

# Climate Change: Impacts and Just Transition



UNITED NATIONS



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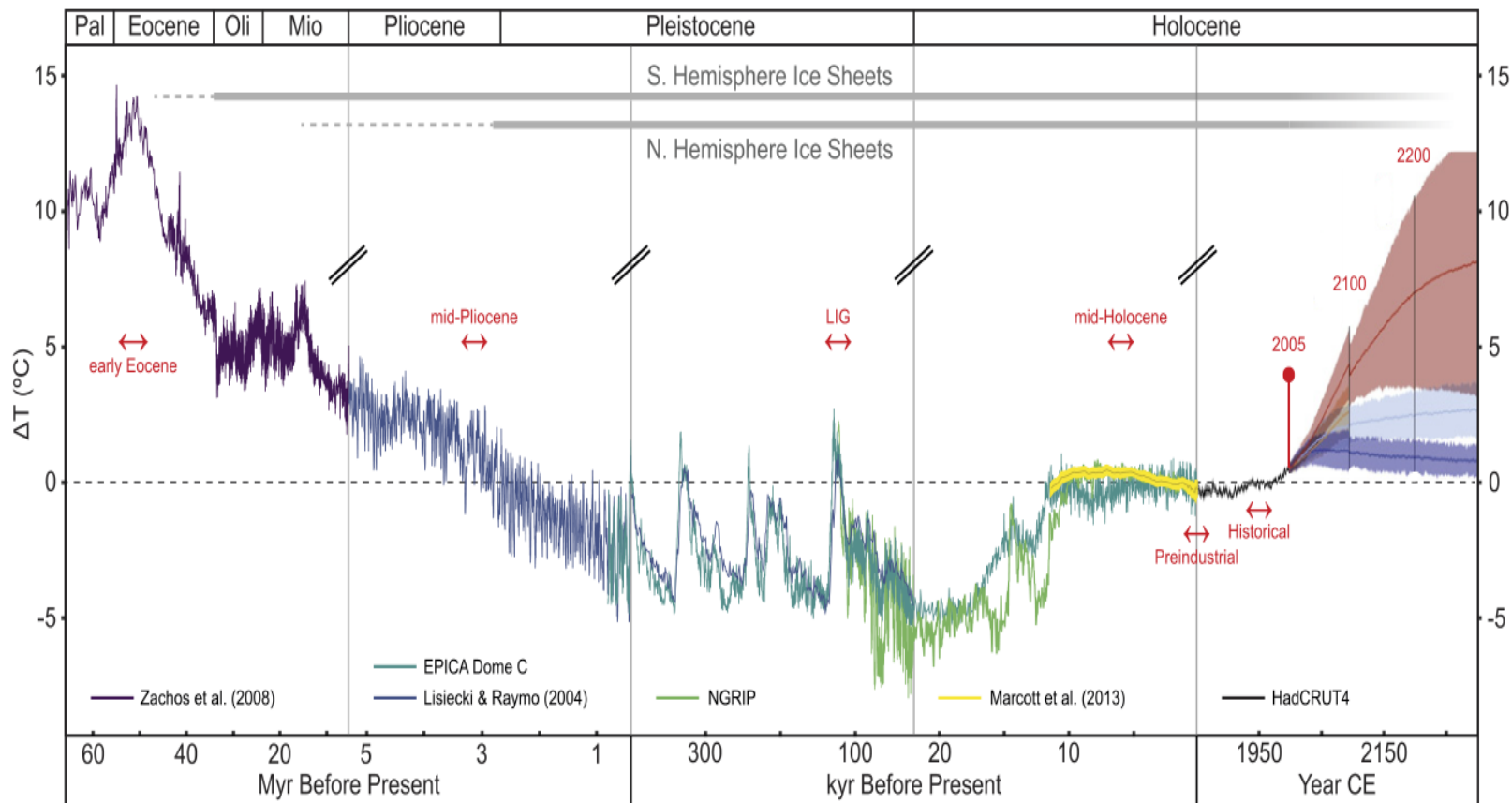
Forum on Just Transition, Green Jobs and Climate Action:  
Exchange of Experiences for Latin America and the Caribbean

Santiago, Chile, 29-30 Oct. 2019

# Will we be able to live on a planet with the conditions it had 65 million years ago?

Global average mean surface temperatures: 65 million years at 2300.

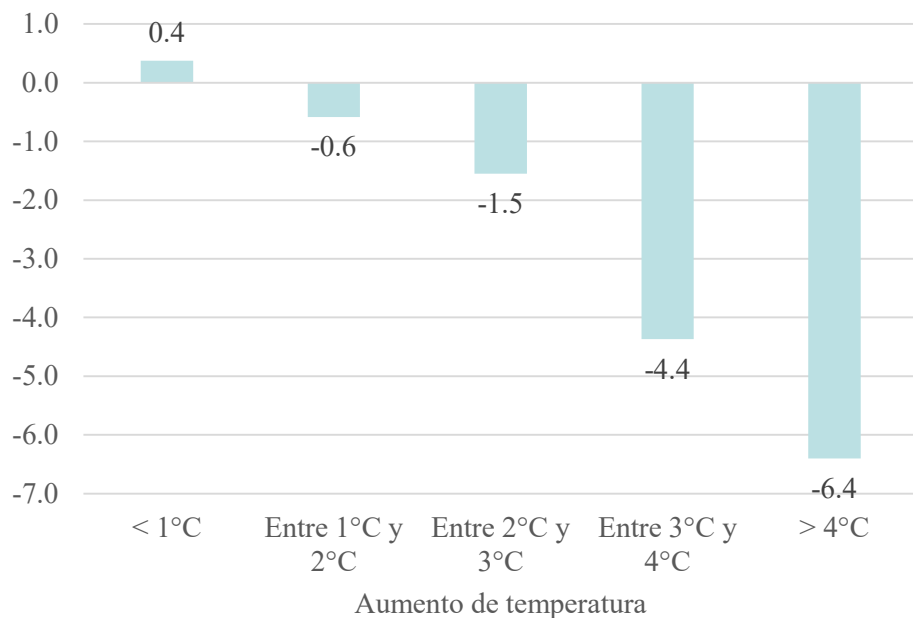
(Temperature anomalies with respect to 1961 - 1990)



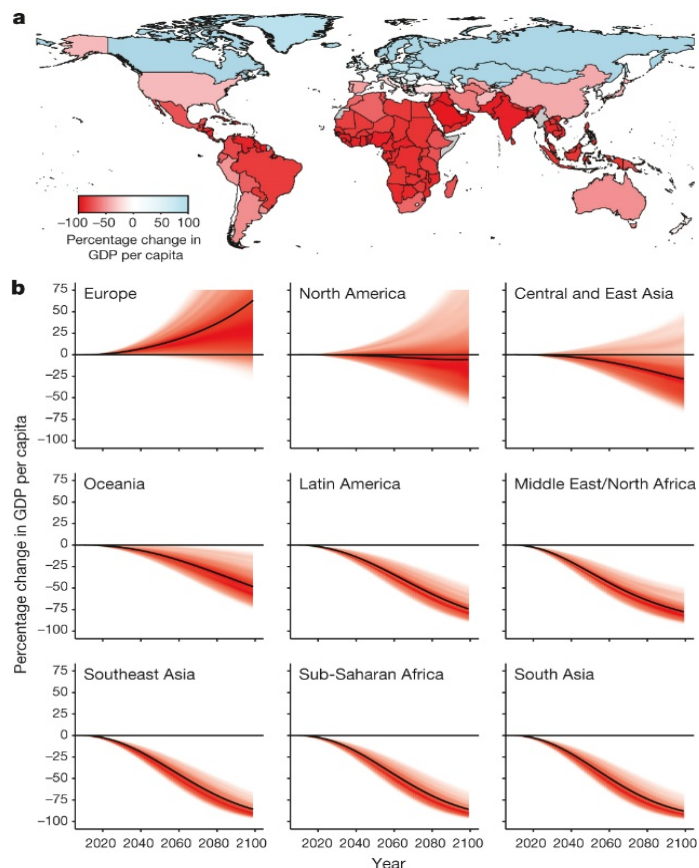
Source: Burke, K. D. et al. (2018), «Pliocene and Eocene provide best analogs for near-future climates», Proceedings of the National Academy of Sciences, vol. 115, No. 52, 26 Dec.

