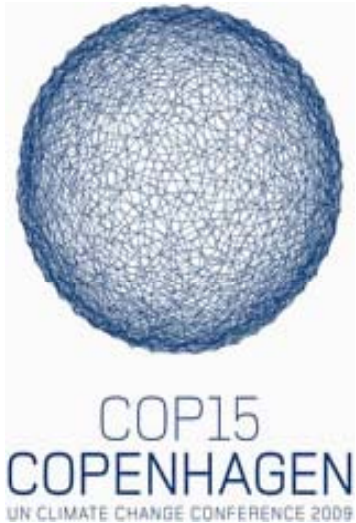
II: Who suffers worst and first?

III: Who caused the problem?

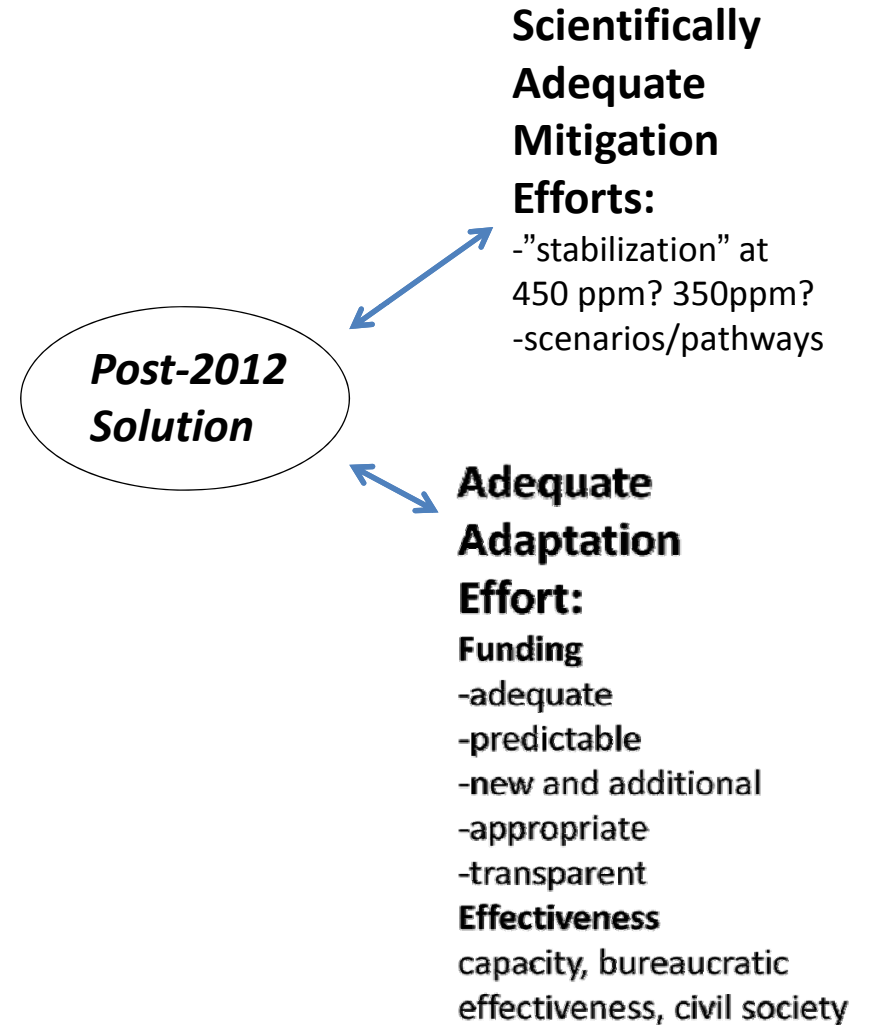
IV: Who is taking action?

