



Center for a
New American
Security

Clout & Climate Change Materials Generated from the War Game



Clout and Climate Change Materials Generated from the War Game

About These Materials

In July 2008, the Center for a New American Security (CNAS), with a consortium of ten partner organizations, hosted “Clout and Climate Change,” an international climate change “war game” to explore the national security implications of global climate change. CNAS and the consortium partners generated these documents – remarks and briefing slides by the “Secretary General” and his team, as well as a final agreement reflecting the results of the four teams – to set the scene and reflect ongoing events of the game. These documents contributed to shaping the game and were used to disseminate information to players during game play.

You can also find a report of key findings from the event and the briefing book provided to participants in advance of the game at www.cnas.org. The briefing book and game-derived materials should not be considered as facts or predictions, but rather plausible projections designed and tailored for the specific purpose of optimal game play.

We encourage researchers and educational institutions to use all game materials. Please cite these materials as:

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Acknowledgements

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Framework Agreement on Managing Long-Term Climate Change

Climate Change Group to Try Framework Agreement



Representatives from China, the European Union, India and the United States convene today in Washington, D.C., to attempt to reach a Framework Agreement on Managing Long-Term Climate Change

BY SHARON BURKE

The meeting, called by the UN Secretary General and scheduled to begin today, is in preparation for November's International Climate Change Review Conference. According to documents obtained by *Climate Game Times*, the United Nations Secretary General will ask delegates to lead the world in to an agreement in four areas at "high risk for global conflict": migration, resource scarcity, disasters, and emissions reductions. A source close to Secretary General John Podesta reports that although delegates will come up with the content of the agreements, Secretary General Podesta has an agenda of his own.

"He would like to see some kind of legal recognition for environmental refugees and a recognition that it is difficult to repatriate these refugees in some cases," noted the source. "There are no guarantees the delegates will agree with Secretary Podesta, of course, but we are optimistic that they will come up with some strategy for dealing with these problems."

The documents outlining the Secretary General's proposal also have language calling on delegates to invest more in resilience to climate change in vulnerable societies, including in the agriculture sector, and to consider the

NEWS ANALYSIS

creation of a new international disaster relief agency.

Finally, the Secretary General will urge delegates to set a strategy for deep near-term reductions in greenhouse gas emissions and for speeding up the pace of innovation and commercialization of new energy technologies.

The meeting takes place against a backdrop of growing global alarm and tension over global climate change. The last seven years have seen an increase in heatwaves, droughts, floods, wildfires, high food prices, and intense tropical storms, including Cyclone Bhola II, which killed nearly 200,000 people in Bangladesh in 2013, and the Category 5 hurricane that hit the Caribbean and Miami in July of this year, causing an estimated \$75 billion in damage.

According to the Fifth Assessment of the Intergovernmental Panel on Climate Change, released late last year, the world is likely to see more of the same – and worse – between now and 2050. Moreover, the IPCC reports that unless global carbon dioxide emissions peak and decline this year, catastrophic climate change could be the result by the end of the century.

"A 5.7 degree Celsius rise in temperature by 2100 – well, that's not a world anyone wants to live in," commented the United Nations source. "But even by 2050, we will have our hands full – if these countries do not lead the way to international cooperation, we are going to see a rise in human misery and conflict."

LEADERS DISCUSS ENVIRONMENT, NATIONAL SECURITY & WAR GAMES

A Summary of Remarks by
Hon. Carol Browner, Gen. Chuck
Wald (Ret.) & Peter Schwartz

By CHRISTINE PARTHEMORE

Last night, a crowd of more than 100 lunarians heard from three experts about the intersection of climate change and national security and how to plan for an uncertain future. The speeches were part of the opening ceremonies of the four-day meeting on long-term climate change effects.

The evening started with what was billed as a "conversation" between Carol M. Browner, former Administrator of the U.S. Environmental Protection Agency, and Chuck Wald, a retired four-star U.S. Air Force General.

Browner described a world that is now witnessing many of the effects of climate change projected by scientists fifteen years ago, when she was head of the EPA.

The biggest difference with how this challenge is interpreted today, she explained, was that it is now clear that climate change is "an economic issue, not solely an environmental one." Today, the business community is concerned about climate change and is pushing for U.S. political leadership on the issue. The former Deputy Commander of the U.S. European Command, Wald echoed Browner's call for global leadership.

Throughout his military career, General Wald saw that environmental and demographic changes will have major national security implications. "The world is likely to confront threats on a scale not faced before," said Wald.

As General Wald explained, the national security community conducts strategic planning by projecting the future world we'd like to live in and then interpreting how to build constructive relationships with international partners to achieve it. However, nations must also plan and train for alternative futures characterized by adversarial relationships. He offered a stark warning: "If it's only crisis that can move us, we're going to fail."

Browner agreed, noting the urgency of climate change, "which is something we have to face right now."

Following dinner, the audience heard a startling keynote speech from Peter Schwartz, the Co-Founder and Chairman of the Global Business Network. Schwartz pioneered the use of scenario planning, using his technique of analyzing plausible futures to benefit businesses such as Royal Dutch Shell and governmental agencies, including the U.S. Department of Defense.

"Far too often, the things that we think can't happen, do happen," said Schwartz. "The test of a good scenario is not whether it's right or wrong," he continued, "but whether it leads to better decisions."

According to Schwartz, scenario planning is a way to deal with uncertainty and plan for various contingencies. He noted that his experience with Shell Oil was formative. In the 1980s, he and his team created a scenario in which there was a price collapse in the oil market – at a time when all predictions called for continuing price hikes. As a result, Shell was ready when the prices did actually collapse.

Climate change lends itself to scenario planning, noted Schwartz, given the uncertainties involved. "Climate change will be 'much more extreme, more frequent, in more places,' he explained. Schwartz emphasized that the central challenge for the international community is to "decouple greenhouse gas emissions and economic growth."

Schwartz noted that the world is not on a trajectory to cut emissions, and that the science and technology developments needed for success have not yet occurred.

At a Glance: What the 2012 Agreement Achieved

HISTORICAL ANALYSIS
BY TIMES NEWS STAFF

In 2012, a new global climate change agreement went into effect. In some respects, the "Copenhagen Agreement" of 2012 (named for the initial negotiations in 2009) resembled its predecessor, the Kyoto Protocol, and in several important ways, it was a departure.

The signal achievement of the 2012 agreement was a global consensus that there needed to be an 80 percent reduction of global carbon dioxide emissions by 2050. At the time, the Intergovernmental Panel on Climate Change noted that in order for the goal to be met, global carbon dioxide emissions would have to peak and



begin to decline by 2015.

Other elements of the 2012 agreement included increased pledges to adaptation assistance, which have been concentrated especially on food control measures all over the world

and public health spending. The Clean Development Mechanism, a technology transfer program, was also increased and improved.

The most contentious negotiations preceding the 2012 agreement had to do with national targets. In the end, most major developed nations agreed to a 20 percent reduction in emissions by 2020, and major developing countries agreed to reduce carbon intensity by 20 percent by 2020.

While it is clear now in October of 2015 that very few signatories to the 2012 agreement are likely to make interim targets, the interim targets also have become less germane. The overall goal of an 80 percent reduction by 2050 is still valid, but the world clearly needs a far more aggressive path for getting there.

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Secretary General John Podesta
Opening Remarks: Summit on Managing Long-Term Climate Change
Washington, D.C., October, 2015

Excellencies,

Ladies and gentlemen,

Good morning.

Thank you all for joining us here today to discuss a very serious subject.

I returned a few days ago from a trip to Rwanda, and I come to you today humbled by what I saw.

First, I am humbled by the power of ordinary people: the will to live and to thrive is so strong that it can withstand any challenge and overcome any tragedy. The savagery that human beings are capable of inflicting on each other is no match for our power to hope for a better future and strive for a brighter horizon.

But I am also humbled by the fragility of the human connection to this ancient Earth – and deeply concerned that we appear to be cutting our own connection. Sometimes it seems that our will to survive goes hand in hand with a talent for self destruction.

Antarctica, the glaciers of South America and the Himalayas, the Amazon – these are today the endangered inheritance of all humanity, and we will need more than the strength of our hope if we are to save them.

Indeed, today, in October of 2015, it's no longer only the Earth's special places that stand threatened. Now it is the Mediterranean coast. The Sahel and the Maghreb. The Mekong and Mississippi Deltas and the fertile fields of Uttar Pradesh. No country, no city is exempt from the ravages of climate change, as we saw so tragically with the Category 5 Hurricane that hit Miami earlier this year.

Ladies and gentlemen, climate change is the defining challenge of our age, and it is the work of all nations. And yet there is an inescapable truth that the world looks to the nations represented here today to lead us all forward. As the world's top greenhouse gas emitters -- you are the heart of the problem; and as the world's largest economies -- you have proven that you are willing to be the engine of the solution.

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I was heartened by how these four Governments came together and ratified an agreement in 2012. That agreement laid out an ambitious global consensus for change – an 80 percent reduction in greenhouse gas emissions by 2050. Unfortunately, the Fifth Assessment of the Intergovernmental Panel on Climate Change told us that 2015 was the crucial year: this is the year our emissions needed to peak and begin a marked decline. Well, it is October, and that has clearly not happened. Indeed, global emissions have continued to rise. I do not suggest that we should renegotiate the 2012 agreement today; instead, I suggest that we work together to find a way to reach that 80 percent reduction by 2050 – we must meet the goals of that agreement.

After all, the Fifth Assessment also made clear that concerted and sustained action can still avoid some of the most catastrophic scenarios. But let me be very clear: our time is running out.

Today, we have two problems.

Between now and 2050, we will face changes to the climate as we know it – this mid-term trajectory is largely set by the accumulation of greenhouse gases we have already pumped into the atmosphere. As you can see in these slides, the United States and the EU have made a significant, historic contribution to total carbon dioxide emissions [*slide 2*]; China and to a lesser extent India started later, but have increased sharply in the last two decades [*slide 3*]. The rest of the world accounts for more than 40 percent of emissions, though that is spread across more than 160 nations. Today, the concentration of CO₂, the most prevalent of greenhouse gases, is about 407 parts per million. [*slide 4*]

With that concentration, there is scientific certainty that the globe will warm for the next three decades. We can be and we must be ready for the changes we cannot avoid. We must adapt.

The future beyond 2050, however, is not yet set – and that's our second problem, and our opportunity. If we do nothing more to reduce our greenhouse gas emissions today [*slides 5 and 6*], our emissions will increase dramatically by the end of the century, as you see in these two slides. That means, as you see in this slide [*slide 7*] that we will be on a path to reach a concentration of about 940 parts per million of CO₂ in the atmosphere. The world's best scientific minds have told us that we will see unmanageable effects to the climate – raging, violent storms, a parched Earth, and catastrophic sea level rises.

If we stay on the trajectory we are on, our children will face a bleak future, indeed.

And I say our children advisedly: this is not a problem for far distant future generations. But we can avoid the most catastrophic climate change if we begin cooperating globally today to dramatically reduce emissions. But we must start today and you are the countries that must get us started.

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We must honor the 2012 agreement. If you look at this slide, you will see what success will look like *[slide 8]* – we need to drop our emissions this sharply. And as you see here, this will be the work of all nations *[slide 9]*. If we are able to realize those goals, we will have that better future and brighter horizon. *[slide 10]*. This slide shows that we have an opportunity to stabilize the climate for our children.

This is something we have to do together. And that is why you are here. You are the four biggest emitters and the four biggest economies. You are the technological engines of the world. You are also the leaders of the developed and developing worlds. You must show the world the path to addressing climate change.

Right now, our capacity to adapt to what is inherently a cross-border international challenge is very weak. Despite our common targets and an increased monetary investment in adaptation and in international aid for adaptation and the improvements that have resulted in flood control and other measures, we have clearly underestimated the scale and scope of the challenge and the new institutions and mechanisms that will be needed to meet the challenge. What we lack is a strategic understanding of the problem and the potential solutions that require international cooperation.

I hope this meeting will bring you together to discuss a common problem and to seek common solutions. Indeed, I hope you will reach a Framework Agreement on Managing Long-Term Climate Change, which we can then submit to all the parties to the 2012 Climate Change Agreement and to the UN Security Council for consideration and adoption.

Before I outline the four areas for negotiation and discussion, I would like to ask the Assistant Secretary General, Michèle Flournoy, to give you a long-term threat assessment, and then I will outline the areas for discussion.

[Flournoy presents threat assessment]

Thank you, Assistant Secretary General Flournoy. I hope you digested that this is not science fiction – this is what is likely to happen.

I want to focus discussion on four areas, but before I do so I would note that the number one missing ingredient in our climate change policies today is a high-level common understanding of the nature of the challenges we face between now and 2050 from climate change – and a global, strategic approach to meeting those challenges.

In your discussions over the next two days, I urge you to resist the temptation to delve into the technical and tactical details. We have working group meetings with technical experts who can do that for us.

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Our charge in this meeting is to develop a strategic approach – a framework to guide all subsequent conversations and negotiations on how we can work together to meet the long-term challenges of climate change. I propose that you discuss today in your country teams what your views on this collective strategy are: what is your nation willing to do to prepare for the challenges of 2050 and beyond?

I suggest you focus on the four areas just identified as the most likely to increase conflict in your nations and around the world: migration, resource scarcity, disasters, and emissions reductions.

As you heard Assistant Secretary General Flournoy say, we have at least 50 million environmental migrants today and expect between 200 million and one billion by 2050. Each country here has already experienced a rise in migration – that will increase by orders of magnitude by 2050.

So my first recommendation is that you propose cooperative mechanisms for dealing with these increased flows of migrants, with an understanding that repatriation may be difficult or impossible.

I would like to see you consider granting legal recognition of these populations as refugees, with some consideration given to an international legal obligation to resettle – particularly from the major emitter countries. There is a perception already in many of the places hardest hit that they are suffering consequences of development from which they have not benefitted.