# The economic costs of climate change are increasing and distributed asymmetrically.

Average of estimates of global impacts of climate change (% of GDP)



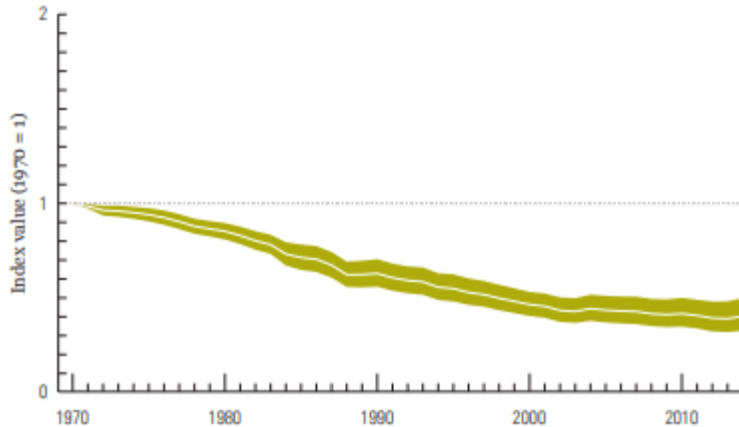
Projection of temperature changes on GDP per capita (% of GDP per capita without climate change)



**Source:** Own elaboration on the basis of Nodhaus, W. & Moffat A. (2017), A Survey of Global Impacts of Climate Change: Replication, Survey Methods, and a Statistical Analysis

# Biodiversity loss reflects overexploitation and inequality

**Global Living Planet Index - Global Change on Biodiversity (1970-2014)**



**Main causes of loss of forest cover**

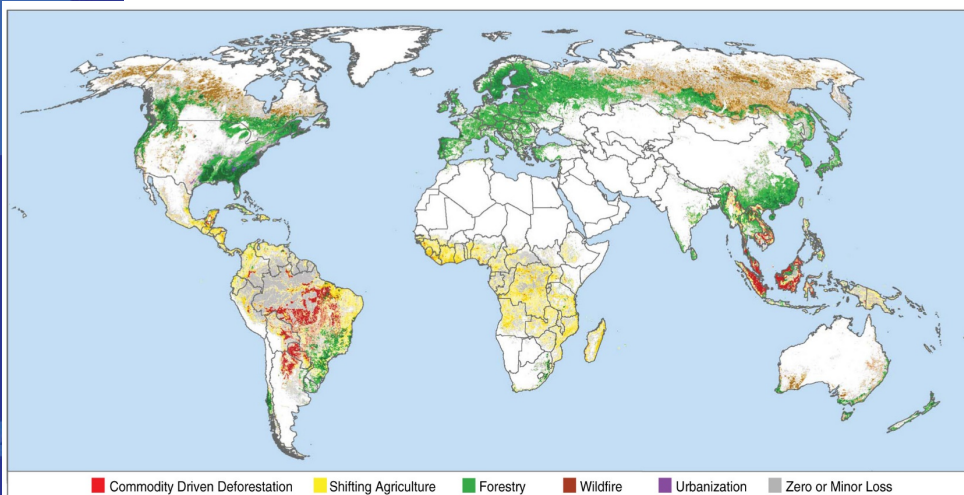
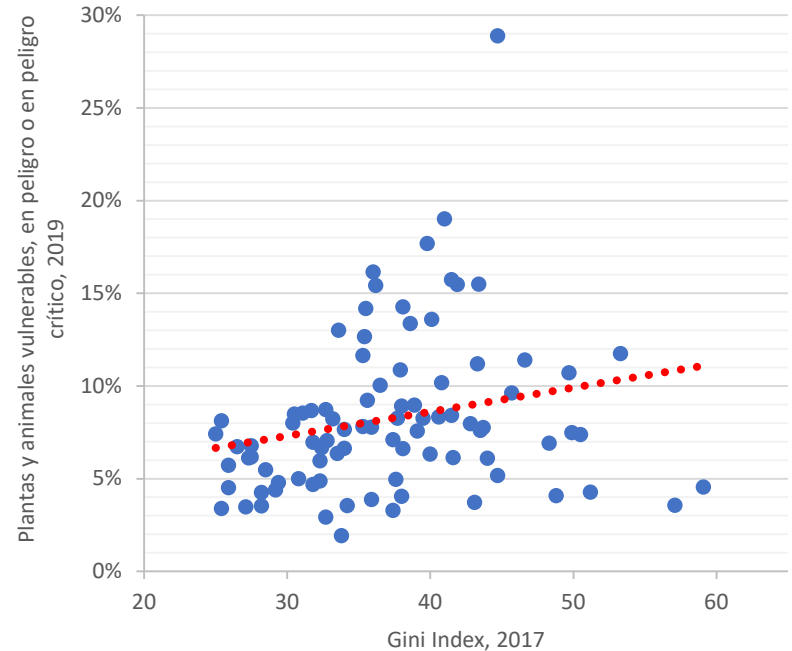


Fig. 2. Primary drivers of forest cover loss for the period 2001 to 2015. Darker color intensity indicates greater total quantity of forest cover loss.

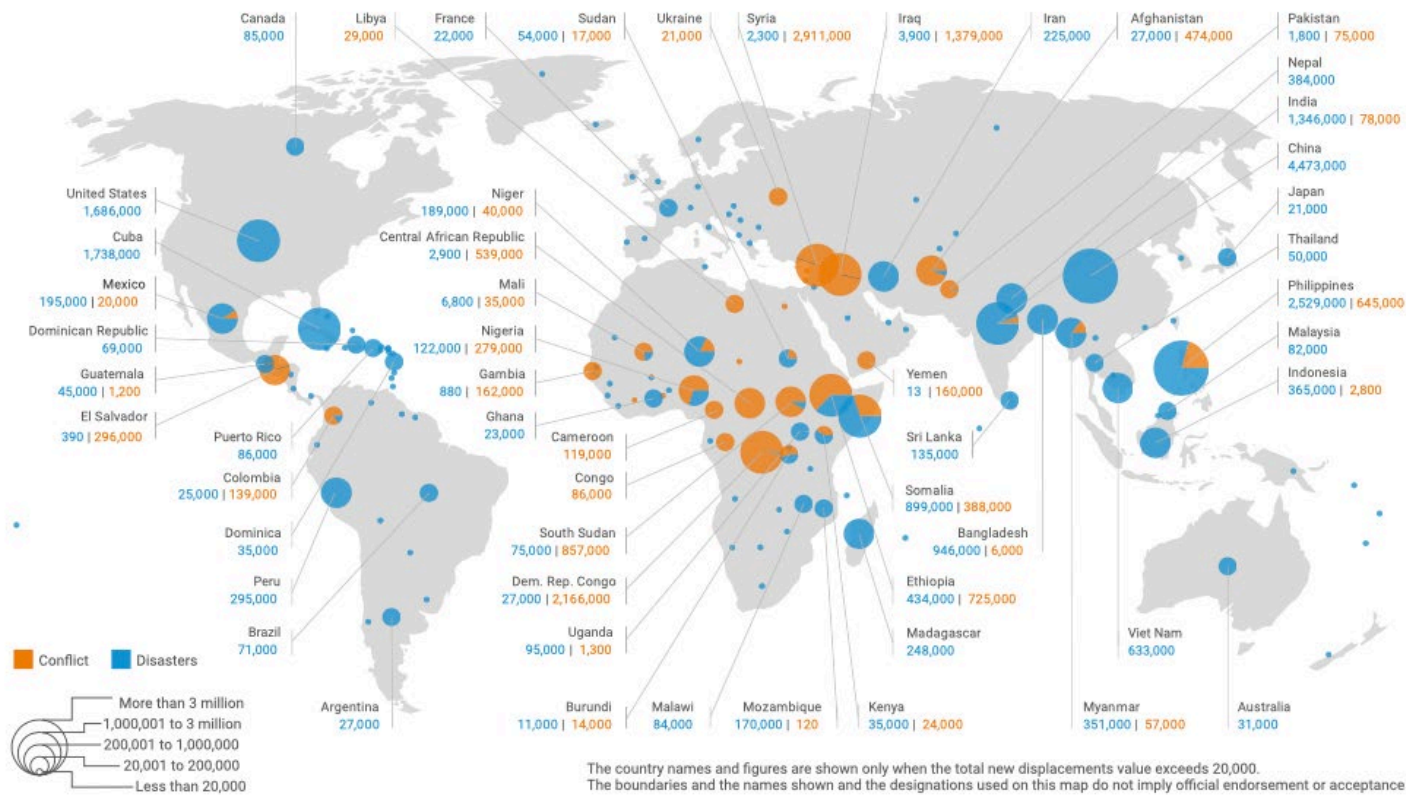
**Correlation between income inequality and biodiversity loss**



Source: ECLAC on the basis of World Bank World Development Indicators and IUCN Red List

