



Regional Gateway for Technology Transfer and Climate Change Action in Latin America and the Caribbean (ROLAC-UNEP)

Characterizing and addressing

SLOW ONSET EVENTS

climate change impacts on

BIODIVERSITY

International conference on Adaptation and Loss and Damage. Bangkok, 30-31 August 2013

Characterizing Slow Onset Events - SOE

Decision 1/CP.16, § 25 (UNFCCC), identifies *Slow Onset Events* to include:

SEA LEVEL RISE

TEMPERATURE INCREASE

OCEAN ACIDIFICATION

GLACIAL RETREAT

SALINIZATION

LAND AND FOREST DEGRADATION

LOSS OF BIODIVERSITY

DESERTIFICATION

- Slow onset events have a **cumulative effect** over the ECOSYSTEM, resulting in DAMAGE and sometimes irreversible LOSS
- Potential **habitat degradation/fragmentation/loss** implies potential **extinction of species**

Based on a review of available studies up to 2006, the IPCC (2007) estimated that, on average, 20 to 30% of the species assessed are likely to be at an increasingly high risk of extinction due to climate change impacts as global mean temperatures exceed 2°C to 3°C relative to pre-industrial levels.

The IPCC (2007) has projected that a temperature increase of 2°C, combined with decreases in soil water, would lead to a replacement of tropical forest by savannas in eastern Amazonia and in the tropical forests of central and southern Mexico.

The World Bank (2010) estimates that almost 30 % of warm-water corals in the Caribbean have disappeared since the beginning of the 1980s, largely as a result of increasingly frequent periods of high SSTs

→ **Changes or loss of an ecosystem result in changes or loss of biodiversity.**

Impacts of SOE on ecosystem/ biodiversity

Impacts on biodiversity

Changes on ecosystem boundaries: SLR, flooding, and T changes will allow some habitats to expand into new areas while others contract → knock-on effect on species survival. Loss of species (endemism), appearance of Invasive Alien Species.

Impacts on ecosystem structure and functions

T triggers reproduction, sex determination (e.g. turtles), global warming is causing shifts in the reproductive cycles and growing seasons of certain species; disruption of plant-insect interactions; etc.

Impacts on ecosystem services

A well-functioning ecosystem ensures services such as watershed regulation; coastal protection (mangrove/coral reef); crop pollination, etc.



Impacts on Ecosystem Resilience

Biodiversity contributes to healthy ecosystems capable of bouncing back alterations. A disturbed/fragmented ecosystem is more vulnerable to climate change

Biodiversity loss, adaptation potential loss

LESS BIODIVERSITY = INCREASED VULNERABILITY

- A larger gene pool would facilitate the emergence of genotypes that are better adapted to changed climatic conditions
- Functionally diverse systems may be better able to adapt to climate change and climate variability than functionally impoverished systems
- Loss of biodiversity increases vulnerability and reduces the adaptation capacity of an ecosystem

REGIONAL VARIABILITY

- The impacts of climate change on biodiversity will vary from region to region: vulnerable ecosystems and species include small populations or those restricted to small areas. Endemism, Islands, Isthmus
- Ecosystems with other biodiversity stressors (e.g.: overexploitation of forests, mangroves, tourism-related pollution in coral reefs: etc.) are more vulnerable to CC impacts.

COULD THE VICIOUS CYCLE BE TURNED INTO A VIRTUOUS ONE?

As biodiversity is lost, options for adaptation are diminished and human society has less coping strategies and becomes more vulnerable

Sound ecosystem management helps preserve its biodiversity, makes it less vulnerable and offers more capacity to adapt: → **ECOSYSTEM BASED ADAPTATION**

What makes SOE difficult to manage?

1- Uncertainty

- About CC impacts, but also about biodiversity existing pools and their potential (large % of undiscovered biodiversity)
- Greater uncertainty associated with the long-term nature of slowly evolving risks compared to rapid onset events

2- Non economic loss (how to measure “existence value”?)