V: Understanding Inaction

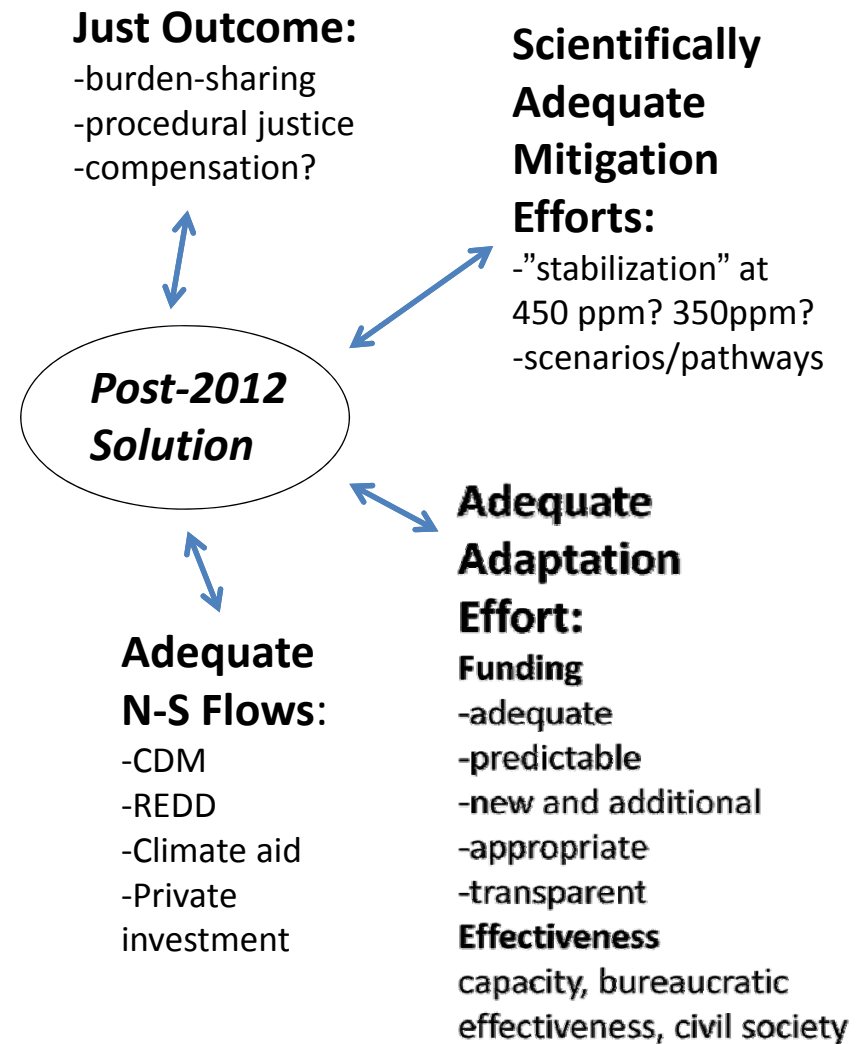
VI: Final Thoughts: What is to be done?