# “Environmental” Migrants show increased climate injustice

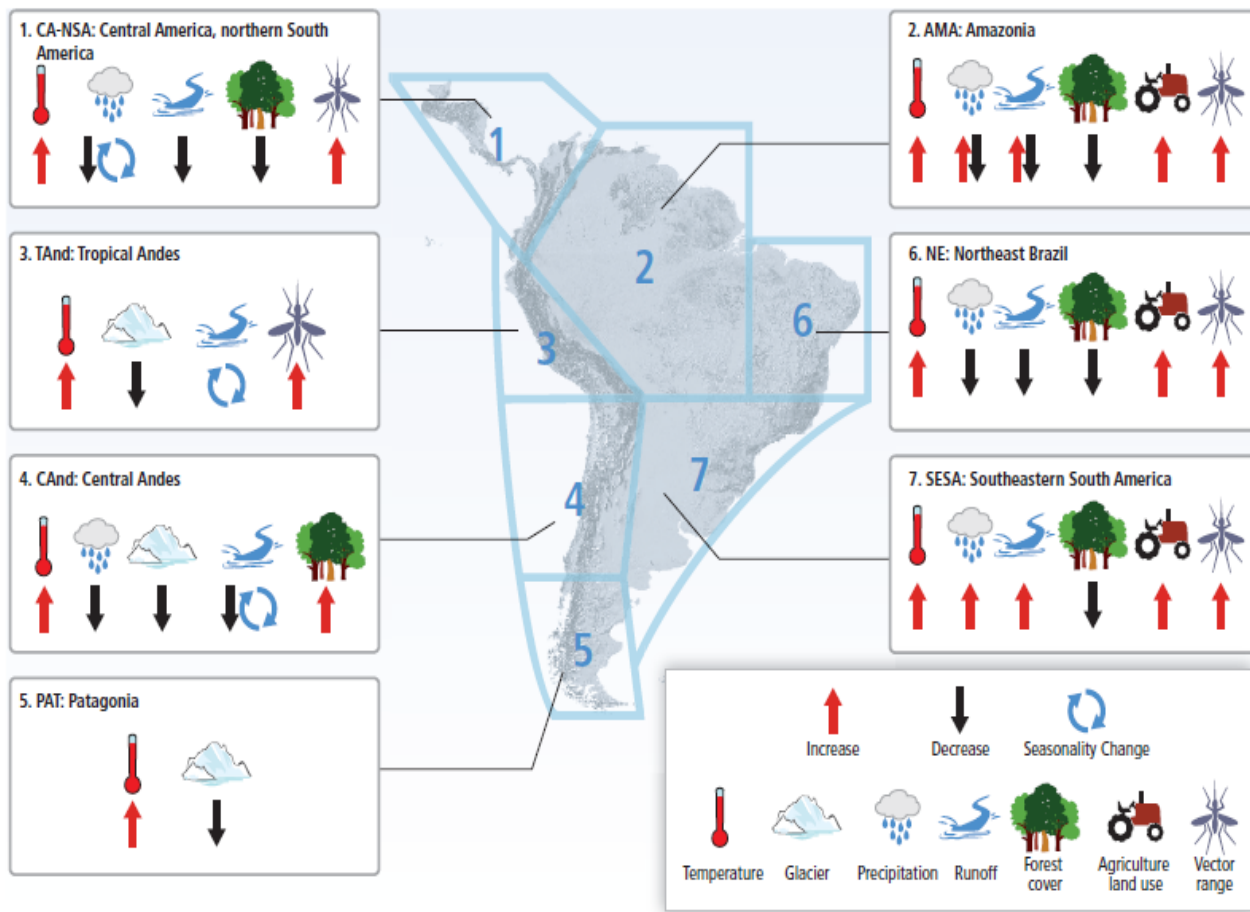
## New internal displacements caused by conflicts and natural disasters, 2017



Source: Internal Displacement Monitoring Centre (IDMC), “Global Report on Internal Displacement 2018” (<http://www.internal-displacement.org/global-report/grid2018/>)

# Latin America and the Caribbean: high vulnerability

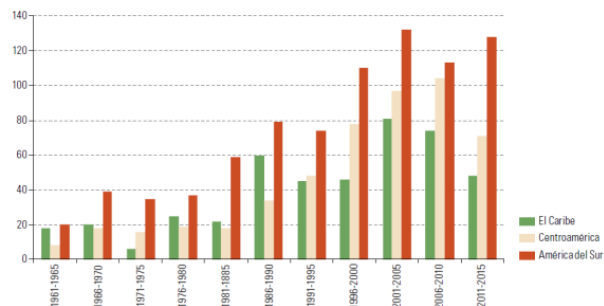
## Summary of observed changes related to climatic factors in representative regions of Latin America and the Caribbean



# Selected impacts of climate change

**En la región, el creciente número de eventos extremos relacionados con el cambio climático exige aplicar políticas estructurales de adaptación**

AMÉRICA LATINA Y EL CARIBE: EVENTOS EXTREMOS RELACIONADOS CON EL CAMBIO CLIMÁTICO, 1961-2015  
(En número de eventos)

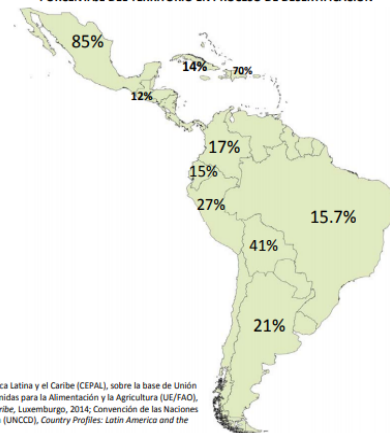


Fuente: Comisión Económica para América Latina y el Caribe (CEPAL), sobre la base de Centro de Investigación sobre la Epidemiología de los Desastres (CRED), Base de Datos Internacional sobre Desastres (EM-DAT) [en línea] <http://www.emdat.be/database>.

Nota: Se incluyen las sequías, las temperaturas extremas, las inundaciones, los deslizamientos, las tormentas y los incendios.

**En la región, aproximadamente el 60% de las tierras áridas y más de 300 millones de hectáreas de las tierras agrícolas se encuentran desertificadas**

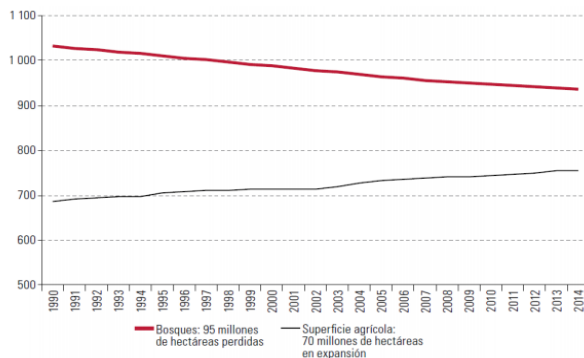
PORCENTAJE DEL TERRITORIO EN PROCESO DE DESERTIFICACIÓN



Fuente: Comisión Económica para América Latina y el Caribe (CEPAL), sobre la base de Unión Europea/Organización de las Naciones Unidas para la Alimentación y la Agricultura (UE/FAO), Atlas de Suelos de América Latina y el Caribe, Luxemburgo, 2014; Convención de las Naciones Unidas de Lucha contra la Desertificación (UNCCD), Country Profiles: Latin America and the Caribbean Region, Bonn, 2015.

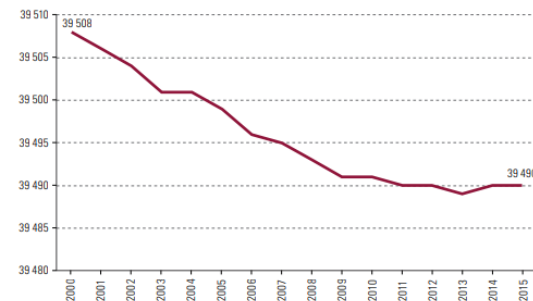
**América Latina y el Caribe ha perdido el 9,4% de su superficie de bosques**

AMÉRICA LATINA Y EL CARIBE: SUPERFICIE PERDIDA DE LOS BOSQUES Y EXPANSIÓN DEL ÁREA AGROPECUARIA, 1990-2014  
(En millones de hectáreas)



**Superficie cubierta por nieves permanentes y glaciares se ha reducido**

Gráfico V.18  
América Latina y el Caribe: superficie cubierta por nieves permanentes y glaciares, 2000-2015  
(En km<sup>2</sup>)



Fuente: Comisión Económica para América Latina y el Caribe (CEPAL), Anuario Estadístico de América Latina y el Caribe, 2018 (LC/PUB.2019/2-P), Santiago, 2019.