- Ecosystem/biodiversity value is not measurable in economic terms, market mechanisms not applicable. Difficult to measure, difficult to manage
- Biodiversity loss = livelihoods potential untapped. A development opportunity cost

3- Establishment of **baselines** for cumulative effects and of **indicators** for adaptation and vulnerability remains a challenge

4- Limits of Adaptation: ecosystem resilience, **ecological thresholds**, tipping points exist. When is degradation irreversible?

5- “**Attribution**” problem of the global commons enhanced by a time factor. Manifestation of the impact can be “**delayed**” (intra-generational + intergenerational responsibilities).

SOE: increased vulnerability factors

SIDS and developing countries will be the hardest hit due to their higher vulnerability resulting from:

- Ecological factors

- Degrees of adaptability of ecosystems: vulnerable ecosystems (fragile balance in the Tropics), endemic species in small isolated areas, already disturbed ecosystems

- Socio-economic factors

- Societies highly dependent on natural resources. Overexploitation in key economic sectors (e.g.: tourism, fisheries, forestry) put pressure on the ecosystem
- Poverty, more pressing needs and long term investments prioritized (H, E)

- Institutional factors

- Land tenure rights issues, capacity to enforce policies
- Leverage capacity in the UNFCCC negotiations (except AOSIS?)

What solutions do we know?

- 1- **Mitigation** (avoid the problem)- reduce the extent to which climate is altered. *Further ambition is needed (UNEP emissions gap Report)*
- 2- **Adaptation** (reduce the impact)- learn to live with inevitable changes. *Further investments are needed (90% bilateral FSF in LAC went to mitigation, CPI 2011)*
- 3- **Ecosystem restoration/biodiversity conservation** (protected areas as biodiversity reservoirs, ecological corridors). *Synergies with mitigation could be explored, e.g. REDD*
- 4- **Ecosystem based adaptation** integrating biodiversity, livelihoods management and climate change adaptation. Foster ecosystem's resilience and capacity to adapt
- 5- **Sustainable Development planning tools** (conservation agriculture, sustainable forestry, payment for environmental services, etc.). Building resilience needs flexible approaches that can be built into long-term planning processes
- 6- **Institutional responses** international regulations to govern the global commons (acknowledgement, internalization of environmental costs, political will)

Further knowledge to be developed?

SCIENCE

- Biodiversity database repositories, inventories
- Adaptation baselines/ indicators, adaptation MRV should be as stringent as mitigation MRV
- Scientific research: where are ecological thresholds for ecosystem services? How to enhance ecosystem resilience? Can effective ecosystem restoration be achieved?