I realize that may be an unacceptable shift for many of you, but urge you to offer an alternative: this is not a problem we can ignore or wish away. You need to consider what sort of law enforcement, military, and humanitarian means countries will need in order to deal with the influx. I understand that the cost will be a factor, but urge to consider first what you will need in order to deal with the increases in migration, and then later figure out how we will pay for it.

Second, we must do all we can to keep these populations from being forced to move in the first place. That requires fundamentally addressing the availability of drinking water and soil quality and other concerns that determine agricultural productivity. More to the point, I believe there is a high risk of internal and international conflict over these resources – particularly water. We are already seeing high regional tensions in the Middle East, over the Nile headwaters, and in North America over strategic watersheds.

Third, we must be better prepared for natural disasters. Populations fleeing disasters can be destabilizing for neighboring states, and nations that already have governance and economic challenges can slip into a state of conflict in the aftermath of disasters. Dealing with the rise in meteorological, hydrological, and climate-related disasters will require better response capabilities than we can currently muster, and it requires resilience planning – or disaster risk

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reduction, to allow populations to better withstand typhoons, hurricanes, floods and fires. Even the most capable nation in the world, the United States, has struggled to respond to recent weather disasters.

I would like you to consider how to improve current international efforts or perhaps to create a new international disaster relief agency, which would function along similar lines to our peacekeeping forces.

Finally, we must do more to reduce our greenhouse gas emissions in the near term. We thought we had more time to achieve reductions; we were wrong. The trajectory we are on today will mean catastrophic changes to the Earth's climate for our children by the end of the century. That is clear.

So I would like you to consider two remedies:

- 1) What can you do using existing technologies to make far deeper cuts in your emissions in the short-term?
- 2) What can you do to speed up the global innovation system to produce and disseminate breakthrough energy technologies on a far more aggressive timetable – to transform your economies from high-carbon to low-carbon?

We have science advisors on hand who can help you, particularly in calculating what near-term actions could help in reducing emissions. I urge you to call on them for advice.

At this point, I would like you to break into your country teams and talk about what your nation is prepared to contribute in each of these four areas. You will have briefing slides to help guide your discussion, and you may consult with other nations as you wish. At the end of the day, we would like each team to present what their nation is prepared to do.

In putting together your proposal, I urge you again to stay at a strategic level – we have working groups to discuss the technical details, but only you must provide a guiding strategic vision.

Thank you all.

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Science Advisor to the Secretary General
Dr. Jay Gulledge
Environmental Briefing
Washington, D.C., October 2015

Thank you, Ms. Assistant Secretary General.

I will provide a very brief overview of the environmental impacts of climate change. I do not have time today to go into each of the regions represented here individually, but I do have more regional information that I can share with you as the need arises. The rapporteurs in your team rooms will also have copies of some projection maps for your regions. And I want to recognize the wonderful scientists at Oak Ridge National Laboratory who provided these maps for your use. Some of them are here and available to resolve any scientific questions you may have. Simply ask your rapporteur if you require any scientific assistance and we will get that for you.

As you know, last year in 2014, the IPCC released its Fifth Assessment Report [SHOW SLIDE 1]. A summary of the report is included as an appendix in your briefing books. A few of the major conclusions are shown here.

[SHOW SLIDE 2] These maps show warming of the Earth in 2050 and 2100 relative to the beginning of the 21st century. Darker coloring represents greater warming. The data were produced by the Community Climate System Model, version 3 (CCSM3) developed by the National Center for Atmospheric Research in the United States. The data were processed and the maps were produced by Oak Ridge National Laboratory. The greenhouse gas emissions scenario driving the model was what is commonly called “business as usual” emissions. This description implies that emissions continue to grow based on rapid economic growth and a fossil fuel-intensive energy system, in the absence of policies to limit GHG emissions in the future. In this scenario, CO₂ concentration in the atmosphere is between 450 and 500 ppm in 2050 and between 900 and 1000 ppm in 2100.

As the Secretary General pointed out, there is little we can do to alter the climate of 2050 because it will be governed by the greenhouse gases we have already emitted. The 2012 agreement limited CO₂ concentrations to around 450 ppm, which would produce a stable climate slightly cooler than the one depicted in the upper map for 2050. Unfortunately, the IPCC estimates that we would have needed our global CO₂ emissions to peak this year in order to achieve that goal, yet our emissions continued to grow rapidly. On average this world is about 2.5 degrees warmer than the preindustrial world and some regions near the poles warm by about 6 degrees. This is a challenging world to live in because hundreds of millions to billions more people will live under water stress, weather will be significantly more extreme, and some

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diseases are likely to spread to new areas. The developing world will be impacted the most, especially Africa, Asia, and tropical Latin America. But if we stabilize the climate in this condition, there is a lot we can do to adapt to those changes and there is a chance that we can avoid the most severe impacts of climate change, such as multiple meters of sea level rise before the end of this century and the collapse of the North Atlantic Ocean's conveyor belt or thermohaline circulation, which would likely have dramatic effects for the global climate, not just in Europe.

The lower map shows a very different world that is almost 6 degrees warmer on average. This is a world that humans have never known. The Earth has not been this warm for more than 50 million years. The last time it was this warm there was no ice on Greenland or Antarctica and the global average sea level was 90 meters higher than it is today. Permanent ice cannot survive on a planet this warm. And although it would take thousands of years for all of the ice to melt, only small portions of the ice are needed to cause catastrophic sea level rise on the scale of a century. A world this warm is very likely to undergo other large, abrupt changes, such as reorganization of the atmosphere that shifts rainfall away from our main food producing regions and the collapse of the North Atlantic thermohaline circulation. Such a climate would likely result in fundamental reorganization of the global society in ways that we simply cannot assess or prepare for. And it is very important to understand also that CO₂-driven warming is essentially irreversible on any time scale that humans care about. Whether we allow the planet to warm by two degrees or six degrees, to the best of our knowledge we will be stuck with that temperature for thousands of years.

What we must do then, is “manage the unavoidable, while avoiding the unmanageable.” [SHOW SLIDE 3] Since we are already stuck with the world of 2050 as a result of our past greenhouse gas emissions, we must prepare for that world—we must adapt to the coming changes in the climate. And, since we do not want to contemplate life on this planet under the business as usual projection for 2100, we must mitigate our greenhouse gas emissions as soon as possible in order to avoid an unthinkable fate. Remember that because there is a 30-year lag between our emissions and the climate's response, we have to start today in order to have an influence on the climate after 2050.

We know what we must do to avoid the worst effects of climate change. We must dramatically reduce our greenhouse gas emissions globally. The targets set forth in the 2012 agreement provide a reasonable framework that would allow us to stabilize the climate at a level that we might be able to adapt to. The rest of my presentation will focus briefly on what conditions we will face in our attempts to adapt.

[SHOW SLIDE 4] This map shows a projection of future annual streamflow in different countries of the world. Blue areas have increased surface water and yellow and brown areas have decreased surface water. Darker colors show larger changes. We can see that the dry tropics and sub-tropics are become drier. Since these areas are dry already, they will face additional

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challenges, especially as growing populations put increasing demand on dwindling water supplies.

The high northern latitudes and the wet tropics are projected to get more water. In the high latitudes this is a result of both increased precipitation and the melting of snow and ice. In the tropics, it is largely a result of more intense monsoon rainfall. As the ice melts, there will be many negative effects ranging from species and ecosystem loss to physical damage to roads and towns. In the wet tropics, the increased rainfall will come in the wet season when additional rain is not helpful and will increase flooding. During the dry season, water will still be limited in spite of the increase in annual rainfall and higher temperatures are likely to cause more drought by evaporating more water from the soil.

Climate change will affect agriculture as well. [SHOW SLIDE 5] This map shows areas where the potential for crop production is expected to either increase or decrease. Green and blue indicate increased production and yellow and red indicate decreased production. Not surprisingly, it shows a similar overall pattern to the change in surface water, but some areas where streamflow will increase, such as India, may still see lowered crop production because of temperature stress on the crops. Again, low latitudes are generally more strongly impacted than high latitudes.

According to the IPCC, hurricanes and typhoons will also become more intense as ocean temperatures rise. [SHOW SLIDE 6] This map shows the regions of the world that suffer from tropical cyclones. These areas will all be affected. China, Southeast Asia, India, Bangladesh, and the United States and its southern neighbors are among the most exposed countries in the world. The recent hurricanes in Bangladesh and Miami illustrate the extreme vulnerability that all of these regions face regardless of their levels of economic development.

Sea level rise will strongly impact all of the countries in this negotiation, as well as most other countries in the world. [SHOW SLIDE 7] This map shows exposure to sea level rise based on the percentage of coastal land that lies below 10 meters elevation. Darker colors indicate greater exposure. The United States and India are particularly exposed, whereas China and Europe show medium exposure based on this criterion. More important than how much land is exposed, however, is what sits on that land. Many important cities and heavily populated agricultural deltas lie in many of these areas. In your individual groups, there will be maps showing examples of 1 meter of sea level rise in various regions.

Very modest amounts of sea level rise will inundate coastal wetlands, which serve as breeding grounds and nurseries for the vast majority of economically important fish species. As these wetlands drown, our fisheries will drown with them.

I can't resist showing you just one regional image of sea level rise. This is the island of Singapore. [SHOW SLIDE 8] The white shading shows population density. There are about 5

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million people living in Singapore. The next slide will show in red the land area that would be inundated by one meter of sea level rise.

Now, this is very dramatic, but I'm sure that Singapore has plans to hold back a meter of sea level rise. However, it really is the effect of sea level rise on storm surge that is of much greater concern. [SHOW SLIDE 9] One meter added on top of the storm surge of a category 3 hurricane converts it into a category 4 storm surge.

Some other global impacts of climate change include ocean acidification, which harms coral reefs and other types of shell-forming marine organisms, which will disrupt marine ecosystems and decrease fishery production. [SHOW SLIDE 10] As northern latitudes begin to have milder winters, temperature limited pests and diseases will expand northward. And heavier monsoon rains are likely to increase the incidence of water-borne diseases that plague wet tropical regions.

[SHOW SLIDE 11] Summing up the adaptation challenge is a big job. In general, I would summarize it as:

1. Water, water, water! Whether it be too much water from intense rainfall or sea level rise, or too little water from glacier retreat and drought, water will be a major adaptation challenge.
2. Food security will be challenged by degradation of marine ecosystems from acidification, warming, and sea level rise, and by increased weather extremes, making crop production more uncertain and food prices more volatile.
3. Health will be impacted by weather extremes, malnutrition, poor water quality, and the spread of tropical and water-borne diseases.
4. Finally, as the Assistant Secretary is about to tell you, we judge that all of these effects will generate a large population of environmental refugees who will bring with them a new set of security challenges.

The Assistant Secretary General will now discuss her recent threat assessment based on these environmental impacts of climate change.

Science Advisor to the
Secretary General
Environmental Assessment (Part 1)