# Impacts of climate change on the coasts of Latin America and the Caribbean

## A. Impactos en la zona costera



## B. Dinámica costera



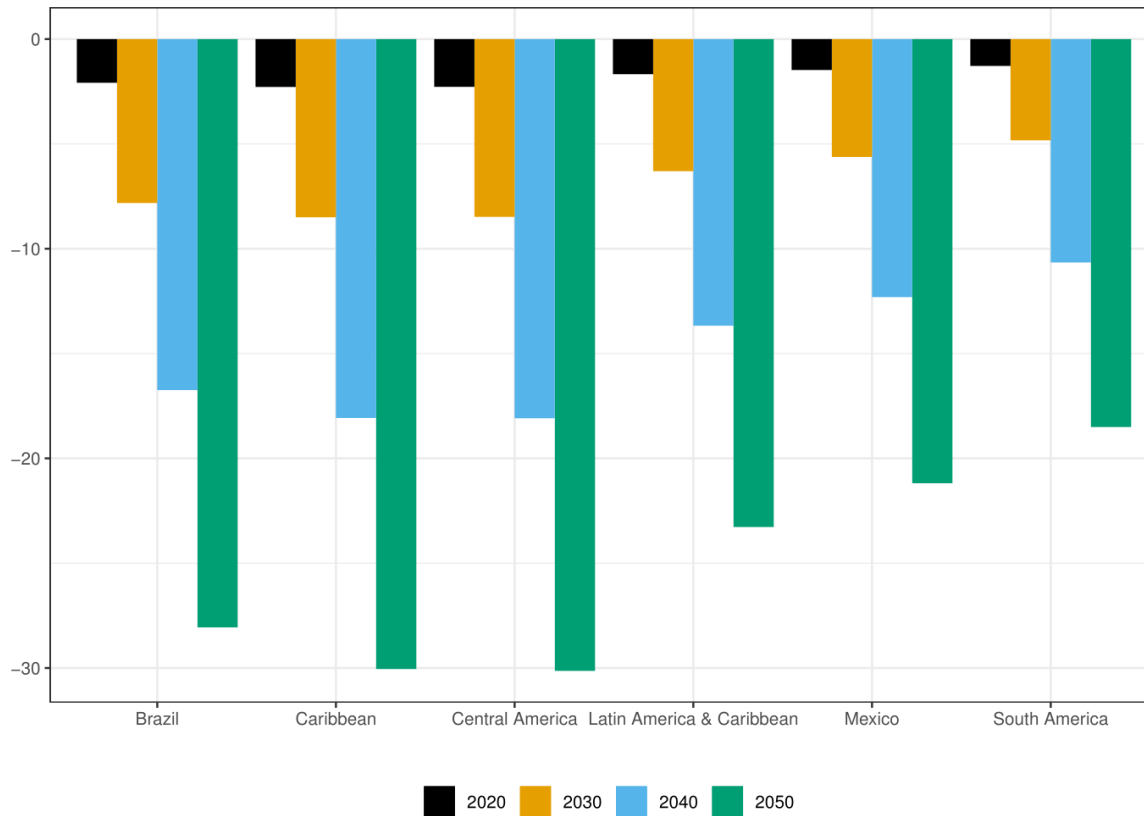
- INUNDACIONES**
- Zonas urbanas afectadas por inundaciones
  - Afectación de infraestructuras por debajo de 1 m
  - >40% de cambio durante los últimos 60 años debido al aumento total del nivel del mar en 100 años (excluye huracanes)
  - >6 mm/año en inundaciones costeras extremas
- EROSIÓN DE LAS PLAYAS**
- Cambios de la tasa potencial de transporte de sedimentos
  - Erosión debido a la rotación de las playas
- PUERTOS MARÍTIMOS**
- Posible afectación de la navegación en puertos marítimos debido al aumento de la altura de las olas
  - Reducción de la fiabilidad de las estructuras costeras

- >0,3 m/año en Hs (altura ola significante) 12
- <0,1 mm/año en la altura media anual de las olas
- Menor aumento del nivel del mar detectado (aproximadamente 1 mm/año)
- De un 30% a un 40% de cambio en una inundación cada 50 años en los decenios de 1950 a 1960 y de 1998 a 2008
- Cambio de dirección del flujo anual medio de energía (en °C/año)
- Tendencias marcadas de mareas de tormenta extremas



# Latin America and the Caribbean: projection of temperature changes on GDP per capita, 2030 and 2050

(% of GDP per capita without climate change)



Source: ECLAC on the basis of M Burke *et al.* *Nature* **000**, 1-5 (2015) doi:10.1038/nature15725

# Inequality is also reflected in the generation of climate change

The Latin American and Caribbean region accounts for less than 10% of total global emissions of greenhouse gases yet is particularly vulnerable to the negative impacts of climate change.



East Asia and the Pacific 18 461	North America 7 303	Latin America and the Caribbean 4 020
	15.1%	8.3%
	38.1%	
Europe and Central Asia 7 726	South Asia 3 905	Middle East and North Africa 3 441
	8.1%	
	16.0%	
	Sub-Saharan Africa 3 549	
	7.3%	7.1%

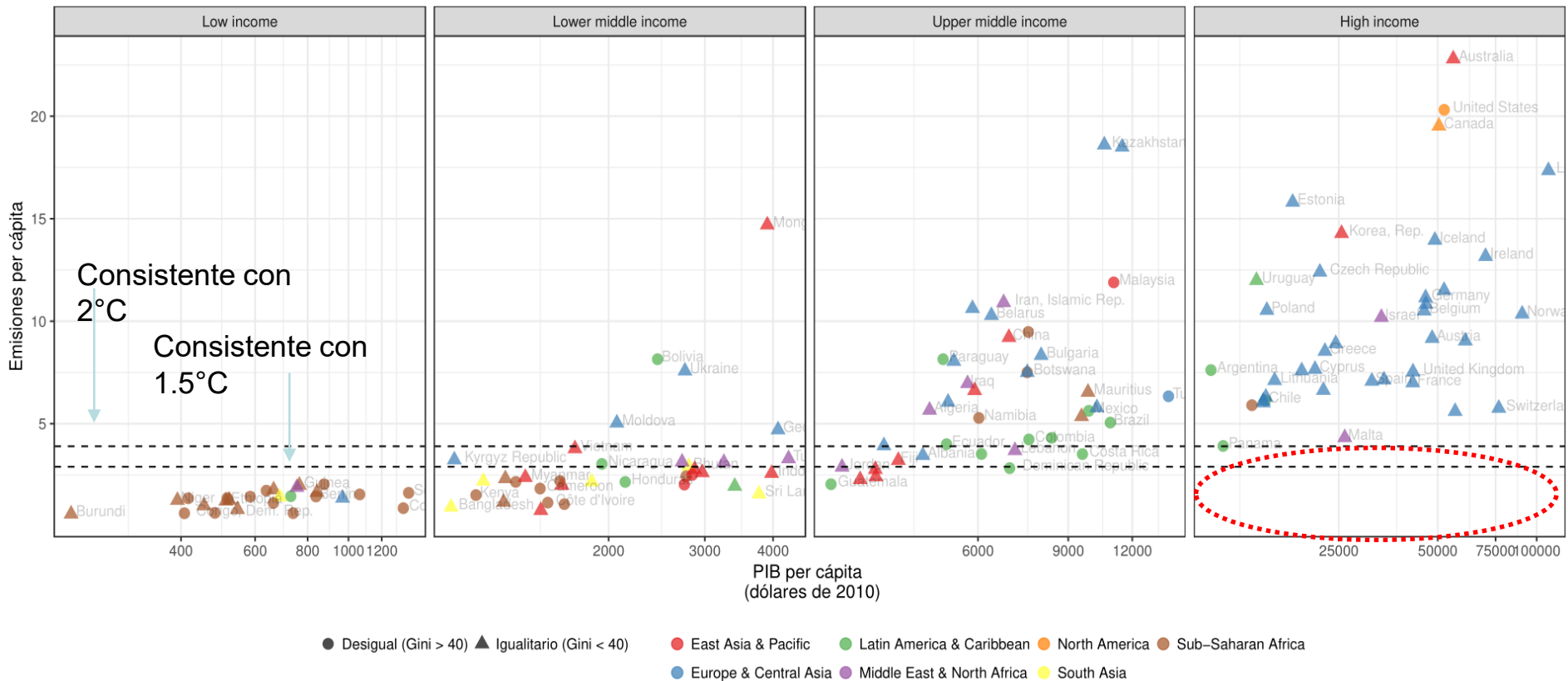
Latin America's per capita CO<sub>2</sub> emissions level is close to the global average and represents about 1/3 of the average per capita emissions level of Europe or the United States.