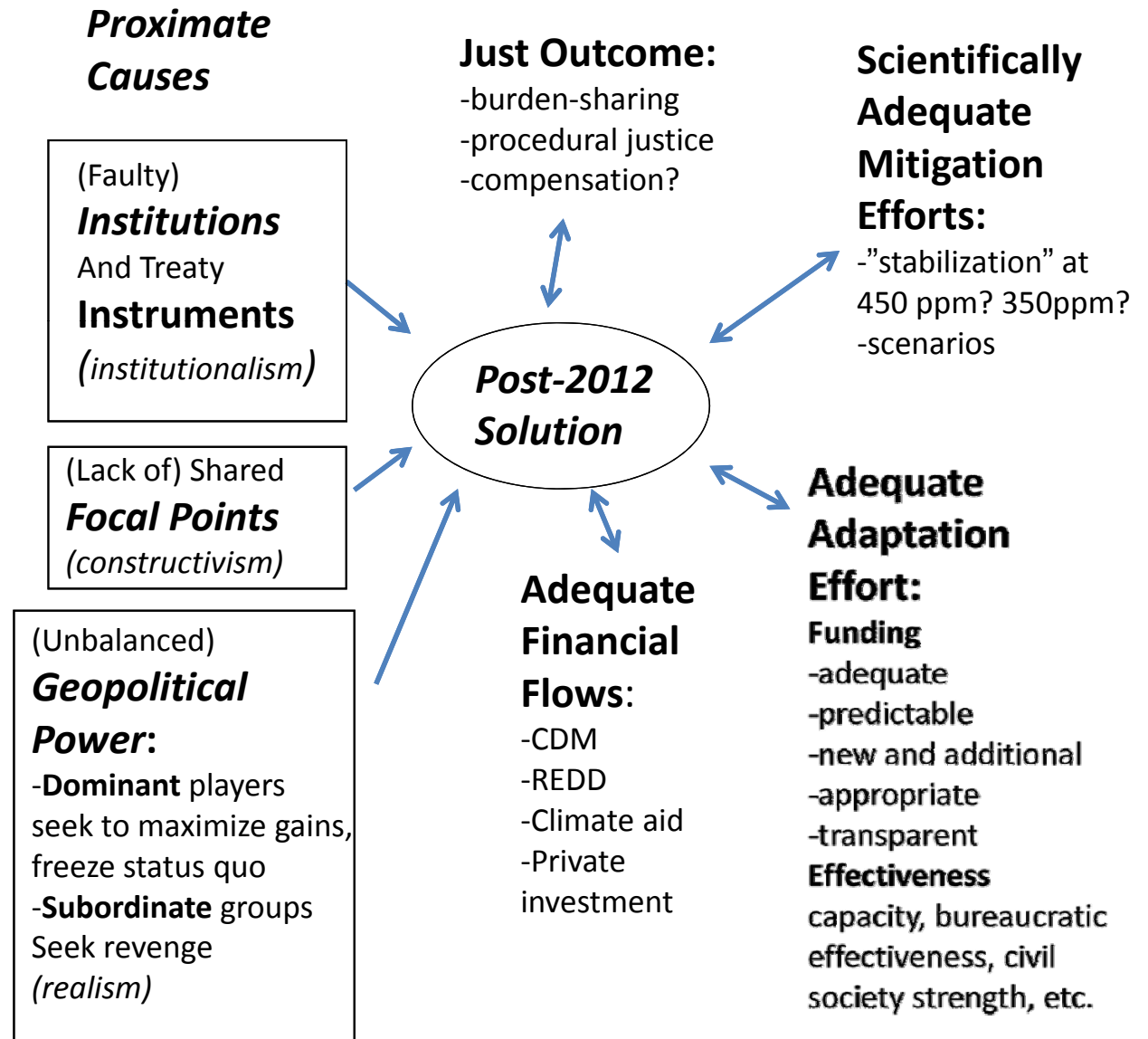
Theorizing (non-)cooperation



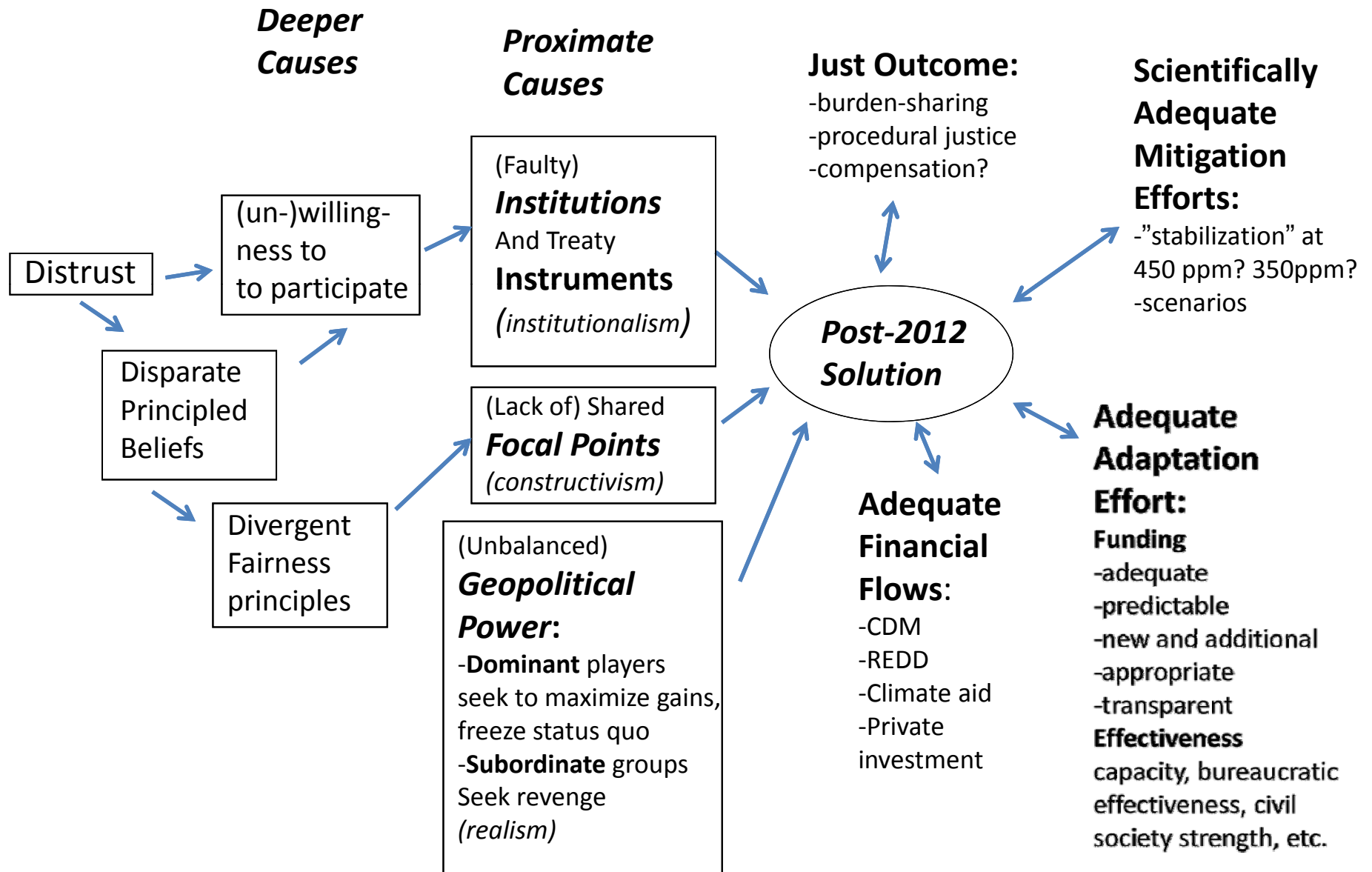
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Roadmap for today