Clout & Climate Change
Slides 1-5



WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



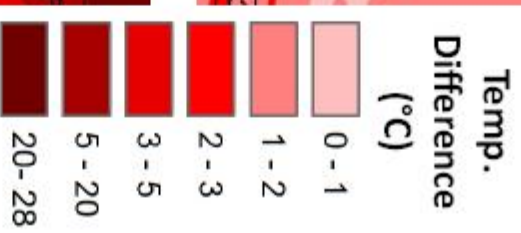
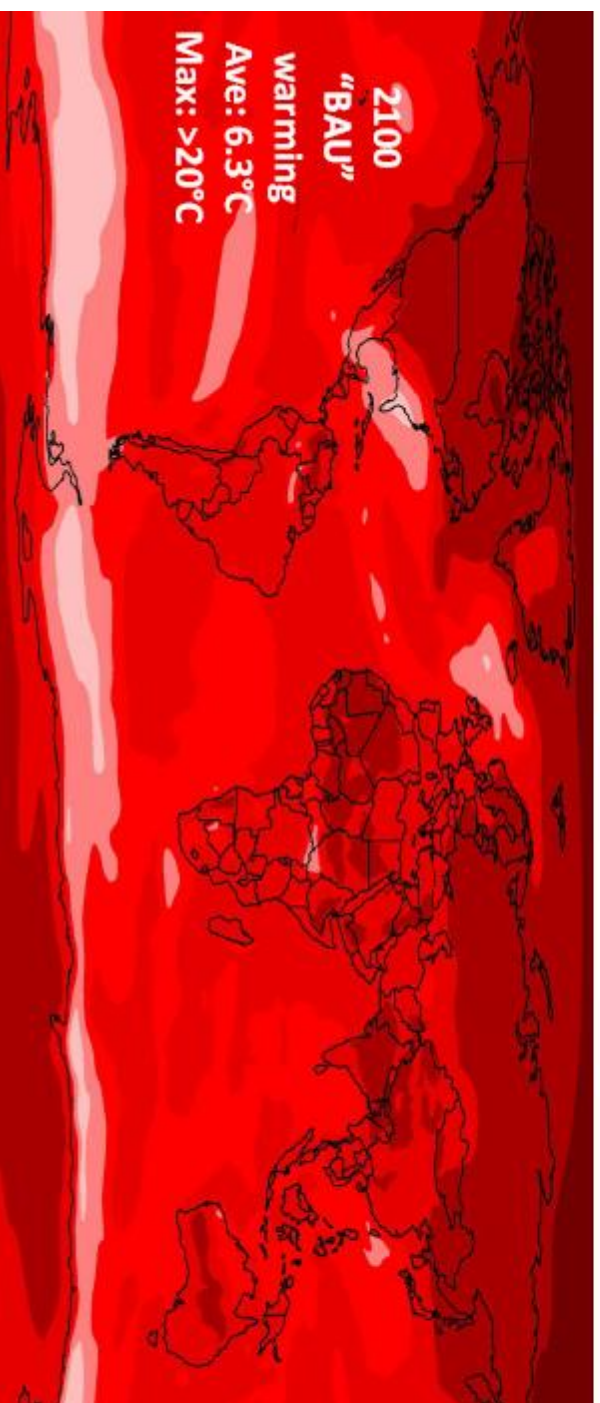
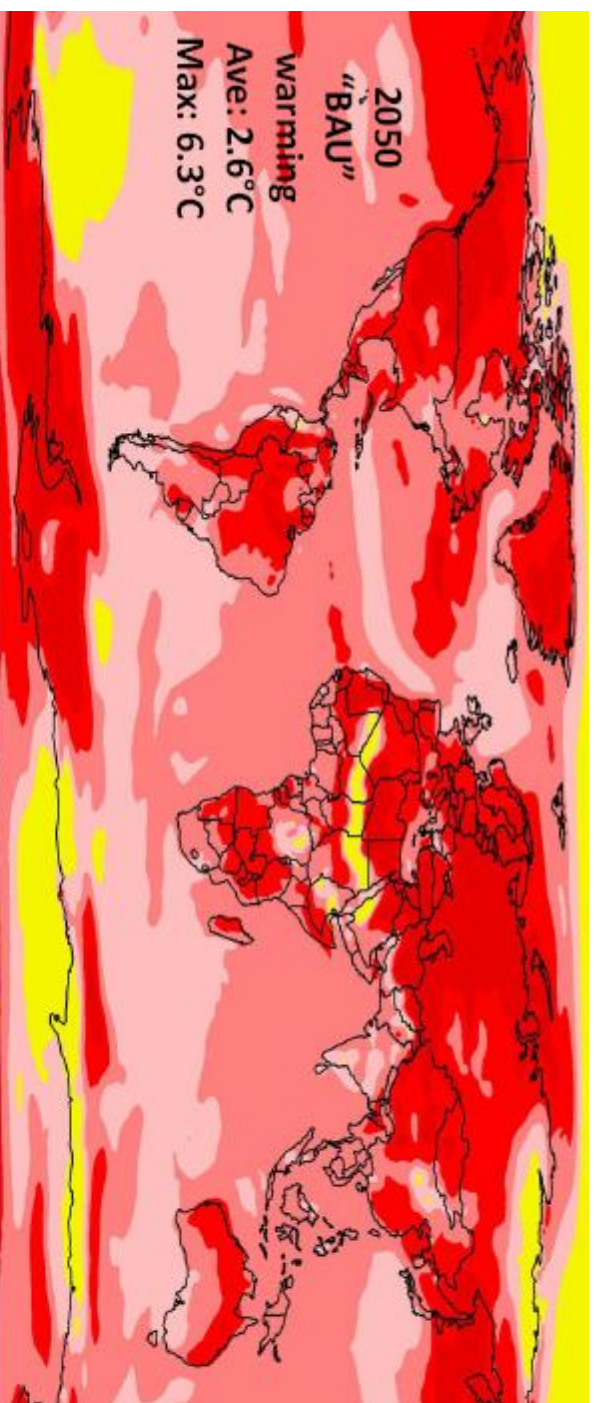
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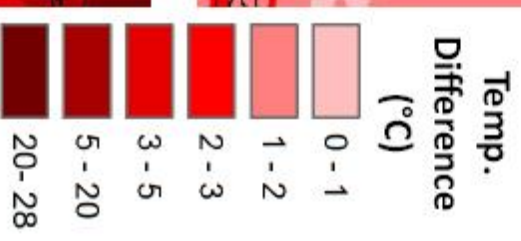
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Climate Change 2014: The Fifth Assessment Report

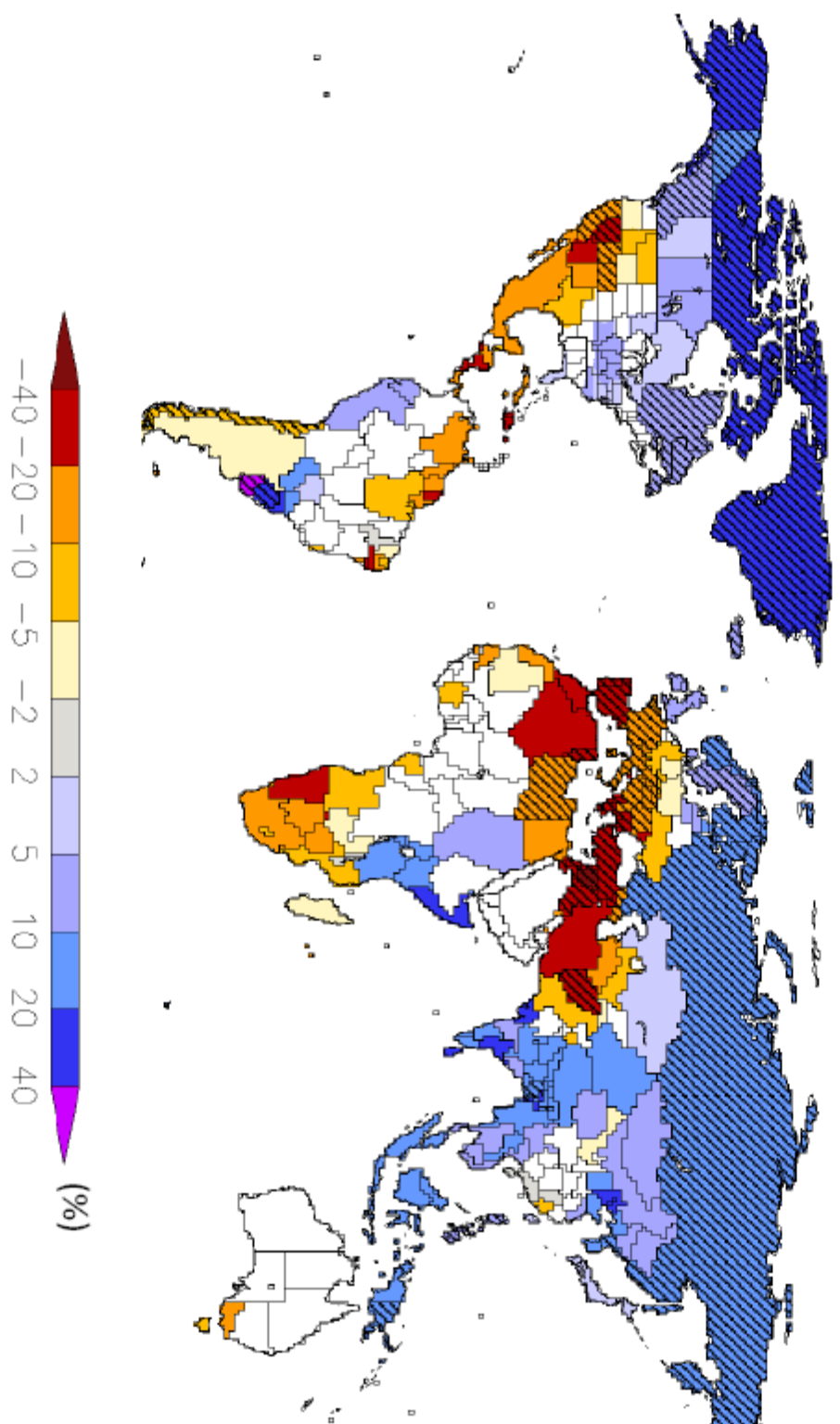
- Observed changes in the climate
 - 18 of the 20 warmest years since 1850 occurred between 1991 and 2012.
 - Many impacts are occurring faster than projected.
- Attribution of changes to human activities
 - *likely** contributed to accelerated sea level rise;
 - *very likely*** caused more intense weather extremes;
- Projected climate change
 - Warming: 1.1-2.7°C in 2050; 2.7-5.8°C warming in 2100
 - Sea Level Rise: 38 to 117 cm in 2100 relative to 2000
 - Increased climate extremes (heat, drought, storms)

**Likely: >66% chance; **Very likely: >90% chance*



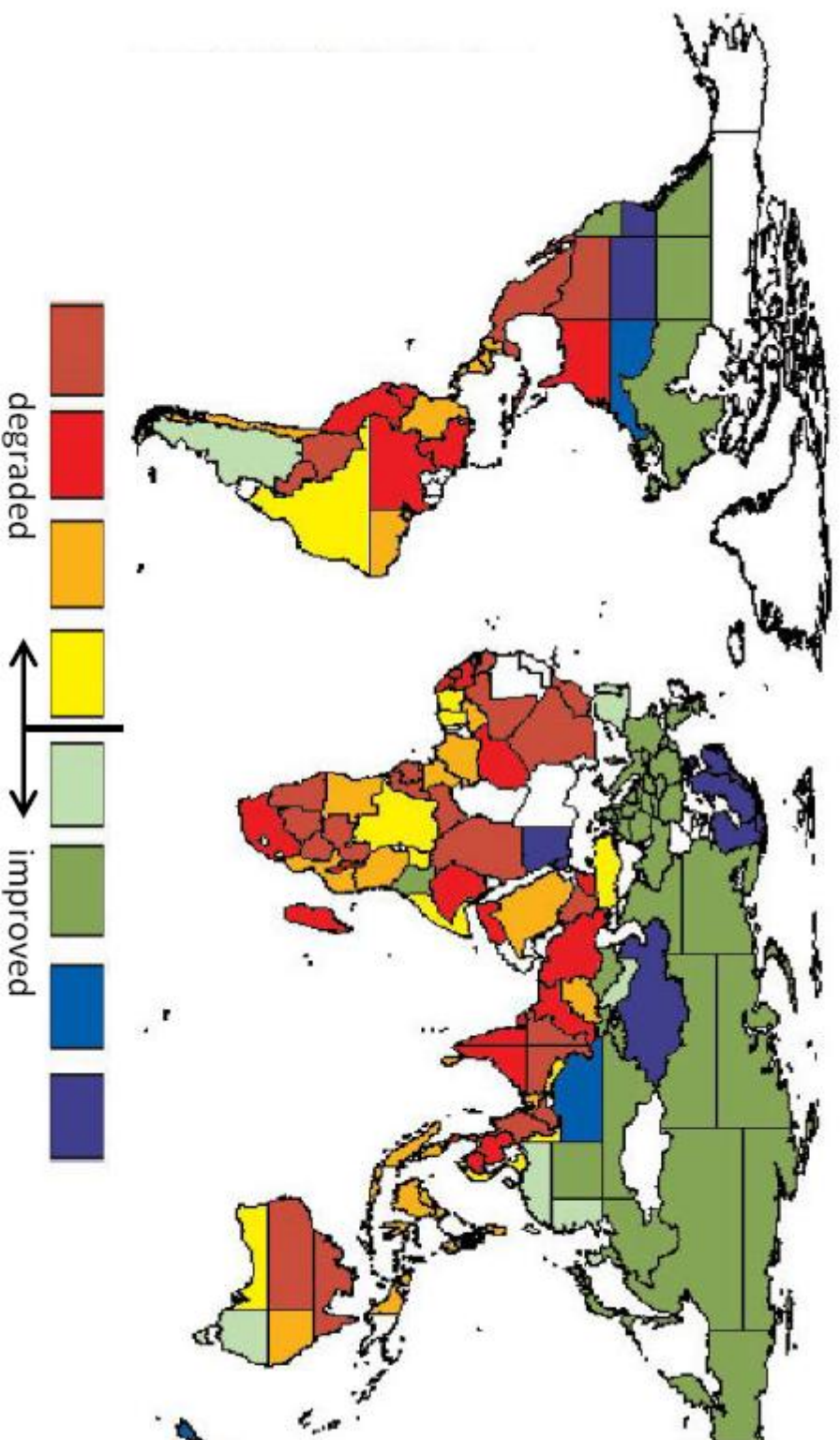


Changes in Streamflow, 1970 to 2050



(Updated from Milly, P.C.D., K.A. Dunne, A.V. Vecchia, Global pattern of trends in streamflow and water availability in a changing climate, *Nature*, **438**, 347-350, 2005.)