**IND 14.1** World regions: share of world GHG emissions, 2014  
(Megatons of CO<sub>2</sub> equivalent (MtCO<sub>2</sub>eq) and percentages)

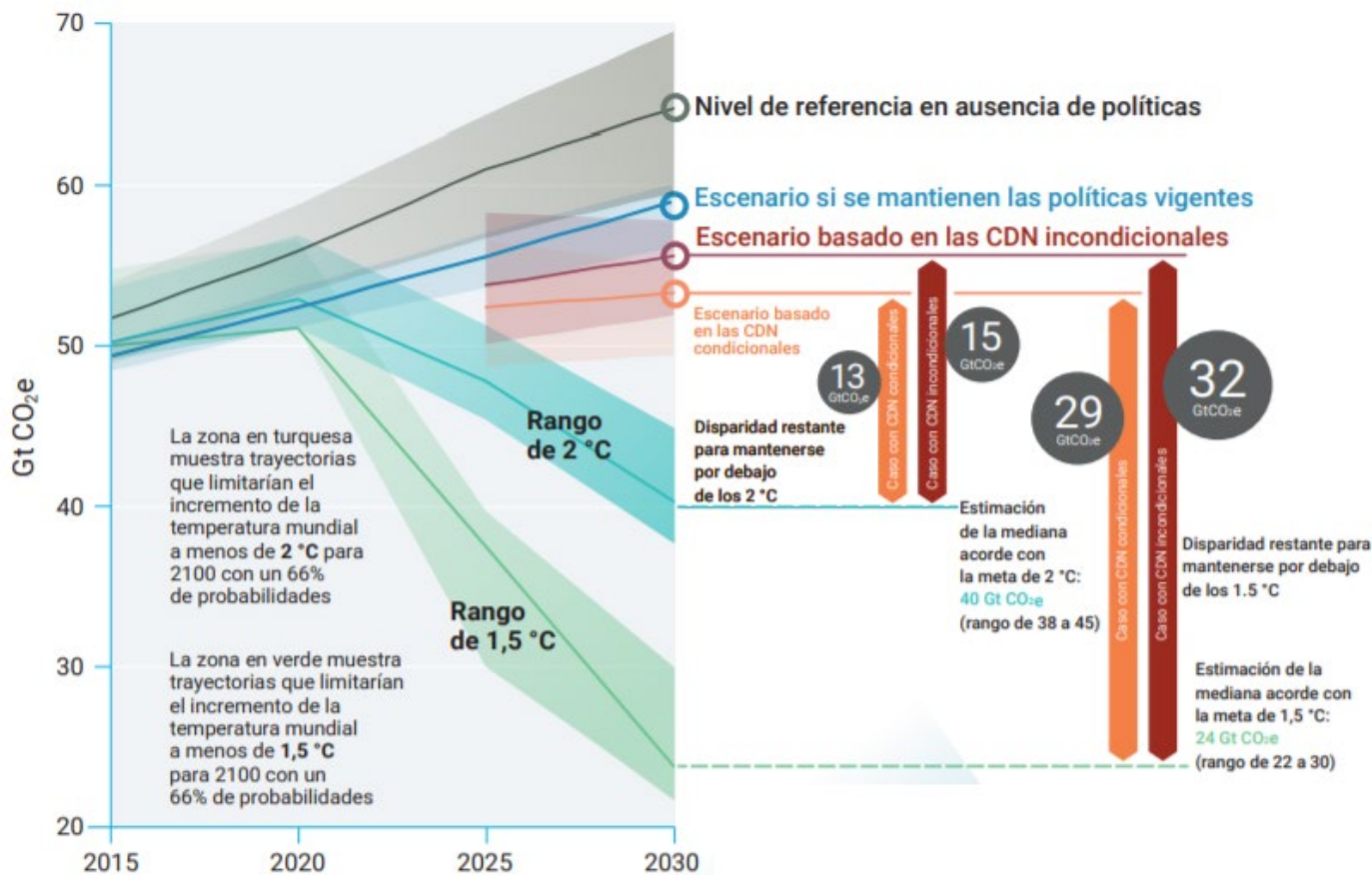
# High income and environmental responsibility give us an empty box: there is not yet a developed country that grows and at the same time is within its climate responsibility.

World: GDP per capita and emissions per capita, 2016  
(Logarithmic scale)



# The Paris Agreement: Commitments are insufficient

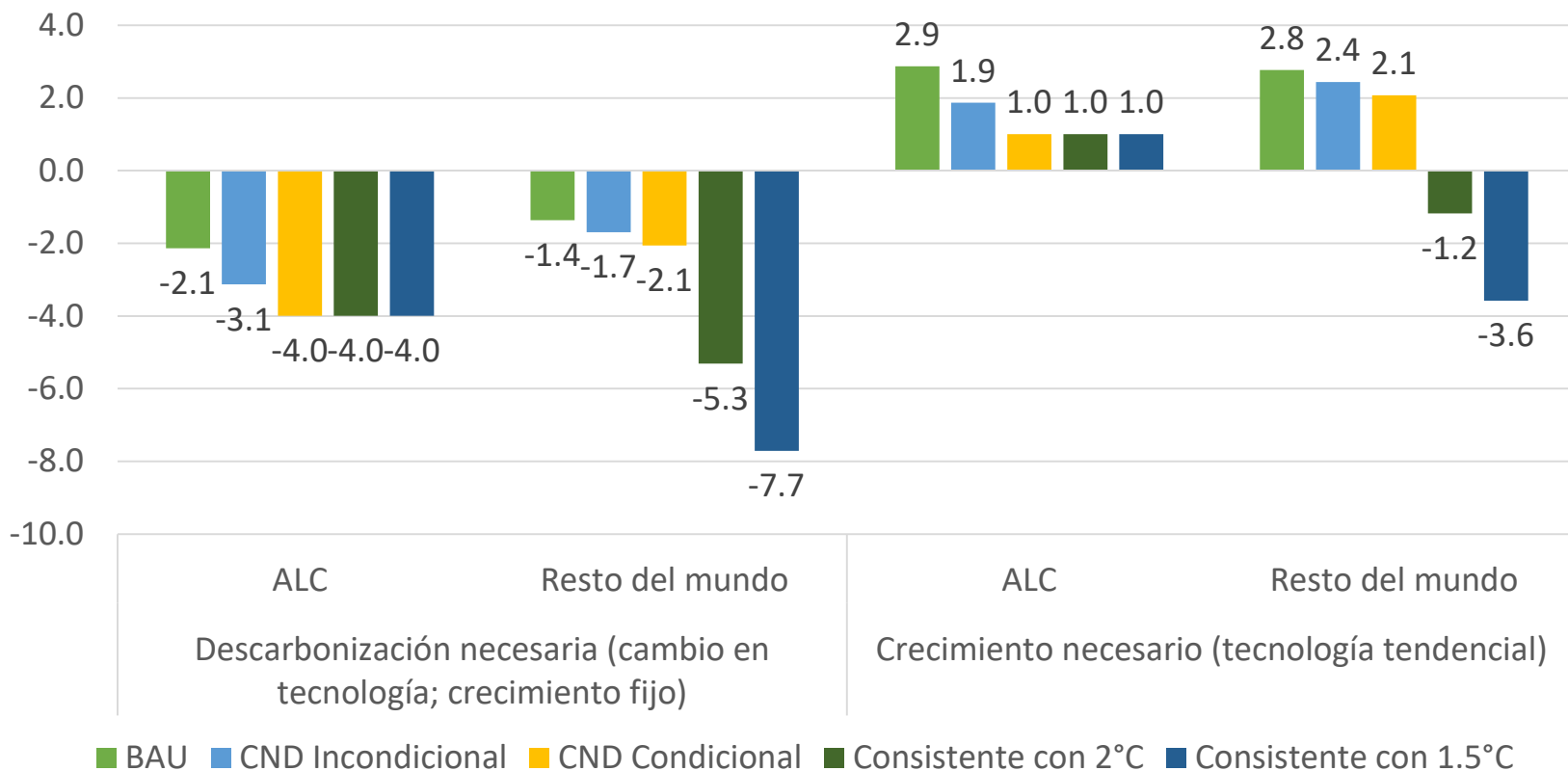
**Global GHG emissions under different scenarios and gaps in 2030**  
**(median estimate and 10th to 90th percentile range)**  
 (In megatonnes of CO2 equivalent (MtCO2eq) and degrees Celsius)



Source: UNEP (2018). The Emissions Gap Report 2018. United Nations Environment Programme (UNEP) Nairobi.