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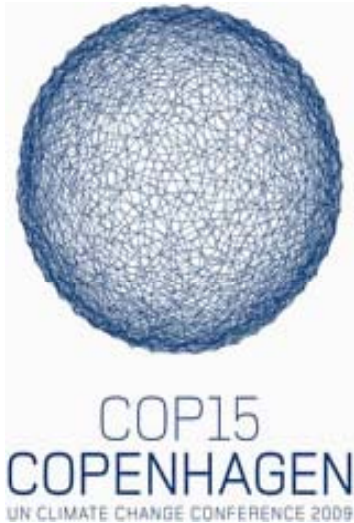
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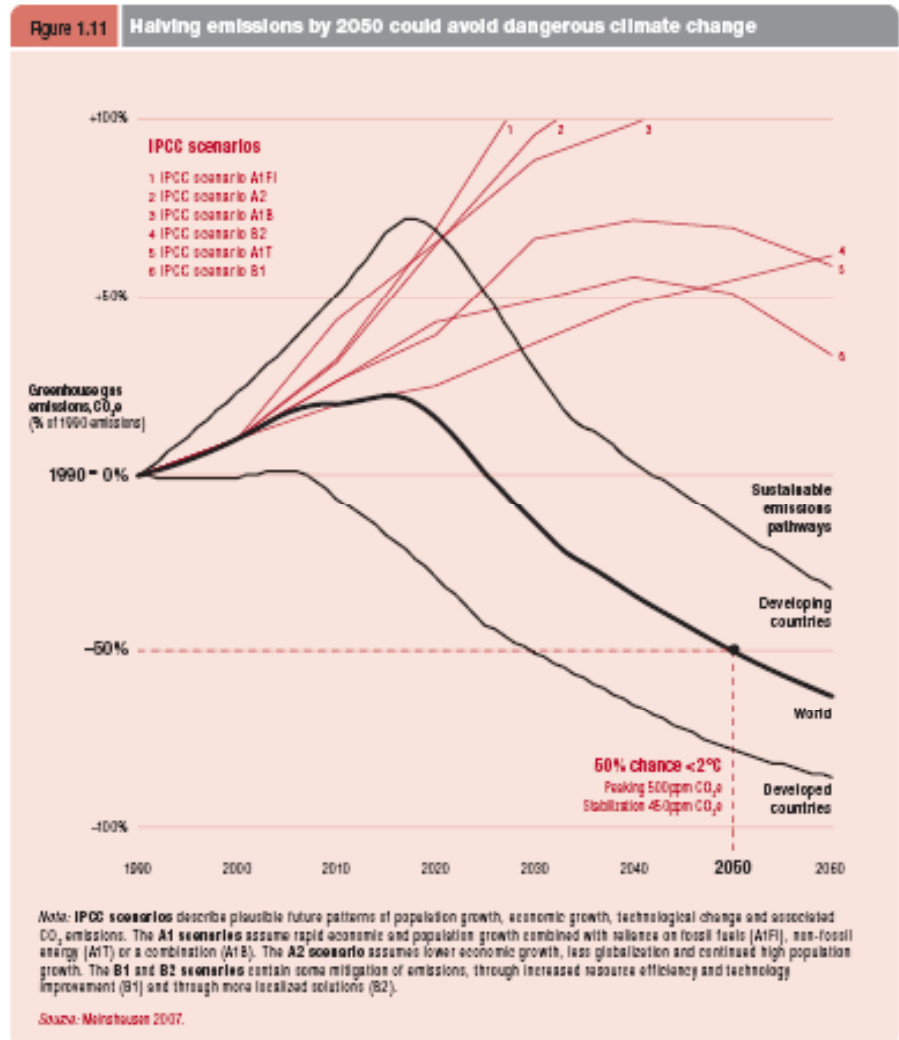