Climate Change Effects on Crop Production



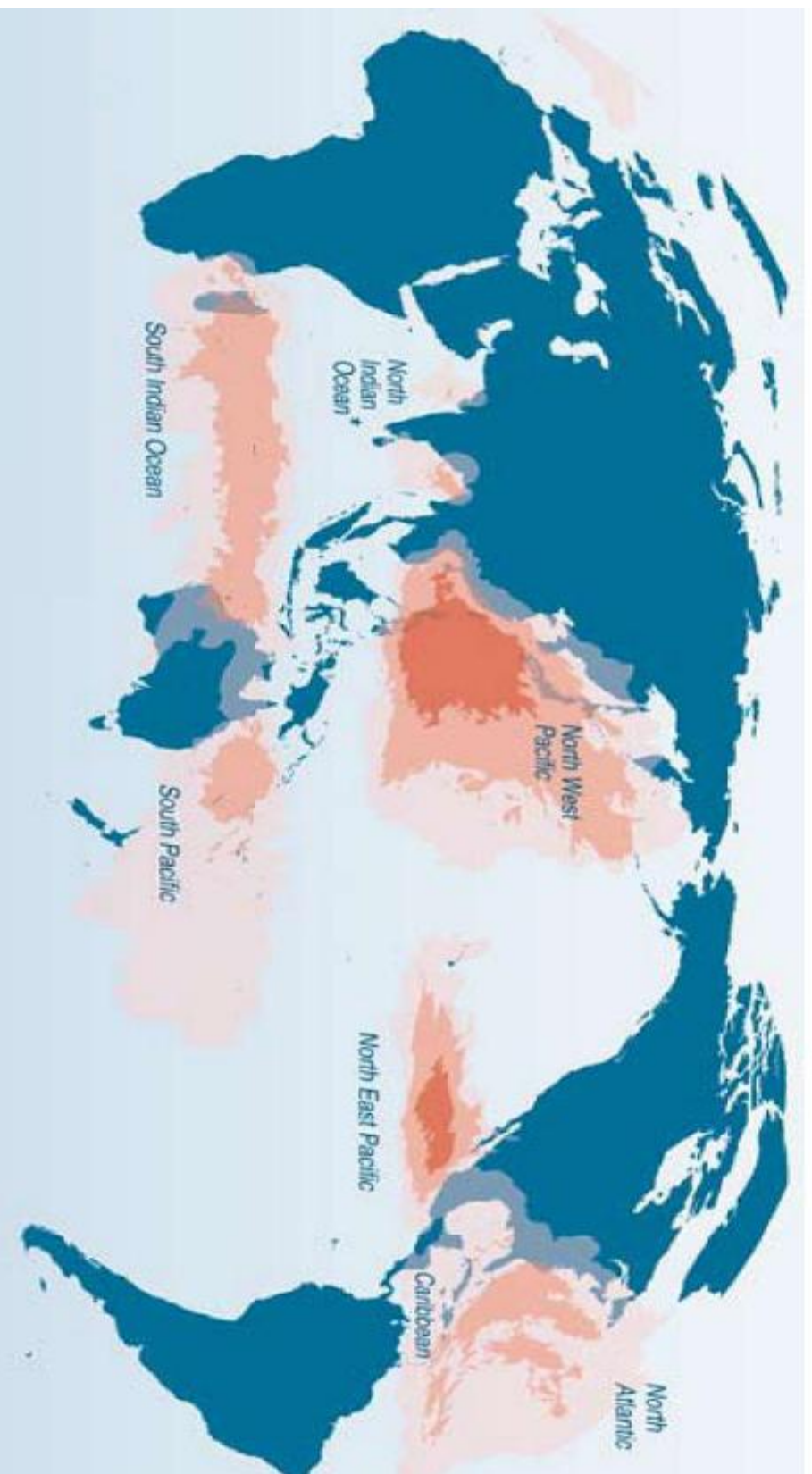
Adapted from W.R. Cline (2007) *Global Warming and Agriculture: Impact Estimates by Country*, Center for Global Development, Washington, D.C.

Science Advisor to the
Secretary General
Environmental Assessment (Part 2)



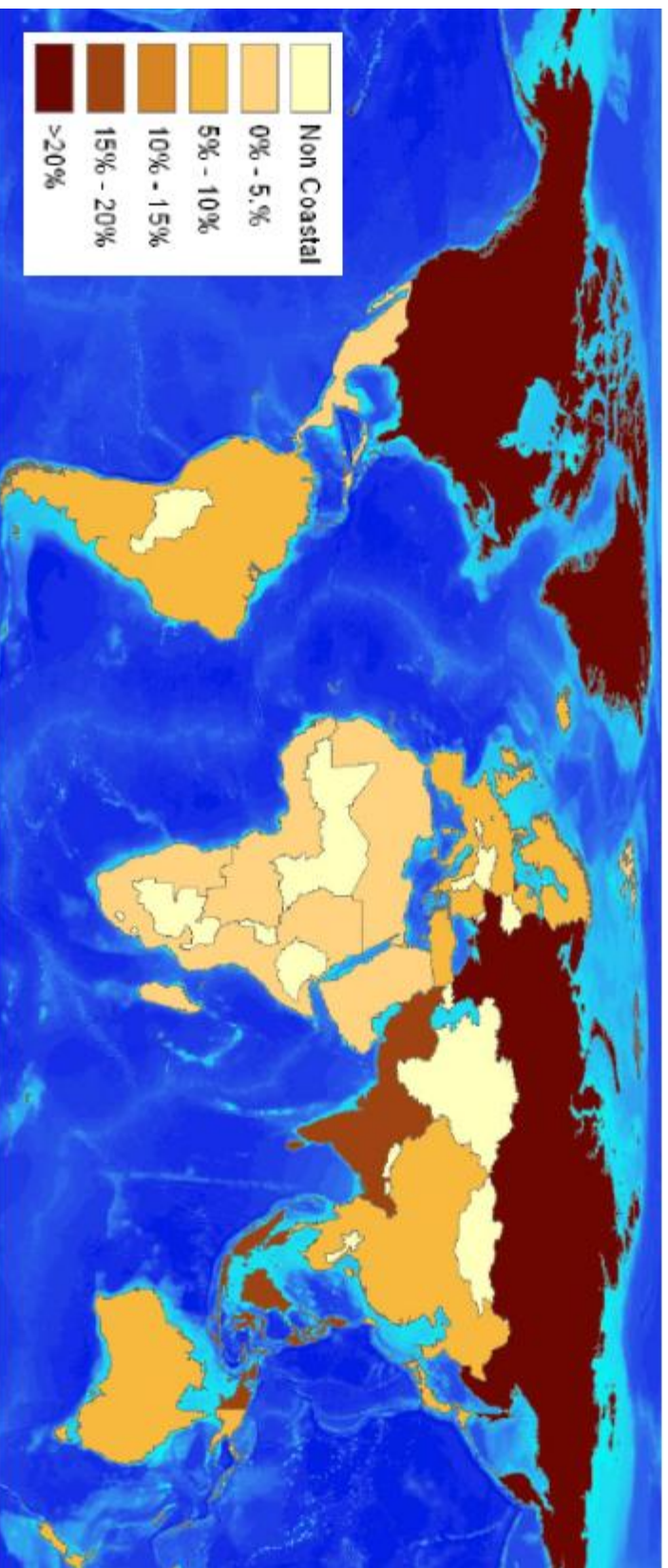
Tropical Cyclones (Typhoons, Hurricanes)

IPCC-AR5: *Very likely*, tropical cyclone intensity will increase...



Global Sea Level Rise

IPCC AR5 Projection: 0.38 to 1.17 m in 2100



David Anthoff, Robert J. Nicholls, Richard S.J. Tol, Athanasios T. Vafeidis (2006). Global and regional exposure to large rises in sea-level: a sensitivity analysis. Tyndall Center.



Singapore
~5M people



Susceptibility to Sea Level Rise

Weiss & Overpeck
The University of Arizona





Singapore
~5M people

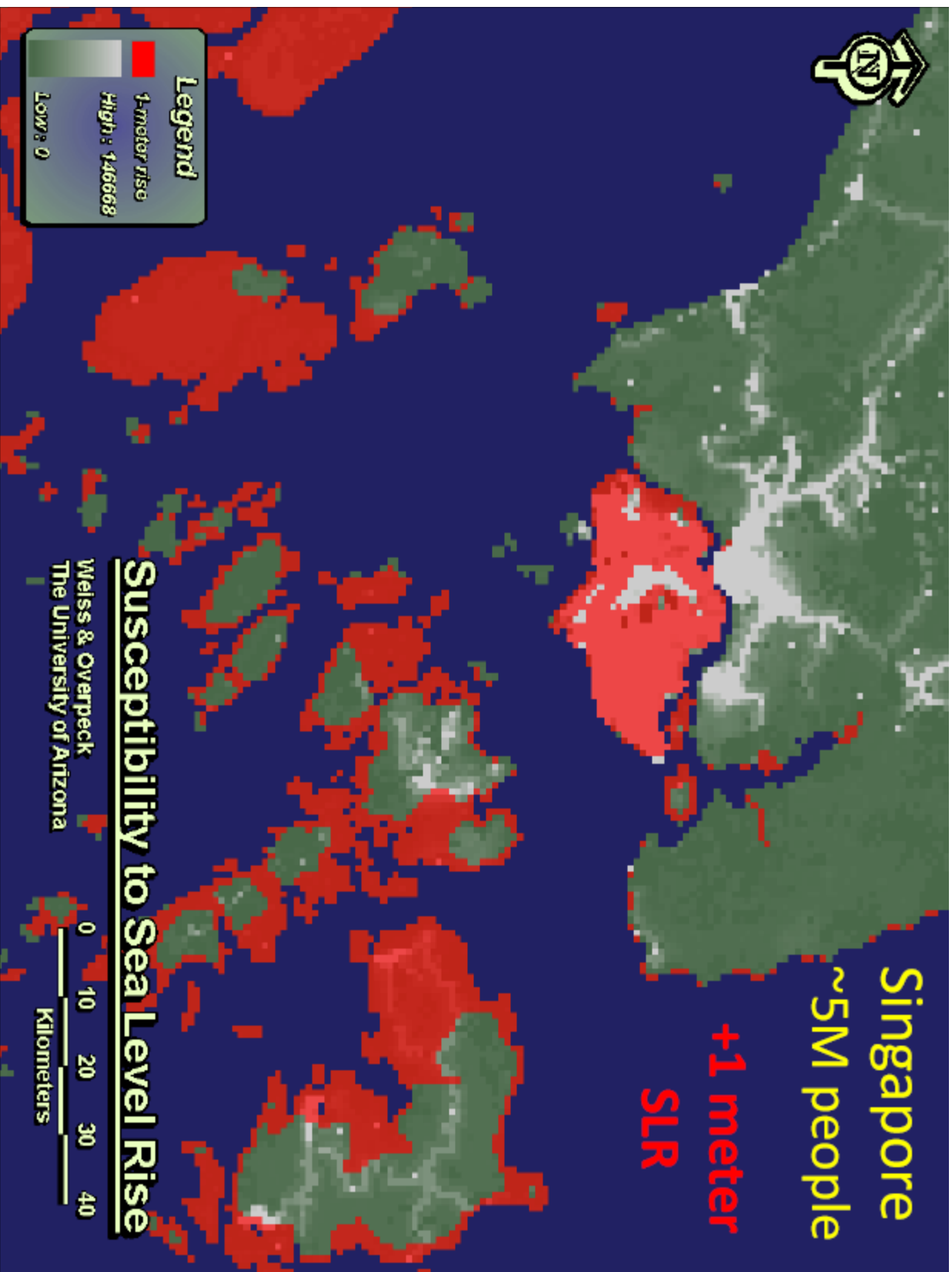
+1 meter
SLR



Susceptibility to Sea Level Rise

Meiss & Overpeck
The University of Arizona

0 10 20 30 40
Kilometers





INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



1 09520568465108546211597532584698461

Other Global Impacts of Climate Change

- Ocean acidification degrades coral reefs and harms other shell-forming organisms, decreasing productivity of marine ecosystems.
- Spread of temperature-limited diseases to higher latitudes and altitudes.
- Higher incidence of water-born disease in tropical regions with increased rainfall.



WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



UNEP

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The Adaptation Challenge in 2050

- *Water, Water, Water*—Snow & Ice loss, drought, floods, Sea level rise
- *Food Security*
 - Wetland & coral reef loss degrades fisheries.
 - Changes in water availability and weather extremes likely to make food production and prices more variable.
- *Health*—Heat, extreme weather, malnutrition, water quality, tropical and water-born diseases.
- *Migration*—Above effects may create a large population of environmental refugees.

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Assistant Secretary General Michèle Flournoy
Threat Assessment for Long-Term Climate Change

Thank you, Mr. Secretary General.

I appreciate the opportunity to brief all of you on our assessment of the threat to international peace and the global commons that we believe may result from global climate change. This threat assessment covers the period between now and 2050.

To help me set the context, I would like to ask my science advisor, Dr. Jay Gulledge, to start with a technical brief on the long-term environmental effects we expect to see from global climate change.

[Dr. Gulledge presents.]

Thank you, Dr. Gulledge. Based on this analysis, there are four climate change factors we believe are most likely to threaten the peace and prosperity of the international community in the next 35 years:

- migration
- resource scarcity
- disasters
- and emissions of greenhouse gases.

I want to emphasize that in the military planning community, 35 years is a reasonable amount of time to plan for the personnel and materiel needed to meet an anticipated threat. Indeed, when it comes to climate change, we arguably know more about the threat than we might with a more traditional long-range threat.

MIGRATION

Some of the most significant threats we face concern the mass movements of people.

In the past, most global refugees and internally displaced people have fled conflict, and most – 80-90 percent – have stayed close to home within their country or in neighboring countries.

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Historically, only about 1 percent of these people have been resettled – most have repatriated to their country of origin.¹

We are already seeing a departure from these historical patterns. First, there has been a sharp rise in migrants moving for environmental reasons. We estimate the numbers of these migrants today in 2015 at more than 50 million.²

We still don't fully understand this phenomenon and these individuals have no legal standing as refugees, but it appears that people are most likely to be fleeing from resource scarcity – particularly of water and arable land – and from other climate-related effects including sea level rise and natural disasters. Compared to other migrants, our tracking suggests they are less likely to stay in their immediate region of origin and are less likely to be repatriated, depending on the conditions they are fleeing. In some cases, the environmental conditions that are impelling people to move extend beyond their immediate home region may be irreversible or may be recurring. For example, we estimate that between 25 million and 40 million people will be displaced from coastal areas due to sea level rise by 2050.³

We have two very strong concerns. One is that we can expect elevated mortality rates; in addition to these people being displaced with all the challenges that entails, they are likely to be facing exposure to other climate changes, such as heat waves, contaminated water, vulnerability to chronic disease, and an increase in vector-borne diseases, such as yellow fever, dengue, and malaria.

The second strong concern is that there is a highly elevated risk of conflict associated with such large movements of people. First, many of the states at highest risk of producing environmental refugees are also at high risk for state instability or even failure, which could produce conflict. Also, we have seen increasing levels of hostility to migrants as their numbers have increased, with a rise in border conflict and civil unrest in every nation represented here today. Based on what Dr. Gulledge just told us, we should expect these trends to intensify.

We estimate that by 2050, the number of environmental refugees could range from 200 million to as high as one billion.⁴ Further, we estimate that the United States, Europe, India, and China

¹ United Nations High Commissioner for Refugees, "2007 Global Trends: Refugees, Asylum-seekers, Returnees, Internally Displaced and Stateless Persons," (June 2008).