# It is necessary to change the way we produce and consume: decarbonization

**Group of scenarios: 1. Trend economic growth and 2. Trend technology**  
**Average annual growth 2016 - 2030**  
 (Percentage)

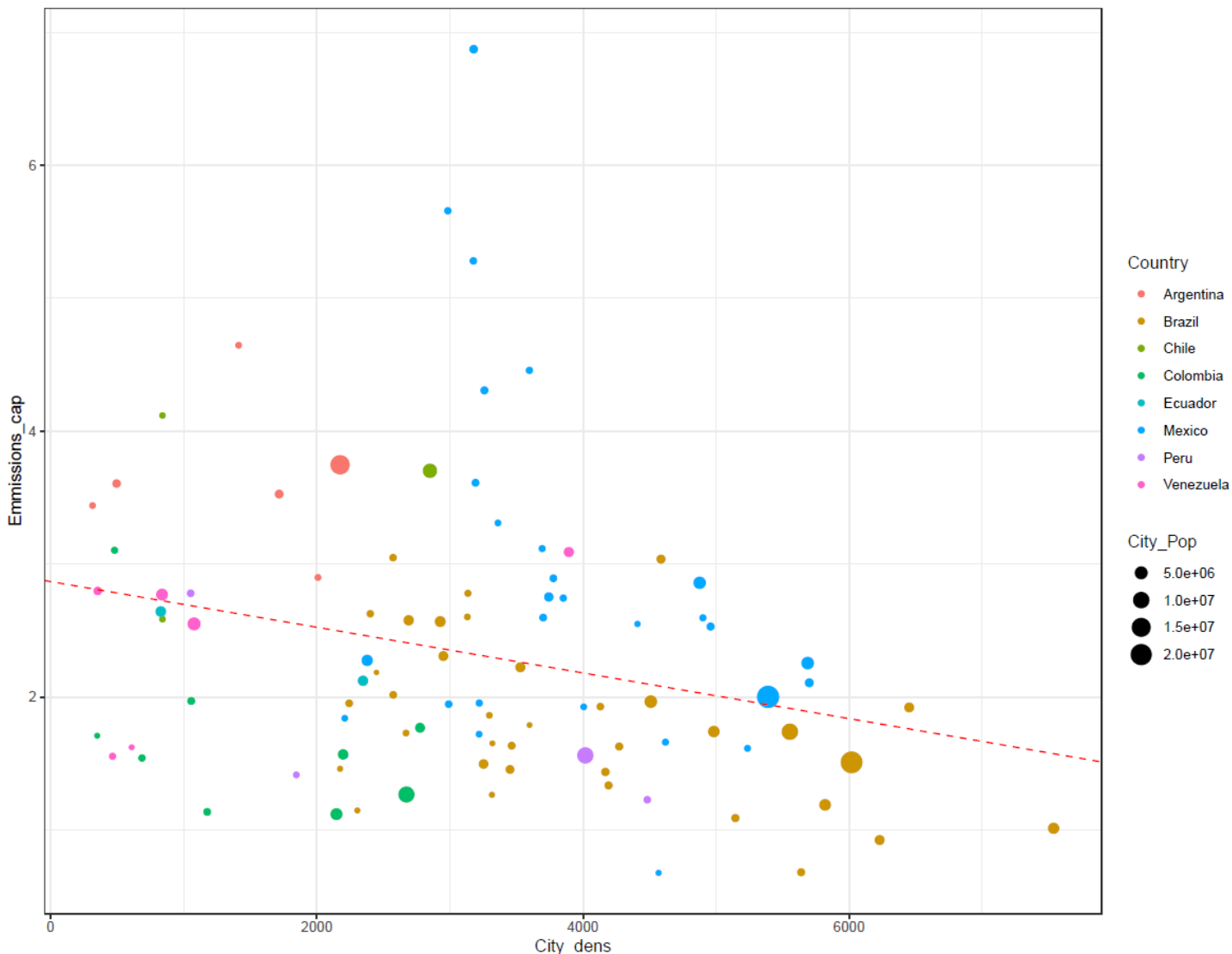




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# and the pattern of human settlements. Compact cities have higher carbon efficiency



$$CO2/cap_i = \varphi W \left( \frac{co2}{Pop} \right)_i + \alpha + \beta_1 Density_i + \beta_2 \left( \frac{GDP}{Pop} \right)_i + \beta_3 Population_i + \mu$$

Source:  
ECLAC- EF on  
the basis of the  
emissions  
calculated by  
city clusters  
with ODIAC  
data for 8  
countries

# Sectors identified for **adaptation** in the Nationally Determined Contributions (NDCs) of Latin America and the Caribbean



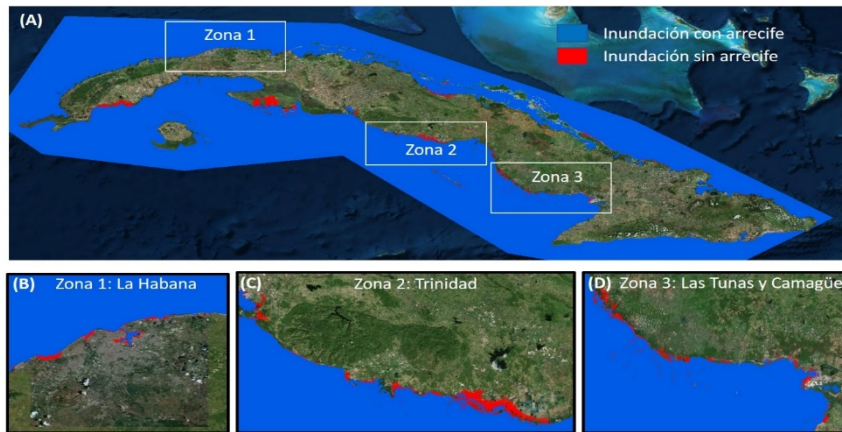
Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on the NDCs of the countries of Latin America and the Caribbean.

Notes: This chart shows the priority sectors for mitigation mentioned in the NDCs submitted by 33 LAC countries. Some initiatives cover more than one sector. For example, the agriculture sector includes livestock for the Bahamas and Uruguay. Biodiversity: Biodiversity; ZC: Coastal Zone; USCUS: Land Use, Land Use Change and Forestry; GR: Risk Management; Infr.: Infrastructure; AH: Human Settlements.

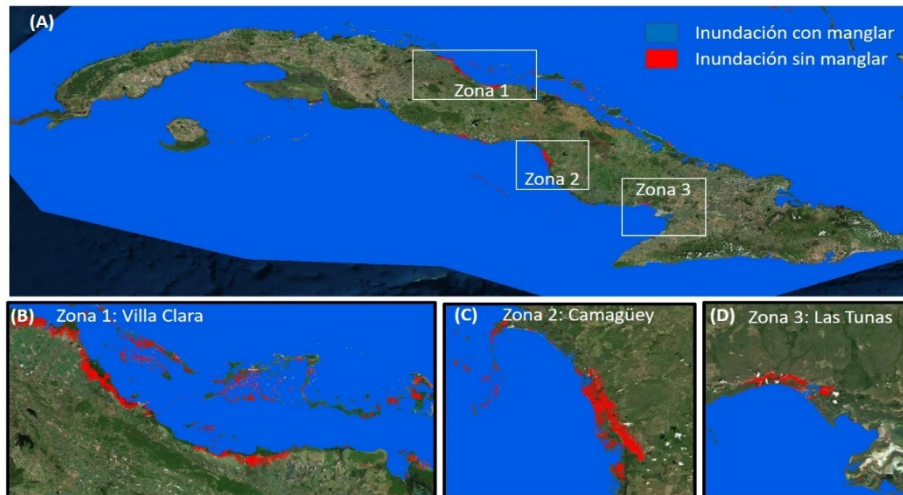
# Valuation of reefs and mangroves in Cuba

## Average annual protection per ecosystem

Comparison of 10-year flood return period in the absence of coral reefs



Comparison of the 10-year flood return period in the absence of mangroves



- Reefs: 8,043 people, avoiding more than \$400 million in economic losses and reducing the flooded area by 76 km<sup>2</sup>, the equivalent, approximately, of 15,000 football fields.
- Mangroves: 22,476 people, avoiding more than \$150 million in economic losses and reducing the flooded area by 222 km<sup>2</sup>, the equivalent, approximately, of 40,000 football fields.