What is to be done

Types of responses:

- **Avoid and deny** (highly risky)
- **Defer action** until absolute proof available (will be too late since there is too much momentum in the climate system)
- **Mitigation** (reduce emissions):
 - Efficiency, conservation, fuel-switching, renewables, sequestration
 - Need global agreement, but national action has been blocked for 11 years. Thousands of local efforts in USA. Need 80-90% reductions by 2050; 25-40% by 2020
- **Adaptation** (much already occurring, but much needed to “climate proof” development, building resilience, diversify vulnerable economies)
- **Fund Developing Nations:** The Clean Development Mechanism, Compensation for Reduced Deforestation, and Adaptation Aid

Our critical parts are in rapid mitigation in our households, institutions, communities, and our nation. Need to support political action and aid. Such action must address global inequality.



Urgency

- "Even doubling our current rate of decarbonization would still lead to emissions consistent with 6C warming by the end of the century," said Leo Johnson, PwC partner for sustainability and climate change.
- Nina Chestney, [Reuters](#), Nov. 4, 2012.
World must cut carbon intensity by 5% every year -- report
- Published on ClimateWire Tuesday, November 6, 2012

Pathways of human development and carbon emissions embodied in trade

Julia K. Steinberger^{1,2*}, J. Timmons Roberts³, Glen P. Peters⁴ and Giovanni Baiocchi⁵