² Norman Myers, "Environmental Refugees: An Emergent Security Issue," Presented at the 13th Economic Forum, Prague (23-27 May 2005), at <http://www.populationmedia.org/wp-content/uploads/2008/03/norman-myers-environmental-refugees-an-emergent-security-issue.pdf>.

³ Rachel Warren, "Impacts of Global Climate Change at Different Annual Mean Global Temperature Increases," in *Avoiding Dangerous Climate Change*, edited by H.J. Schellnhuber and others, (Cambridge, UK: Cambridge University Press, 2006).

⁴ *Human Tide: The Real Migration Crisis*, A Christian Aid Report (May 2007), at http://www.christianaid.org.uk/Images/human_tide3__tcm15-23335.pdf.

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will see very dramatic increases in the numbers of migrants, including internally displaced migrants.

In the U.S., we expect Americans from the West, Mountain States, Southwest, and Gulf Coast to move internally and large numbers of migrants from Central America, Mexico, and the Caribbean to cross southern borders. Consider that total migration to the United States averages more than 500,000 per year right now; if the U.S. percent of total global migration holds steady, that will mean 7 million migrants annually into the United States by 2050.⁵

For Europe, we expect internal migration from southern to northern Europe and dramatic increases from northern, western, and Sahelian Africa, as well as the Middle East and Central Asia.

For China, we expect internal migration from the Tibetan plateau and from several river basins, as well as cross border migration from Southeast, South and Central Asia and Korea. Vietnam is currently the single largest source of refugees and asylum seekers for China; with large parts of Vietnam facing inundation by 2050, those numbers will increase.

For India, we expect internal migration in many parts of the country as a result of droughts, disasters, and food insecurity, and sharp increases in cross-border migration from Bangladesh, Nepal, Bhutan, the Maldives, Sri Lanka, Pakistan, and Central Asia.

This leads us also to our second and third climate and conflict areas that we encourage you to focus on in your discussions. These migrants will move for two basic reasons: slow and sudden onset disasters.

RESOURCE SCARCITY

As Dr. Gullledge just detailed, we believe the slow-onset climate disasters now taking shape are especially related to declining access to fresh water and declining agricultural productivity, through such factors as degraded soil quality. Resource scarcity is the result.

By 2050, we estimate that between 1 and 3 billion additional people around the world will be experiencing water stress and another 132 million around the world will be at risk for hunger. Food instability, in particular, will be a problem as weather patterns become more unpredictable and volatile, which is likely to lead to more food emergencies. We are already seeing this in 2015.

⁵ Based on 2007 numbers, from United Nations High Commissioner for Refugees, “2007 Global Trends: Refugees, Asylum-seekers, Returnees, Internally Displaced and Stateless Persons,” (June 2008).

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This slide [SHOW SLIDE 2] shows regions where we believe the combination of increased water stress and decreased agricultural yields will combine with existing state fragility or tension to create conflict and refugee flows.

Indeed, if you compare the map of hotspots with the map of expected population change between now and 2050 [SLIDE 3], as you see in this slide, it is clear that the highest areas of population growth, the yellow and red areas, coincide with the hotspots.

In addition to the human suffering and migration such scarcity can cause, it can also push fragile states – already marked by internal divisions and poor governance – into conflict. The nations that rank at highest risk for state failure in the Foreign Policy Failed State Index are in general states that are also highly vulnerable to climate change.⁶ State failure or conflict rarely stays contained within national borders, and opportunistic violent groups tend to find safe havens in compromised nations.

In the past, water scarcity has brought nations together as much as it has driven them apart,⁷ but we should keep in mind that it is only recently that we've begun to see water levels in key rivers, such as the Colorado River, the Nile, or the Euphrates, decline below levels that can actually support their dependent populations, including agricultural and industrial users. In some cases, this is directly related to population increases, as well.

We assess that there is a particularly high risk of interstate conflict over water resources, as this absolute decline relative to the size of the population continues. This will include other rivers as well, such as the Brahmaputra, rivers in the Balkans and southeastern Europe, and in several rivers within the United States.⁸

DISASTERS

Sudden-onset disasters, such as floods and violent storms, have been on the rise. There has been a nearly 30 year trend of steady increases. The number of reported floods, for example, rose 7.4 percent per year on average between 1988 and 2000, and has increased at an average rate of 8.4 percent per year since 2000.⁹

Slide 2 [show SLIDE 4] shows a seven-year average distribution of natural disasters of all types. As you can see from the countries in red, the United States, India, and China consistently experience high numbers of disasters.

⁶ Based on the 2008 Failed States Index.

⁷ David G. Victor, "What Resource Wars?" *The National Interest* (12 November 2007).

⁸ Oak Ridge National Laboratory Memo (June 2008).

⁹ J.M. Scheuren, et al., "Annual Disaster Statistical Review: The Numbers and Trends 2007," CRED (May 2008).

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Although the upward trend in frequency of disasters is clear as is the geographic distribution, the cost trends, in terms of victims and damages, varies widely from year to year. We expect the trend to rise dramatically by 2050, however.

The human and financial costs increase markedly when there are mega-disasters. There have been a number of mega-disasters in recent years, including Category 4 hurricanes in 2011 and 2012 in the Atlantic, the cyclone in Bangladesh in 2013, and the Category 5 hurricane that hit parts of the Caribbean and the southeastern United States earlier this year. By 2050, we expect to see the frequency of mega disasters rise, though the science is still unclear about whether just the severity or both the severity and frequency of mega-disaster will rise. Historical data suggests both will occur.

Disasters pose conflict risks for three principal reasons. The first is the forced and sudden migration of people, and usually in circumstances that entail public health risks. Second is that weak governance structures or existing conflicts can be exacerbated by the challenges of responding to a disaster. And finally, most disasters, especially mega-disasters, require military assets for response, which may mean a diversion away from conflict situations.

EMISSIONS REDUCTIONS

Finally, just a few quick words about the rise of carbon dioxide emissions and the risk of conflict. Our projections suggest that we will be able to meet the challenge of global climate change over the next 35 years, but most likely with some difficulty. As Dr. Gullede showed us, however, the world after 2050 will be far more challenging.

In recent years, we have seen some tension between nations over accountability for global climate change and who is responsible for cutting emissions and bearing the costs. If we do not succeed in reducing emissions, that tension is likely to increase as the climate effects increase.

Allow me to close with one more slide [SHOW SLIDE 5]. What that second red line tells you is where we will be in 2100, if we continue on our current emissions trajectory. As Dr. Gullede noted, that would be a 5.7 degree Celsius temperature rise.

At that level of increase, this slide tells us we can expect to see by the end of the century falling crop yields all over the world, major coastal cities all over the world threatened by sea level rise, rising numbers of species extinction, sharply rising intensity of storms, floods, forest fires, flooding and heat waves. Finally, the risk that there will be dangerous feedbacks and large-scale abrupt changes to the climate increases dramatically.

We would be seeing temperatures and conditions not seen on this planet for 50 million years. Given that human beings have only been around for about 1 million years, and human

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civilization has thrived in the last 10,000 years, which have seen a relatively stable climate, we have no idea what to expect.

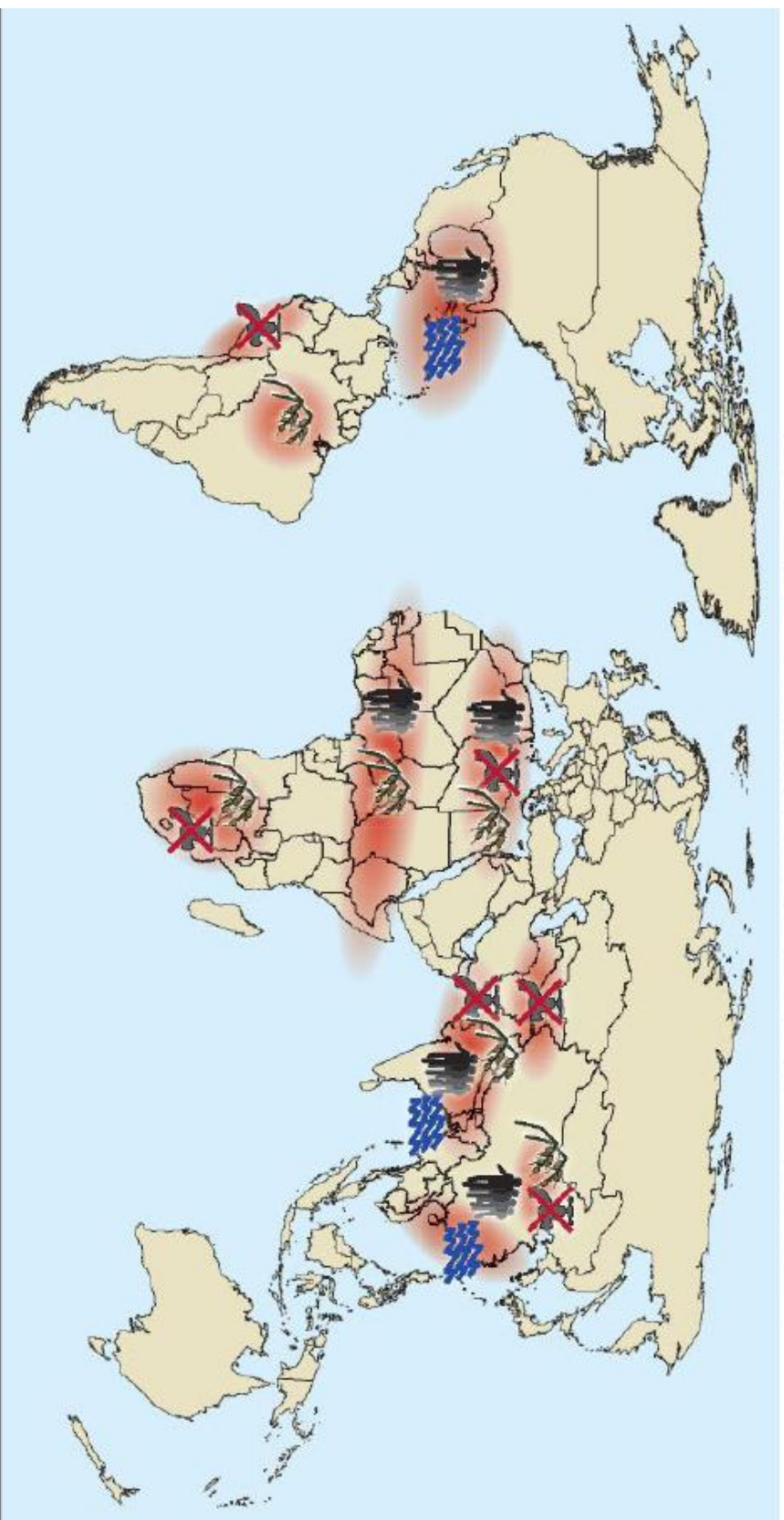
Assessing the threat of conflict in such circumstances seems beside the point, except to say that life as we know it is likely to be over.