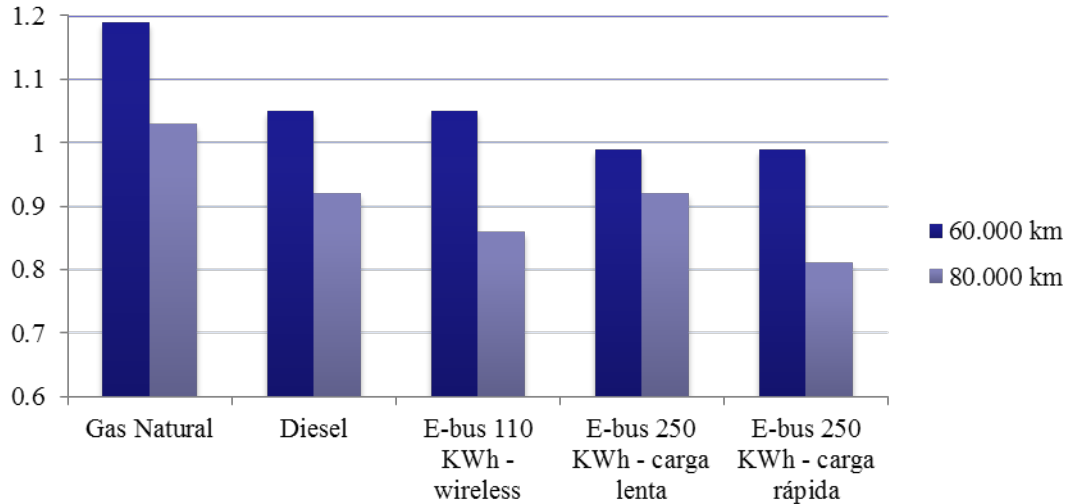
# Sectors identified for **mitigation** in Nationally Determined Contributions (NDCs) of Latin America and the Caribbean



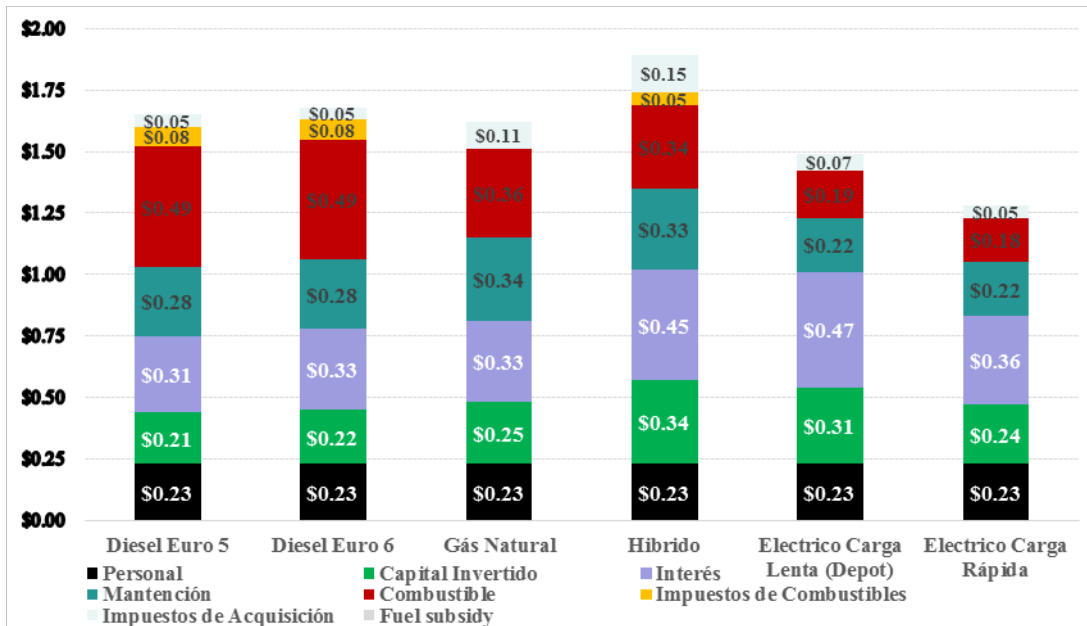
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), based on the NDCs of the countries of Latin America and the Caribbean.

**Notes:** This graph shows the sectors mentioned in the NDCs submitted by 33 LAC countries for mitigation. Some initiatives cover more than one sector. For example, agriculture includes livestock for Haiti and Uruguay. USCUSS: Land Use, Land Use Change and Forestry.

# There is great potential for a new urban mobility: electric public transport is competitive



Total Cost of Ownership: Public Transportation for 60,000 and 80,000 km - in USD/km (data from California region - USA)

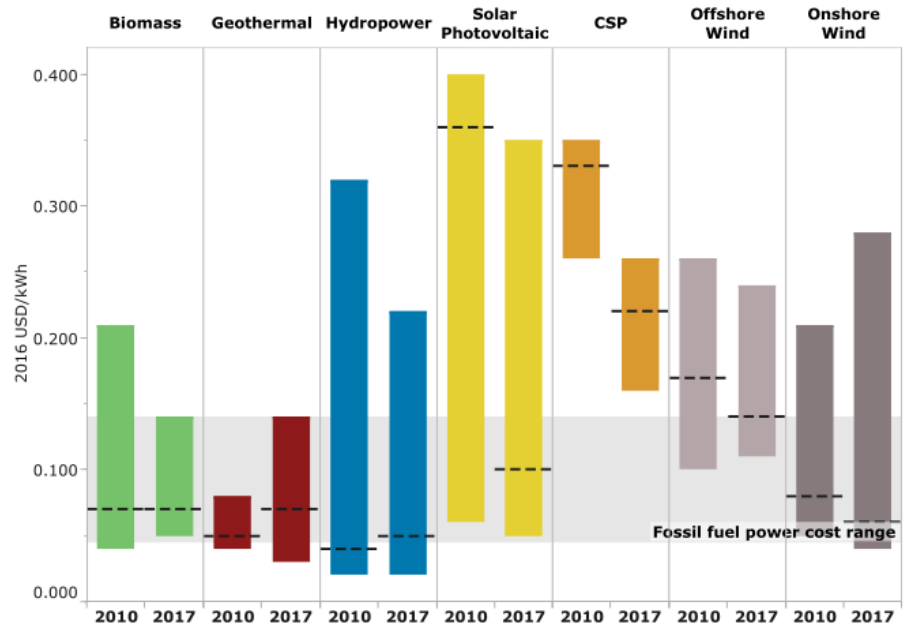


Total Cost of Ownership: Buses in Mexico City - USD/Km



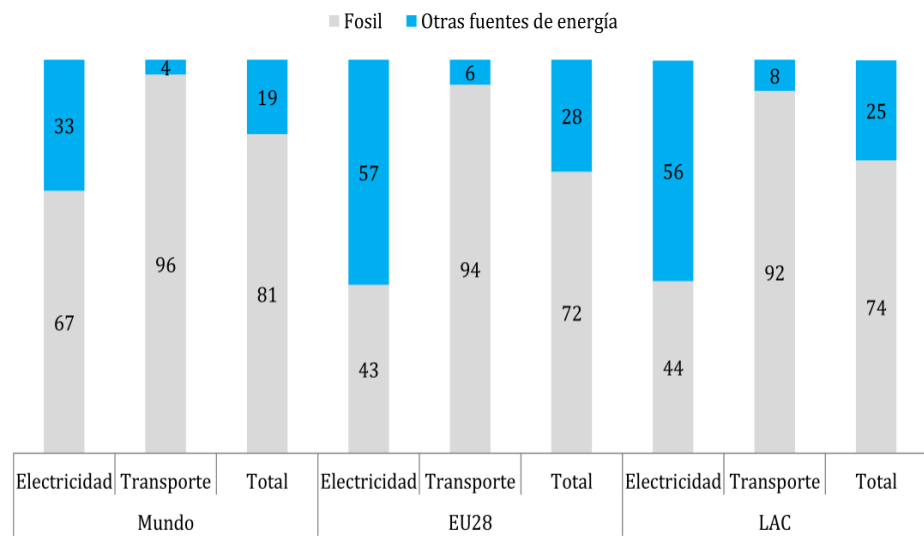
# ... as well as renewable energies; electrification of transport as a growth impulse

### Global levelized cost of electricity from utility-scale renewable power generation technologies 2010- 2017



**Source:** IRENA Renewable Energy Cost Database. **Note:** All costs are in 2016 USD. The dashed lines are the global weighted average LCOE value for plants commissioned in each year. Cost of Capital is 7.5% for OECD and China and 10% for Rest of World. The band represents the fossil fuel-fired power generation cost range. © IRENA

### Share of fossil fuels in the energy matrix: Electricity transport and total, 2014 (%)



**Nota:** Los valores pueden no sumar 100 derivado del redondeo.  
**Fuente:** Comisión Económica para América Latina y el Caribe (CEPAL) con datos de la Agencia Internacional de Energía, disponibles en línea en OECD iLibrary.