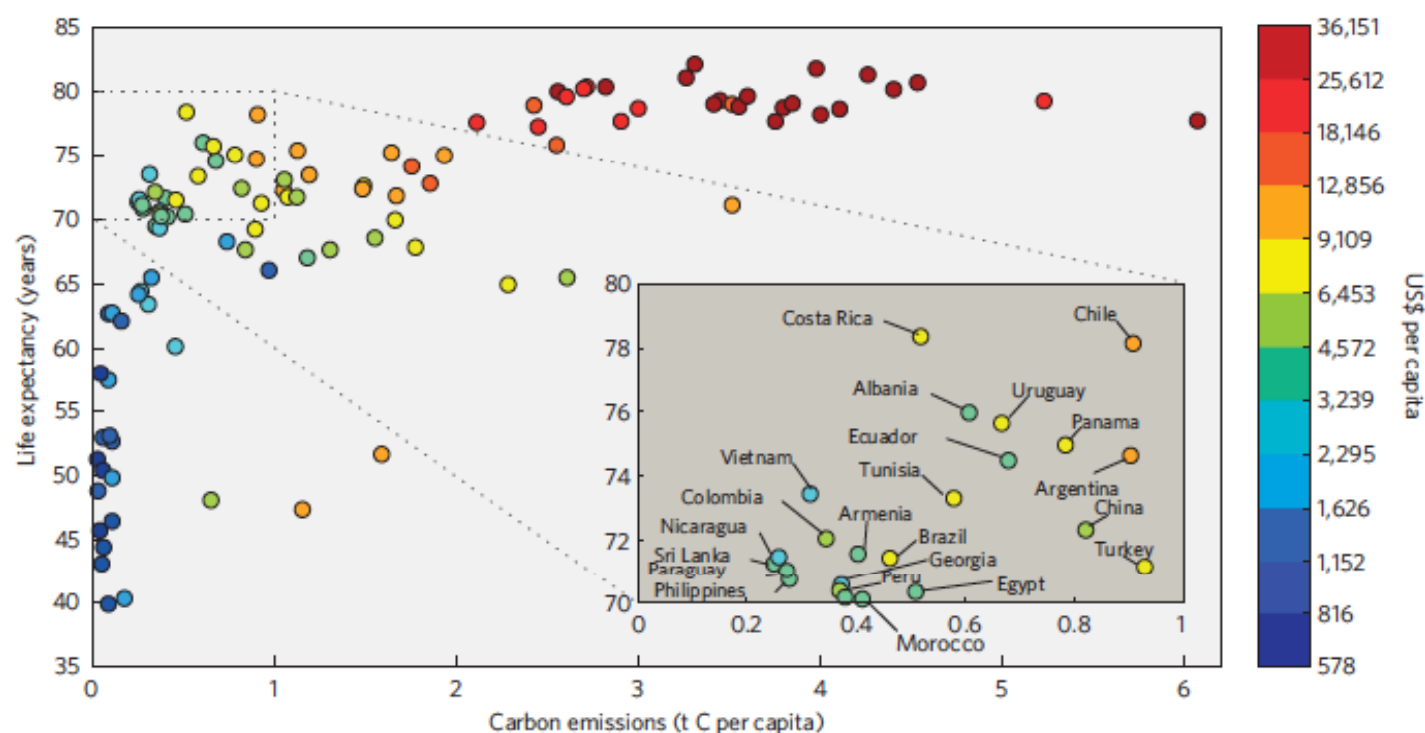
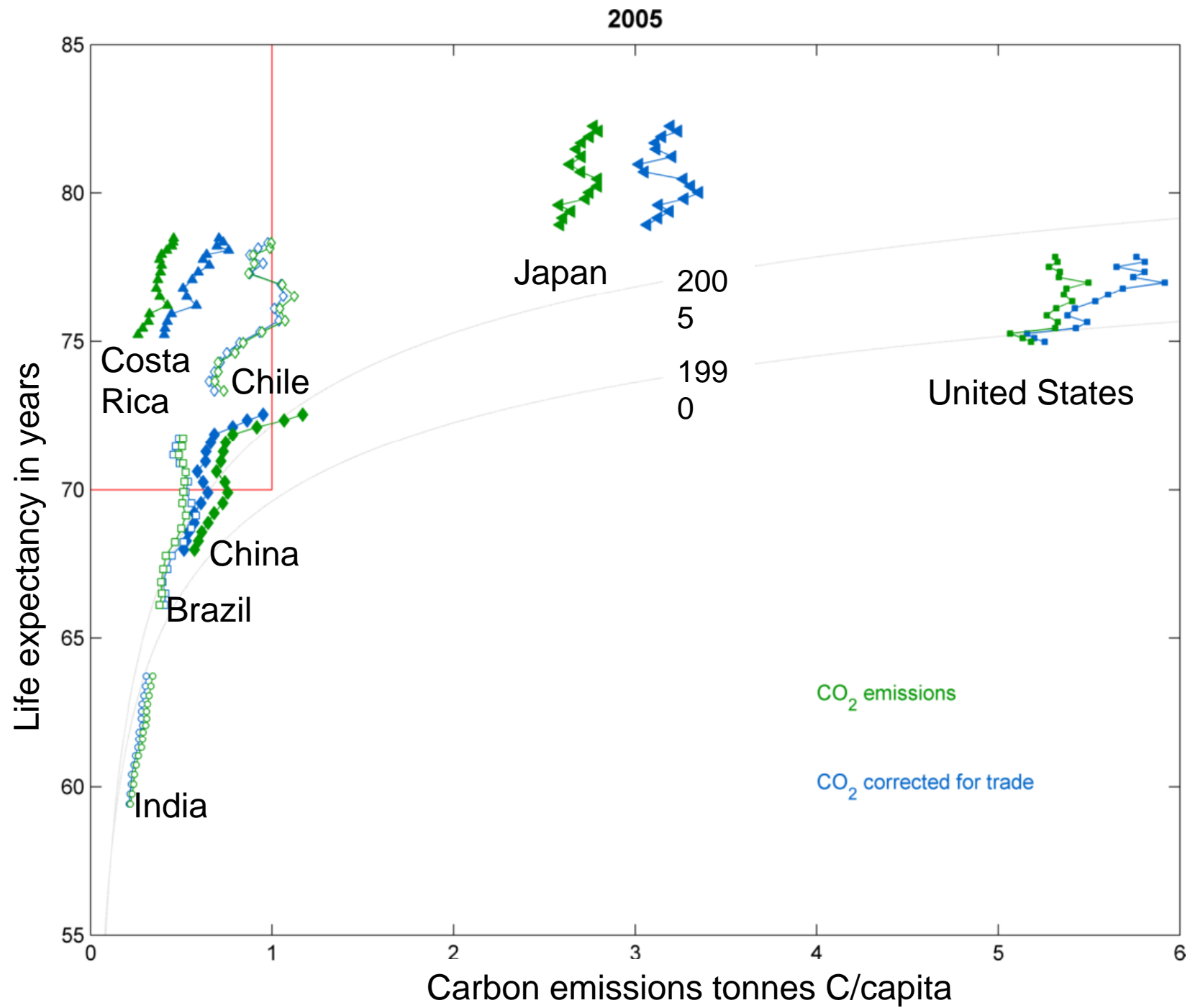