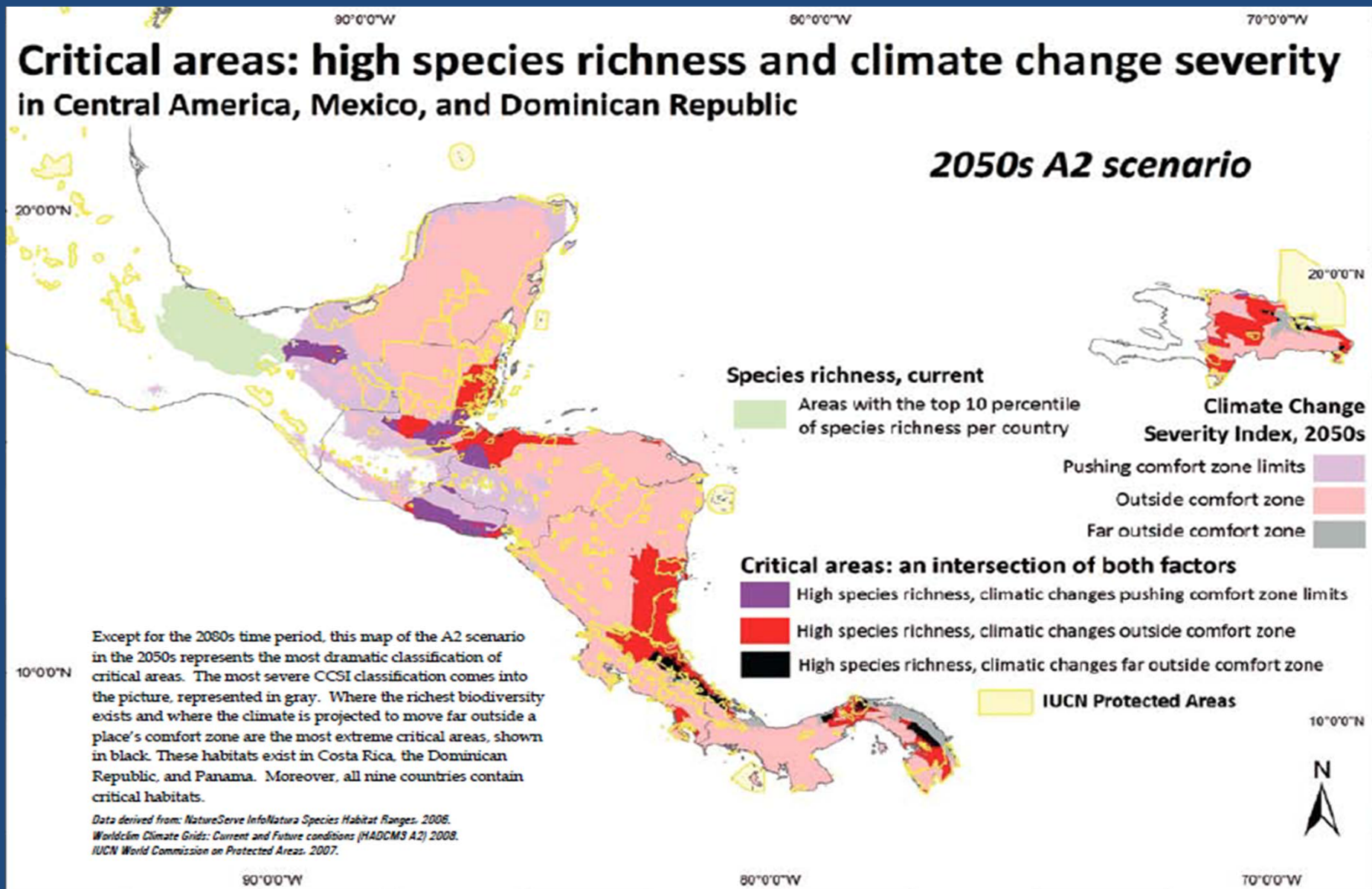
MANAGEMENT

- Large-scale A and M (sea walls, hydropower dams) vs. small-scale approaches (community-based ecosystem management to reduce vulnerability to CC) different knock-on effects on biodiversity
- Measuring value of ecosystem services for a more effective internalization of environmental cost

INSTITUTIONS

- Precautionary principle should be applied/articulated/enforced to avoid non-economic loss + institutional mechanisms set to *compensate* for opportunity cost of irreversible damage
- Synergies between the Climate Change Convention and Convention on Biological Diversity need to be explored

Central America, why de we care?



L&D, including from SOE

- Central America (SICA countries) entered the L&D debate due to the development burden of Extreme Weather Events in the region (ECLAC study). Even if less apparent, SOE also occur and contribute to increase the region's vulnerability
- Central America, an isthmus between 2 oceans constitutes a **biodiversity hotspot**: 0.5% global land area hosts 7% world's terrestrial species
- Hotspots are of particular value due to their high species richness and endemism. Loss and damage of these high-value ecosystems would constitute a key threat to the **planet's biodiversity and genetic capital**
- Of great concern, is the fact that an unknown number of these **threatened organisms have not even been described** or studied
- **L&D hinder development** in the region today (EWE) and development opportunities in the future (SOE)

REGATTA: Vulnerability, Impact and Adaptation Assessments to inform development planning in several countries in Central America (HO, ES, CR, PA, NI)