Assistant Secretary General THREAT ASSESSMENT



Clout & Climate Change

CONFLICT & CLIMATE HOTSPOTS 2015-2050



Conflict constellations in selected hotspots



Climate-induced degradation of freshwater resources



Climate-induced decline in food production



Climate-induced increase in storm and flood disasters



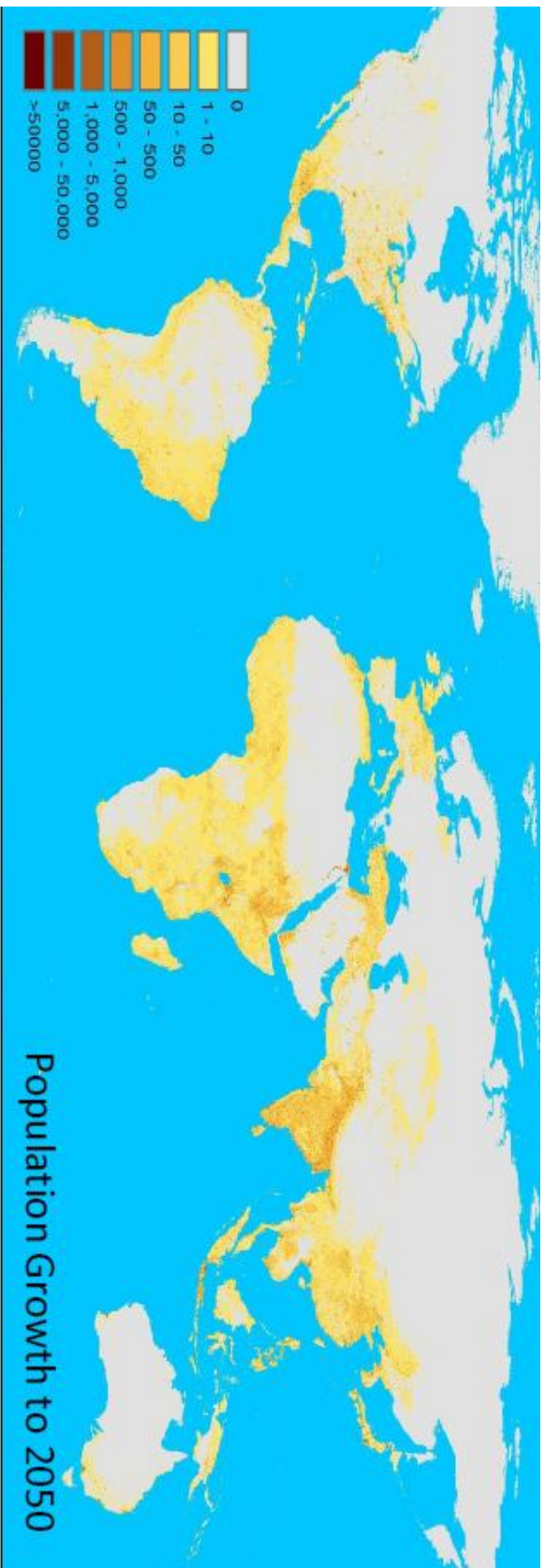
Environmentally-induced migration



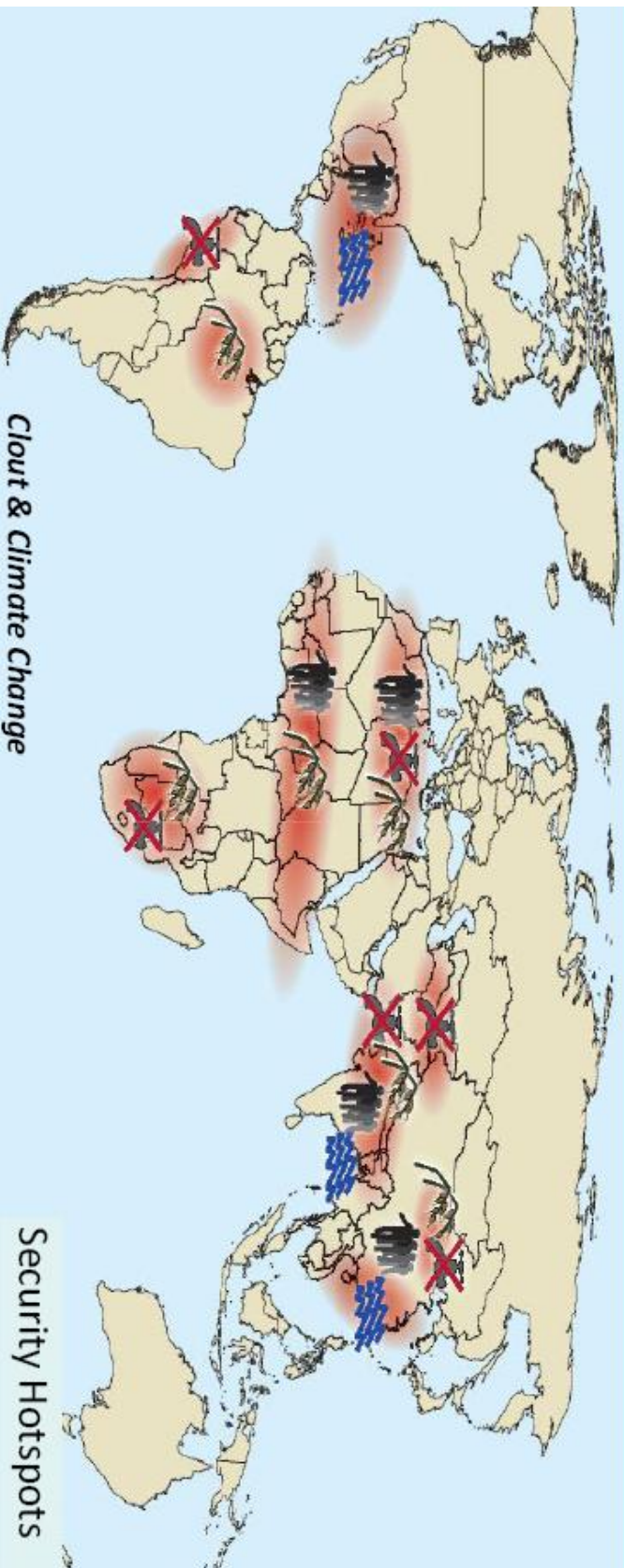
Hotspot

Source: WBGU

Clout & Climate Change



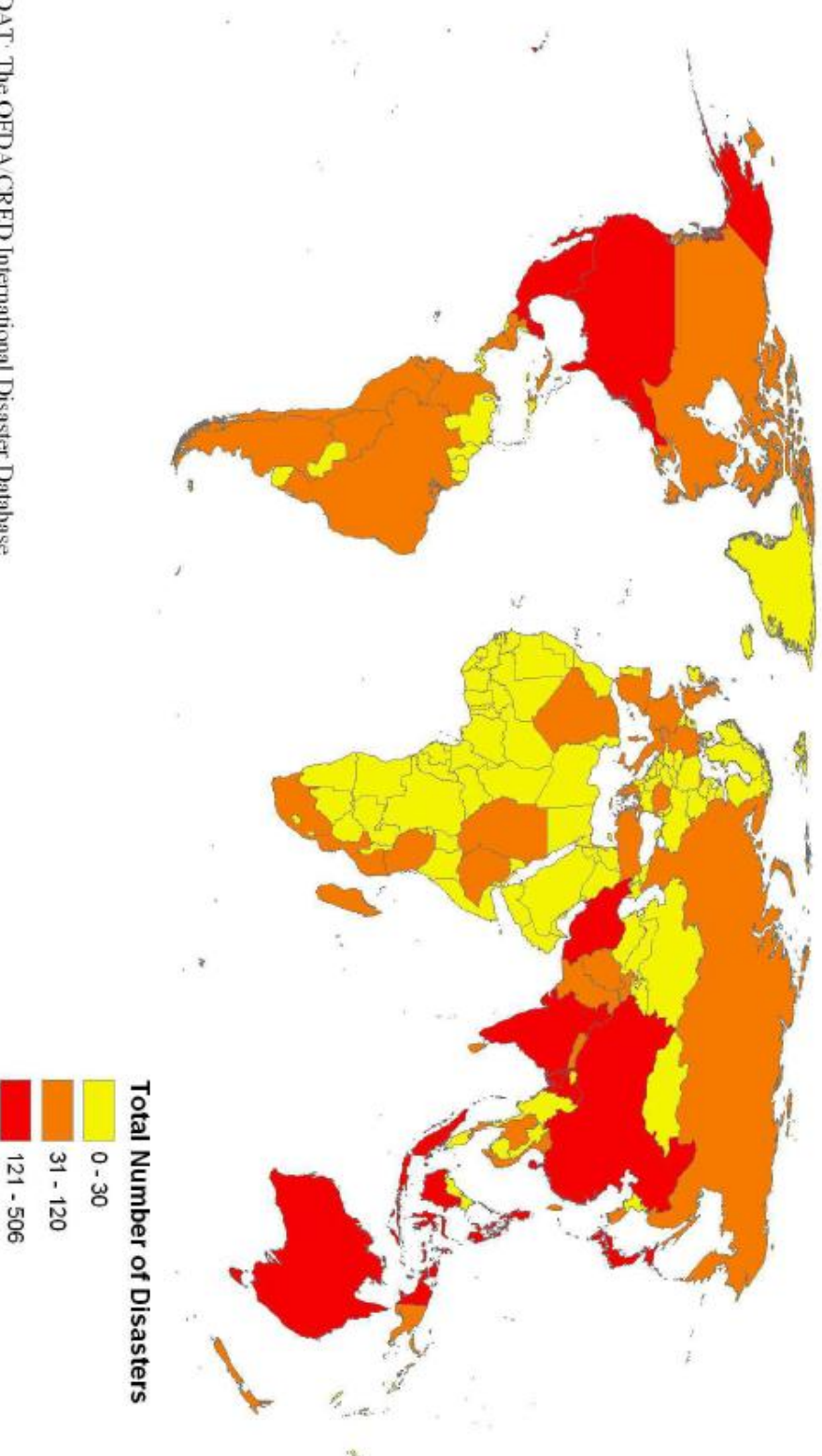
Population Growth to 2050



Clout & Climate Change

Security Hotspots

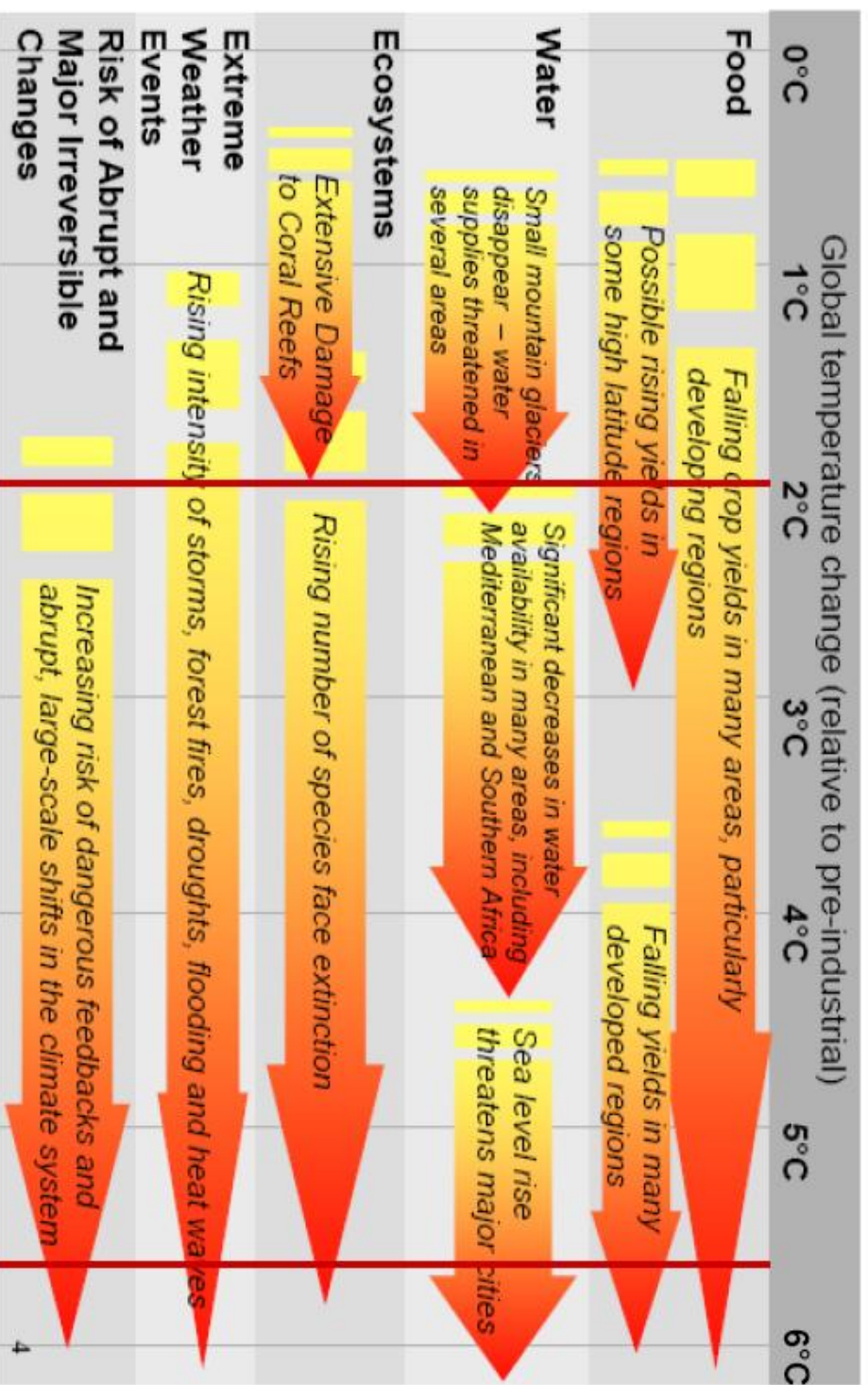
DISASTER PREVALENCE BY COUNTRY



DAT - The OFDA/CRED International Disaster Database
em-dat.net - Université Catholique de Louvain - Brussels - Belgium

Clout & Climate Change

Projected Impacts of Climate Change



Adapted from IPCC

Agreement

Business As Usual

U.S. Emerges as 'Kinder, Gentler' Superpower

BY DAVID CAPEZZA

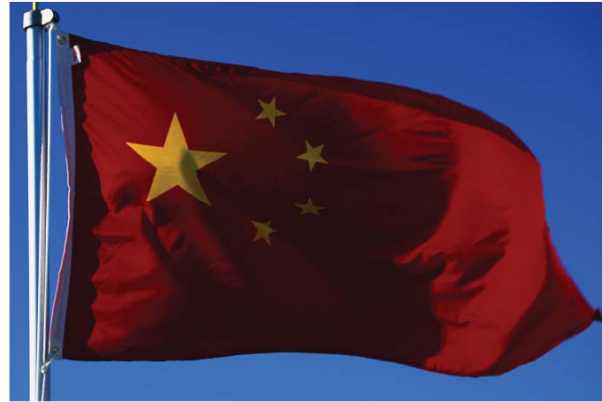
Yesterday the United States met with representatives from China, the EU, and India in hopes of producing a framework agreement to address global climate change. In what was hailed as a marked shift in its position, the U.S. delegation offered guiding principles that it claimed represented a "new America."

Among several specific proposals over which the American government is now willing to negotiate, the U.S. delegation suggested that it would convene an international conference to share best practices when dealing with the challenges of climate change effects, such as migration, resource scarcity, and disaster relief. The United States also expressed concern about climate and economic migrants (CEM) and stated a desire to take a global leadership role in addressing this issue. Interestingly, the U.S. delegation was open to forming a definition of environmental refugees.

During the course of yesterday's deliberations, the U.S. delegation also made clear its stance that it is essential for developing nations to pledge their support for mandatory cuts in greenhouse gas emissions. On the challenge of its own emissions, the U.S. proposed a 30 percent reduction from 2005 levels by 2025.

In a move that took many other nations by surprise, the United States offered its support in principle for international institutions and multilateral and regional agreements to solve some of these adaptation and mitigation challenges.

China Gains International Attention with Positions on Resources, Technology Transfers



Representatives from China met with the European Union, India and the United States yesterday in Washington, D.C., to attempt to reach a Framework Agreement on Managing Long-Term Climate Change; Talks Continue Today

BY CLIMATE GAME TIMES STAFF

Monday marked the beginning of preparations for next month's Climate Change Review Conference, an attempt by China, India, the United States, and the European Union to address the long-term effects of global climate change.

After holding predominantly internal meetings throughout the morning, the world's four biggest economies—and emitters of greenhouse gases—gathered for an afternoon plenary session to present their findings.