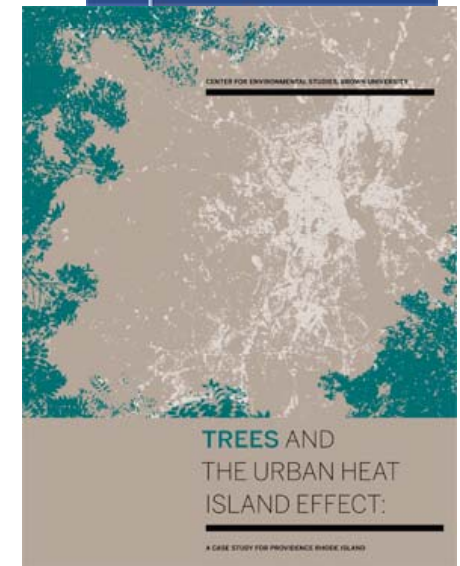
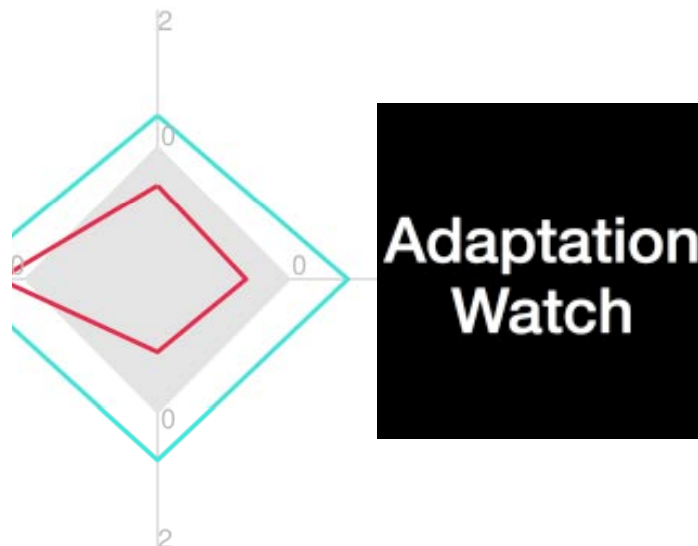
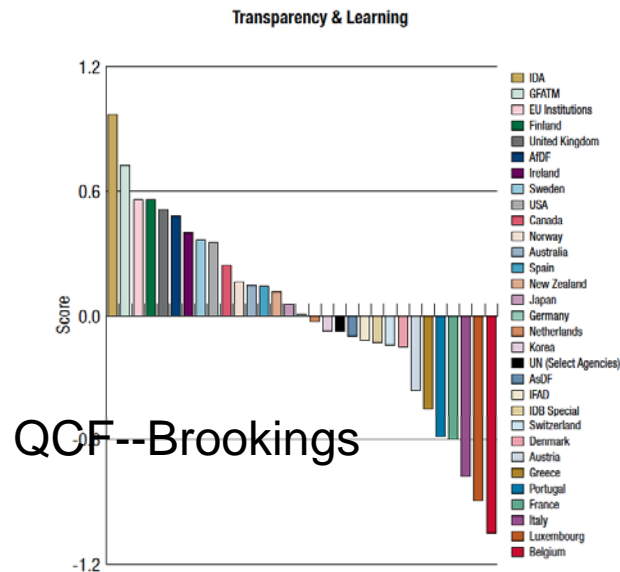
Figure 2 | Simultaneous visualization of international life expectancy, income and consumption-based carbon emissions in 2004. Three-dimensional representation of life expectancy (vertical axis), consumption-based emissions (horizontal axis) and income (colour scale). The inset is the 'Goldemberg corner', with life expectancy over 70 years and less than one tonne of carbon emissions per capita. The highest life-expectancy levels are attained at a wide range of carbon emissions and incomes.