Many observers on hand were especially eager to hear China's approach to the challenges ahead. China put forth a set of principles yesterday that will guide today's continued negotiations on migration, disaster relief, resource scarcity, and emissions reductions, and will set the stage for high-level discussions among delegation leaders. These principles included statements that China's efforts in these areas will be consistent with

its development objectives, and that historical contributions to greenhouse gas emissions be considered in setting targets and dividing the responsibility for global mitigation.

Adaptation was a critical area for the China delegation, which emphasized that it would be willing to support the creation of new food and water sharing and cooperation arrangements and agencies. Though no other nations presented this option, China's negotiators were explicit that they would recommend both an increase in North-South assistance and South-South cooperation.

In perhaps the most important detail to emerge from yesterday's negotiations, the China team will continue to lead in pushing for technology transfers for mitigation and adaptation measures, particularly in emissions reductions, in land use and forestry, and in agriculture so as to encourage a new "green revolution."

INDIA RECOMMITTS TO 80 PERCENT EMISSIONS REDUCTIONS

New Commitment
May Shape
Future Deliberations

BY THEO MILONOPOULOS

In a bold announcement during a United Nations meeting on climate change, India pledged Monday to recommit itself to achieving 80 percent reductions in carbon emissions by 2050, provided equitable distribution of the burdens for meeting these cuts and that developed countries assume responsibility for their historic greenhouse gas emissions.

The commitment was also contingent on calibrating these emission targets on a per capita basis, which India argued would be more equitable than a system based on total emissions into the atmosphere.

"Our position is that any agreement should reflect equitable burden-sharing," said one representative of the India delegation, who spoke on condition of anonymity. "The social and economic benefits of rapid growth should not be denied to any country or sectors of society. Any agreement should not infringe on these rights."

India's new proposal came through a meeting convened by UN Secretary General John Podesta to formulate a framework agreement that would help meet the growing security and environmental challenges posed by climate change. By convening the world's largest carbon emitters in a single strategy session, Podesta said he hopes these countries can come to an agreement in mitigating issues like disaster relief, migration flows, and resource scarcity that evidence suggests will only be exacerbated by continued climate change by 2050.

"We have to manage the unavoidable by adapting, and we need to avoid the unmanageable in 2100," Assistant Secretary General Michèle Flournoy said. "We have to start today."

The Indian emissions proposal also commits the country to reducing emissions by 30 percent by 2025, a major development from Monday's deliberations. Although the 80 percent emissions reductions by 2050 is consistent with India's obligations under the 2012 Copenhagen Agreement, the intermediate 30 percent reduction would be a more robust interim target.

The Indian delegation also proposed establishing regional, on-the-ground migration centers that could provide information on movement of peoples across borders; and called for the creation of a multilateral disaster relief mandate for the United Nations along the lines of current peacekeeping operations and said that India would be willing to play an important role in such operations.

Throughout the day, negotiators from India met with representatives of the United States, China, and a delegation representing developing nations. Some observers suggested that India may position itself as a leader of developing nations and aim to safeguard the interests of such countries in future negotiations.

European Union Focuses Climate Efforts on Refugees, Disasters

BY NICOLE DEMARCO

At the end of the first day of intense negotiations, European Union representatives put forth several key provisions to address the causes and effects of global climate change. Member States demonstrated their ongoing support to international law and humanitarian assistance in a series of proposals that included adaptation to the recent dramatic increases in the world migrant population as well as global funding mechanisms to assist those hardest-hit by climate change.

One example of the EU's leadership in the humanitarian response to climate change-related crises is in the area of refugee law. In support of Secretary General John Podesta's proposal in Washington yesterday to confer legal status on so-called environmental refugees, EU Member States offered delegates from In-



dia, China, and the United States notional language for a definition as "one who is displaced from his or her homeland and cannot return due to a) short term issues (natural disaster, etc.) or b) long term effects of climate change (deforestation, water shortages)."

The European assembly also proposed the creation of a United Nations Disaster Relief Force, nicknamed 'green helmets' in recognition of the UN's success with blue helmeted peacekeeping personnel. In order to realize such an objective, the EU has pledged a significant increase of investment in their disaster response capacity. Initial talks focused on empowering

preexisting UN infrastructure in addition to international NGOs to better prepare for the host of predicted disasters in the near term.

As the only party present at the negotiating table with the realistic ability to meet their Copenhagen commitment, the EU team focused on how to best engage the other delegations on global emissions reductions. Essential to this goal, team members proposed an international mandate for price signals, such as nationally implemented taxes on CO₂ emissions or a cap and trade system. EU delegates indicated that price signals would be flexible to the economic capacity of individual countries, but should be implemented as a necessary step for all countries in reaching worldwide emission reductions goals.

It remains to be seen how participating countries will engage in European proposals over the next two days of international negotiations.

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Secretary General John Podesta
Day 2 Remarks: Summit on Managing Long-Term Climate Change
Washington, D.C., October, 2015

Welcome back to our second day of discussions – I am greatly encouraged by our work yesterday and believe we will successfully move together today toward a Framework Agreement.

- At the end of the day yesterday, I identified areas of particular concern I found in your discussions—I recommend that those areas be the focus of your negotiations today.
- We are also handing out all of your proposals from yesterday; you are welcome to consider proposals other than those I specify.
- But the areas I’ve identified are the ones I believe are crucial to reaching a successful Framework Agreement.
- I recommend that we break into four groups for further discussion and elaboration. The issue teams looking at my recommendations will be:
 - Country Team Leaders;
 - Migration;
 - Resource scarcity and disaster relief (we felt there was sufficient overlap and commonality to warrant combining these two);
 - And emissions reductions.
- Before I present my recommendations, I’d like you to look at the Issue Team Assignments we’ve distributed – please take 5 minutes to discuss your issue team assignments with your delegation and make sure that you are in agreement, and notify us of any changes.
- Now, let me present my proposal for what should be addressed in the Framework Agreement.

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COUNTRY TEAM LEADERS

- 1) Based on yesterday's discussion, you have a great deal of common ground in the principles that should guide a Framework Agreement. First, I ask Country Team leaders to focus on developing shared, overarching principles for the Framework Agreement.
- 2) Of course, your teams will also be looking to your for guidance in their deliberations, and I ask that you keep in mind your charge to lead us all to an agreement.

MIGRATION

- 1) On migration, I suggest you start your negotiations by working to develop a common definition of "climate refugee" or "environmental refugee."
 - The EU proposed: "One who is displaced from his or her homeland and cannot return due to a) short term issues (natural disaster, etc) or b) long term effects of climate change (deforestation, water shortages)."
- 2) I recommend you also discuss how to share and improve information on refugee movements and best practices for dealing with internally displaced people and cross-border migrants.
- 3) Finally, there was a great deal of discussion yesterday about institutional arrangements – I hope you may be able to reach an agreement on whether we need a new international institution, a new mandate for old institutions including the UNHCR, regional organizations, bilateral treaties, or national policies – or perhaps even all of these?

NATURAL RESOURCES/DISASTERS

- 1) In natural resources and disasters, I ask you to attempt to reach an agreement on whether and how to expand development assistance.
- 2) In a related concern, consider focusing on whether and how to promote a new "green revolution" – or the technologies and practices that will allow agricultural productivity to

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continue or increase even in difficult climate conditions. Saltwater and drought resistant seeds, for example. Dr. Pachauri mentioned this yesterday.

- 3) Next, although it was not a major part of your deliberations, I recommend you discuss how to clarify rights and responsibilities on water resources, especially for headwaters and strategic watersheds and for contested territorial rights.
- 4) Finally, I ask that you consider the establishment of a new international disaster relief organization; alternatively, consider whether the mandate of UN Peacekeeping Operations can be expanded or used as a model – some of you called it “Green Helmets.”
 - a. Not to prejudice the outcome of your discussions, but as I indicated yesterday, I am skeptical of this proposal, simply because of how difficult it is to get resources to fully staff peacekeeping operations. I would like you to take that reality into account as you consider this proposal.

EMISSIONS REDUCTIONS

The fourth issue team, emissions reduction, will focus on a difficult area for discussion. The fact is that you all want your economies to grow and your futures to be secure, and that is completely reasonable -- but it will be difficult to achieve both if we continue to fuel our growth the way we are today.

Let's review what happened yesterday:

- 1) India offered a bold proposal: they pledged a 30% CO₂ reduction by 2025 and reaffirmed the 80% reduction by 2050; BUT this was conditional on developed nations reducing their emissions, according to historical and per capita contributions, and on developed nations transferring clean energy and end use technologies that will make India's reductions feasible.
- 2) China wants a road map, the transfer of clean technologies and other assistance, incremental progress, and also asks for conditionality on action from the developed nations.
- 3) The U.S. and EU offered to reduce near-term emissions (in the case of the EU, specifically by putting a global price on carbon), push innovation, provide aid, and

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engage in technology transfers, with some conditions, including enforcement mechanisms.

There is a high degree of overlap here. At first glance, it would appear that India and China want what the EU and United States have to give -- but the difficulty truly is in the details. I would like to invite Drew Jones and his team to present to you their assessment of the potential outcome of your discussions yesterday.

[Jones makes presentation]

So you can see, we have a problem. Ideally, I'd like to see if you can work together to move toward real emission targets for developed and developing countries alike, perhaps based on a roadmap approach.

But I want to be honest with you, because there is so much at stake. The bottom line is that this isn't really about targets. Sometimes, I suspect the focus on targets has long been a way to avoid the larger question.

We all -- China, India, the United States, and the countries of Europe -- we all need to do everything it is possible to do right now to cut emissions as much as possible. For India and China, I believe that will have to mean using energy far more efficiently than you now do. For the United States, you must bring down per capita energy consumption as well as massive movement to carbon-free sources. For the EU, your gains must be more uniform across your member states.

But even if we do all it is possible to do, it won't be enough. It will not get us an 80 percent reduction by 2050 -- certainly not with our economic growth intact.

We are going to have to find new ways to grow our economies; we are going to have to use energy other than fossil fuels, or find a way to remove the carbon. That will require far more innovation and commercialization of new technologies, far faster than we're achieving today.

In your negotiations, I hope you will be able to have a more honest conversation about what you think you need in order to make these things happen. What do you need from each other and what are you prepared to give? Before you break into our groups, do we have any questions?

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Secretary General John Podesta
Day 3 Remarks: Summit on Managing Long-Term Climate Change
Washington, D.C., October, 2015

Excellencies,

Ladies and gentlemen,

Good morning.

I want to thank you for your hard work, diligence, and good faith in representing your countries' positions.

Also, thank you for your patience over the course of these three days. The truth is, however, that patience is perhaps not what the world needs right now, as the moment of opportunity for finding a way to deal with climate change winds down.

This is a time of urgency, and I believe that was reflected in the energy and intensity of our proceedings here. Again I commend you for your hard work.

You have in your hands now a Draft Framework Agreement on Managing Long-Term Climate Change. It is a rough draft, to be sure; it needs more refining by the parties here today and in our Secretariat to be fit for signature, but it is still an important document.

You agreed to 9 guiding principles; six migration proposals, including a basic recognition of climate refugees; 6 ideas for how to deal with resource scarcity, including agricultural development that could mean crucial resilience for nations around the world. You offered 7 proposals for how to deal with disaster relief, which were general, but an important consensus.

And finally, you offered ideas about how to reduce emissions.

First, all agreed on the need for an aggressive near term global target of 30 percent CO2 reduction relative to 2005 – within the next 10 years.

Second, all parties agreed that binding measurable targets are needed. Moreover, the EU, India and the United States agreed to commit to at least meeting the 30 percent reduction in CO2 by

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2025, and to going further if possible. Meeting this goal will be incredibly challenging and will require unprecedented sharing of technology.

I had hoped that China would also agree to specific targets for 2025 at this conference. That did not happen. However, late yesterday, China agreed to conduct a detailed assessment of its energy sector in the next several months, working closely with the EU and United States regarding technology transfer and other assistance in order to define a specific CO2 reduction target for 2025. I urge all of the parties to move forward expeditiously.

The new 2025 targets provide a very important and challenging goal that, if achieved, will represent a fundamental breakthrough in mitigating climate change. I implore all of the parties to follow through on this pledge with utmost urgency. The future of the planet depends on it.

What we asked you to do, what we asked each other to do these past few days was not easy.

The world faces an unprecedented challenge – we have an obligation to continue to lift people out of poverty all over the world;

And to sustain the standard of living of others.

That requires strong and growing economies, and for more than 150 years, that has meant burning coal, oil, or natural gas.

Shutting down that dirty engine that has powered global growth – but that now fundamentally threatens it – will be very, very hard.

These past few days, we were to focus on how to manage the consequences of global climate change between 2015 and 2050;

And how to prevent more dramatic climate change after 2050.

We did focus more on the latter than on the former, even though all of you are to varying degrees preoccupied with climate crises already. Right now, in 2015, not in some projected future, you are all struggling to control your borders, keep your domestic populations calm, deal with the aftermath of disasters, and manage high food prices and water shortages.

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Now, we will certainly give each delegation a chance to comment on how this Framework Agreement helps us with our immediate need to adapt to a changing climate and also to the long-term emissions reductions needs;

And there are aspects of this agreement that certainly beg for clarification and discussion. I have questions, for example, as to whether you could deliver the support of your domestic populations for some of these proposals.

And that's fine – you will all have a chance to comment in a moment, if you have something to say about this draft.

But before we do that I want to ask you to consider 2 questions which have been on the table but I believe need further discussion. First, I urge you to discuss the creation of a large global fund, perhaps \$100 billion, for the joint development and diffusion of energy supply and end use science and technology, with contributions pegged to each country's share of global CO2 before 2005.

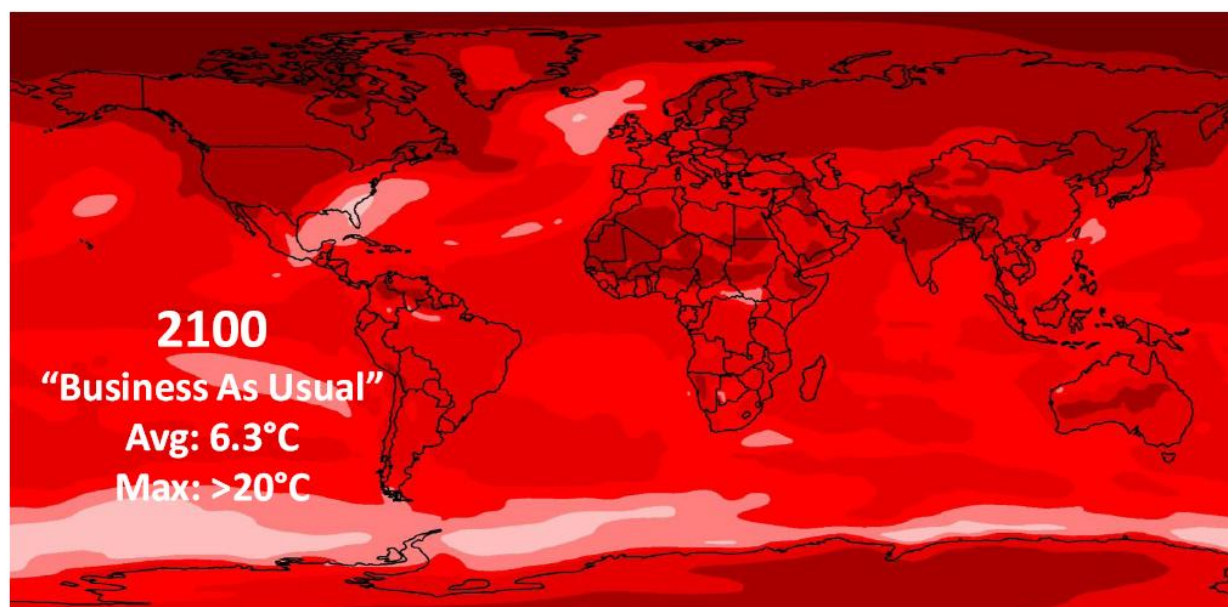
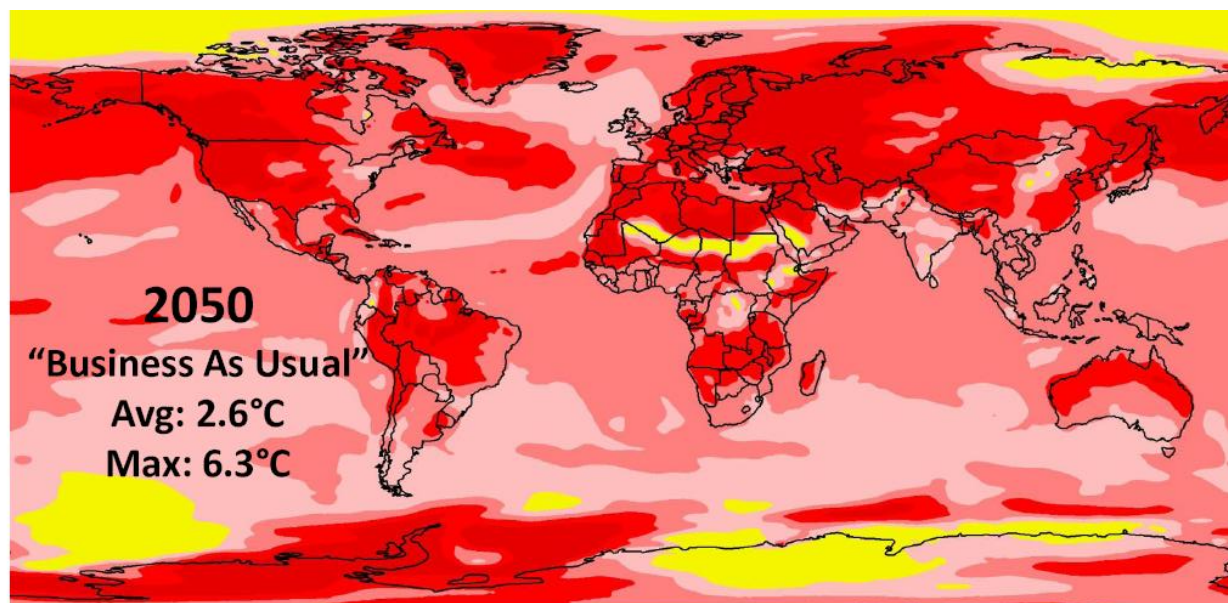
We need to do all we can to reduce emissions today, right now, but we also need to make it possible for us to hit far more ambitious targets. My sense is that we are going to find it very difficult to achieve meaningful targets or even meaningful discussions about targets until we have the means of meeting them while sustaining economic growth.

Second, I hope that you will discuss what specific resources – money, military, or other – your teams are willing to commit for disaster relief. This is an urgent problem: we are seeing a sharp increase in catastrophes, and stagnation in our capacity to respond. Between now and 2050, this is going to cause tremendous human suffering – it already has – and we are simply not doing enough to arm ourselves to meet the threat.

Before we discuss your reactions to the draft agreement and the questions I have put on the table, I want to remind you one last time about that angry red future. *[shows slide with 2100 temperature projections]* This is a future with no hope. The agreement we reached is a good step in the right direction, but it's not yet enough to commit us to a path to a different future.

Ladies and gentlemen, the clock has been ticking, and our time for action is almost up.

Would any of the delegates care to comment?





Framework Agreement on Managing Long-Term Climate Change

Participants in this Framework Agreement find that the magnitude of each country's contribution to global cleanup should be related to historic emissions, current emissions, projected future emissions, per capita emissions, natural-resource base, and structural factors in the economy. Further, participants:

Affirm that climate and energy policy are a global and national priority;

Agree to take every possible action to achieve global climate targets, including an 80 percent reduction in carbon dioxide emissions by 2050;

Commit to adopting best practices to reducing carbon dioxide emissions while maintaining development, pursuing sustainable lifestyles, and advancing per capita income;

Assert the importance of developing international, cooperative means to address and adapt to the effects of global climate change, including and especially within countries that are not participants in this agreement;

Reaffirm the importance of the role of the United Nations, which should support a collaborative effort to develop national, regional, and global capacities to prepare for and respond to consequences of climate change (disasters, mass migrations, and resource scarcity);

Call for implementation of a climate change framework agreement with commitments that are measurable, reportable and verifiable and that include reductions in greenhouse gas emissions, without hindering the advancement of per capita income of developing and developed countries;

Underline the importance of global solidarity and a commercial basis for broad technology, financial, and institutional mechanisms for the transfer, sharing, and co-development of advanced technology and research cooperation for the purposes of emissions reductions and other associated climate change issues;

Affirm that countries with higher per capita income should contribute a larger share of country GDP to the effort of reducing global emissions;

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Establish that targets limiting carbon dioxide may be met through the exchange or trading of emissions limits for appropriate compensation;

Agree to pursue putting a price on carbon as an element of emissions reductions strategies.

Article 1: Migration

In recognition of the common, growing challenge of mass movements of migrants fleeing climate-change related challenges, the participants to this framework have agreed to the following principles, the details of which will be negotiated at an upcoming international conference to be hosted by the United States in January 2016:

1. Distinguish between “climate change-related disaster refugee” (short-term) and “climate change-related migrant” (long-term):
 - a. Status in this case will be a result of climate change-related disasters, rather than natural disasters not related to climate change (such as earthquakes);
 - b. Arrive at a definition of both categories to be agreed upon in collaboration with the United Nations High Commissioner on Refugees and the International Organization for Migration.
2. Prefer non-coercive repatriation of climate change refugees or migrants to country of origin, whenever possible.
3. Deliver assistance to the country of origin for climate migrants or refugees in order of help that country accept its obligation to repatriate such populations.
4. Define a subordinate United Nations entity to serve as point of coordination for data about climate change-related refugee and migrant movements.
 - a. The first duty of this organization would be to coordinate data on the movements of refugees or migrants.
 - b. This organization would lead the exchange of information on refugee and migrant movements among nations.
 - c. The organization would take a lead role in a common, international task force that will help direct the exchange of knowledge, logistical coordination, and international direction on these issues:
 - d. This body will not work to the exclusion of, or with precedence over, regional response groups; rather it will coordinate with such groups.
 - e. Participants agree to fund such an entity and seek global financing mechanisms and avenues, based on calculations that take into account the following: existing emissions; historical emissions; measures developed countries are taking to mitigate their own contributions to climate change; and developmental requirements of participating nations.

Article II: Resource Scarcity

With deep concern for the human suffering that can result from food and water insecurity or scarcity that can result from climate change, the participants in this framework strongly agree to:

1. Expand Development Assistance:
 - a. With a particular commitment to development assistance for mutual capacity building and financial contributions.
2. Facilitate training, education, and transfer of best practices, especially to and among resource-scarce, low-income countries.
3. Develop a sustainable “Green Revolution” or technologies that emphasize total food security for the international community while minimizing foreseeable side effects.
 - a. Support development and deployment of new agricultural or food-related technologies.
 - b. Noting the need to significantly increase on-the-ground capacity in vulnerable countries, the participants agree to provide the human and financial resources to train extension agents.
4. Affirm the significance of rights and responsibilities on natural resources and the importance of protecting fisheries, agroforestry, and biodiversity.
5. Acknowledge that the management of interstate water resources has to be an important component of building climate security. Toward that end, it is necessary to:
 - a. Establish mechanisms for consultations and cooperation on river headwaters and use of international river waters, including the provision for international arbitration by mutual agreement over any dispute;
 - b. Recognize that river basin arrangements can help avert conflicts between riparian neighbors, help strengthen climate change-driven flood management policies and adaptation measures, and promote constructive dialogue and cooperation.

Article III: Disaster Relief

Participants acknowledge that global climate change is producing increased frequency and intensity of disasters and agree to:

1. Commit to forming and funding immediately an international working group to study what international commitments and contributions are needed to build an international capacity for disaster response, possibly to include an International Disaster Relief Organization, and to provide recommendations for financing and equipping such a capacity.
 - a. The working group should consider the possibility of forming a United Nations “green helmets” capability, which could potentially require national contributions of military personnel and other resources.

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2. Emphasize the need for improved and increased response capacity.
3. Acknowledge the universal requirement for military support to disaster relief, which provides a source of disciplined manpower, well defined command and control, superior communications, heavy equipment (i.e. bulldozers, bridge building etc.), lift (especially ships and helicopters).
 - a. Accept the importance of United States' contributions of prepositioned equipment.
4. Recognize the importance of national sovereignty and respecting the rights of local populations in military-to-military relations.
5. Improve information sharing on disasters and disaster relief.
 - a. The standing database of requirements and resources needs to be expanded and supplemented.
 - b. Early warning and disaster response need to be improved.
6. Improve coordination with NGOs.
7. Take preventative measures to preclude weather events from wreaking disastrous consequences on human societies, wherever possible.
8. Take sustainability concerns into account in preparations in advance of disasters and in rebuilding following disasters.

Article IV: Emissions Reductions

With full awareness that global carbon dioxide emissions have not peaked in 2015 and are unlikely to decline at the necessary rate absent concerted and strong action from the world's largest greenhouse gas emitting economies, participants:

1. Reaffirm the importance of global reductions in CO₂ to 80 percent of 2005 levels by 2050, as called for in the Copenhagen Agreement, and confirm their commitments to meet this goal.
2. Recognize the IPCC's finding that a 30 percent reduction in global carbon dioxide emissions by 2025 will be necessary; the participants commit to working with each other and with countries around the world to define specific goals to achieve such reductions;
3. The parties agree that all nations should adopt measurable, enforceable and verifiable targets for emissions reductions, taking into account historic emissions, projected future emissions, the natural resource base, and structural factors in the economy. In this regard:

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- a. The European Union and the United States commit unconditionally to reducing their CO₂ emissions at least to the levels of the global goals expressed in 1 and 2 above.
 - b. India commits to reducing its CO₂ emissions to the levels expressed in 1 and 2 above, conditional on the provision of technological and financial assistance from the developed countries and the issues noted in 3 above.
 - c. China commits within the following year, to define significant and feasible goals for emissions reduction, conditional on the provision of technological and financial assistance from the developed countries. The Chinese delegation states that reductions should be measured relative to projected carbon emissions, taking into account the Copenhagen Agreement.
 - d. The European Union and the US agree for the five year period of 2016-2021 that:
 - For each ton of CO₂ abatement undertaken by China or India the European Union and United States will each finance an additional ton of abatement with the abating country.
 - The baselines against which abatement will be measured for the purposes of this agreement will be the lower of the Copenhagen targets and Business As Usual projected levels.
4. The European Union and the United States commit to providing technical and financial assistance to China and India to assist in emissions reduction and in particular for the acceleration of lower- or non-carbon emitting sources of energy.
 - a. Principle on Technology Partnership: In working towards new innovations and the modernization of carbon-intensive energy sources, the European Union and the United States agree to provide financial support to China and India to assist in taking these resources offline. China and India will commit to investing, and at times purchasing and co-developing, new technologies and innovations.
 - b. China particularly seeks assistance with technologies relating to a) carbon capture and sequestration for coal-based power; b) so-called “third generation” nuclear power plants; and c) advanced wind-based energy generation.
 - c. The European Union and the United States agree that for the five year period 2016-2021, they will each match Chinese and Indian financing for CO₂ reduction that is above China’s and India’s agreed Copenhagen target of reducing energy intensity by 20 percent by 2020.
5. The parties agree to reach out, under United Nations auspices, to key energy consuming nations (e.g., Brazil, Japan, and Russia) to expand membership of this agreement.
6. The parties refer this agreement to follow-on negotiations by the parties to spell out essential details.