Adaptation Planning and Action

- Globally:
 - Meet funding promises
 - Govern funds and track them
 - Allocate to areas of need
 - Monitor and Evaluate for effective adaptation
 - Partnerships internationally
- Locally
 - Support adaptation planning in our communities and state
 - Involves all parts of government, private sector and civil society
 - Pilot actions
 - Identify barriers, consider ways to overcome them
 - Partnerships for success

Some of my lab's work on these



<http://vimeo.com/45150620>

So, that's it, we've discussed

I: Why global inequality matters

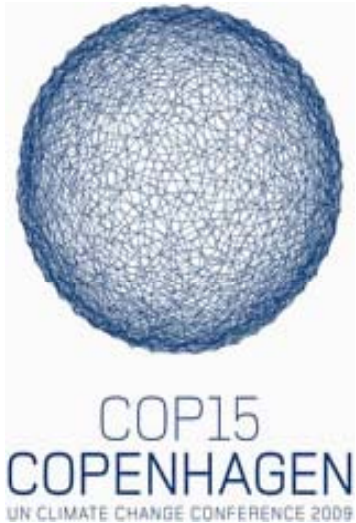
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Returning to Inequality and the Impasse (why inequality matters)

- **Inequality** within and between nations, of many sorts, **drives desperation** in the global South, (vulnerability)
- It **drives anger** at the injustice of the distribution of **goods** (wealth) and **bads** (emissions) since “waste flows downhill.”
- And it **drives inability** and **unwillingness** to **participate** effectively in international efforts to address climate change (participation in Kyoto and other environmental treaties).

Back to the central environmental justice insight that

We Cannot Solve Environmental Problems Without Addressing Inequality

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“Multipolarity and the New World dis(Order): US Hegemonic Decline and the Fragmentation of the Global Climate Regime.” J. Timmons Roberts. *Global Environmental Change*, Vol. 21 No. 3. Lead article in special issue on "Social Theory and the Environment in the New World dis(Order)". 2011

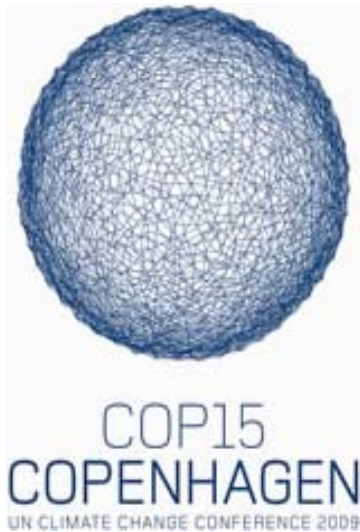
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Thank you. Questions?



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