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# Our renewable and non-renewable resources have great growth potential (bioeconomy and mining of the future):

## Composition of Exports in LAC 2010-2015



Fuente: Rodríguez, Mondaini y Hitschfeld (2017)

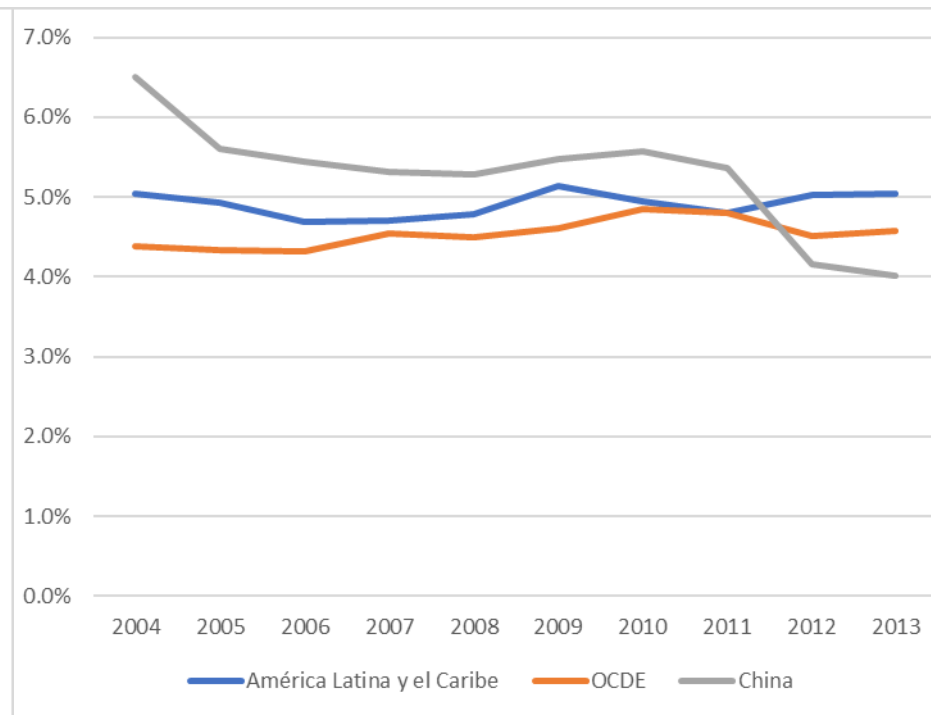
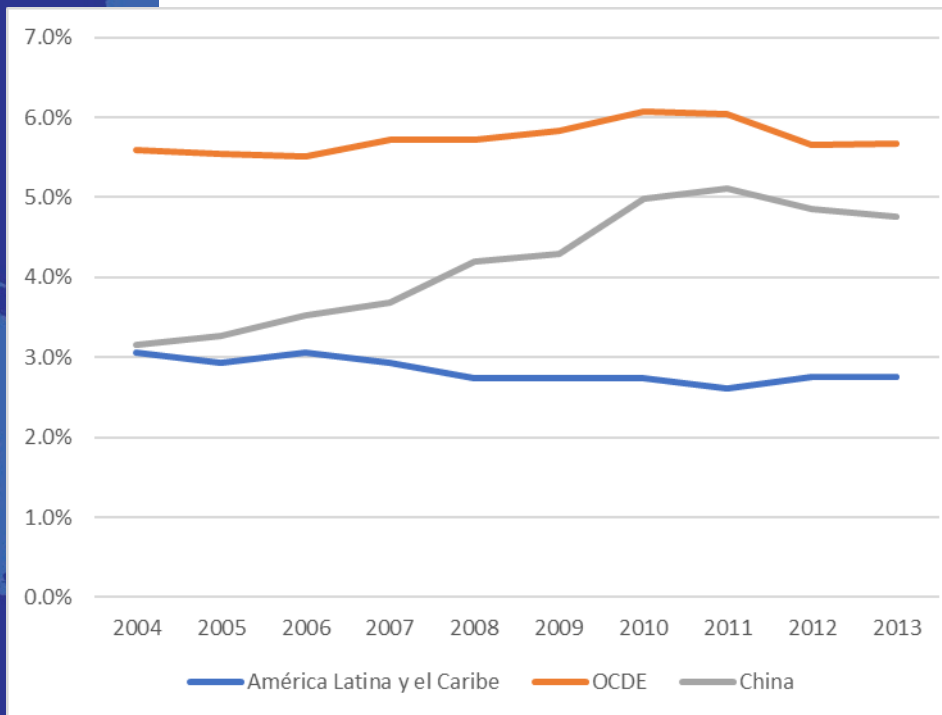


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# Structural changes are necessary

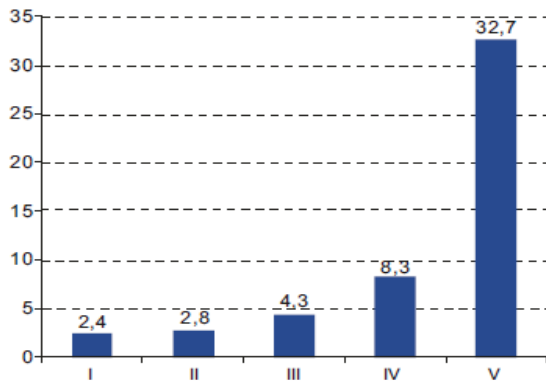
## Green exports and imports as a percentage of trade



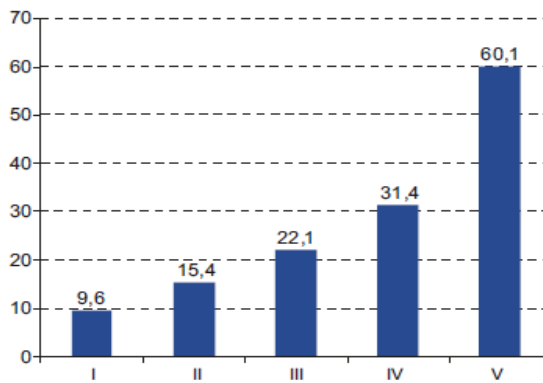
# Correct distorted price-incentives, which are highly regressive

Latin America (6 countries): car ownership, by income quintiles, 2006-2009  
(Percentages)

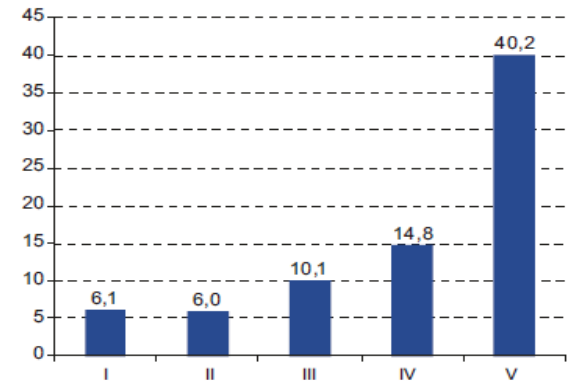
A. Colombia, 2007



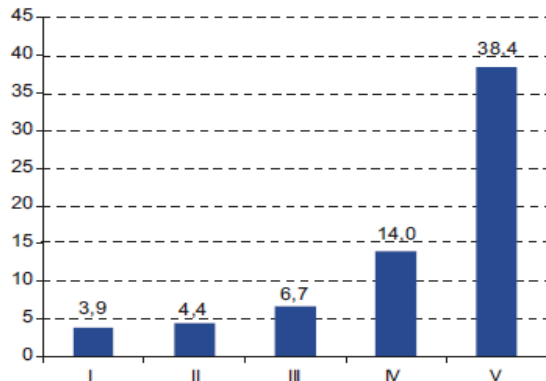
B. Costa Rica, 2004



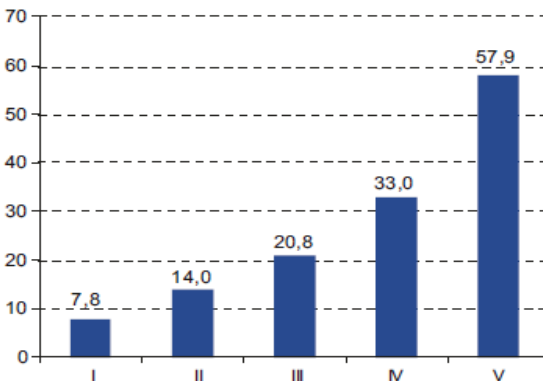
C. Ecuador, 2009



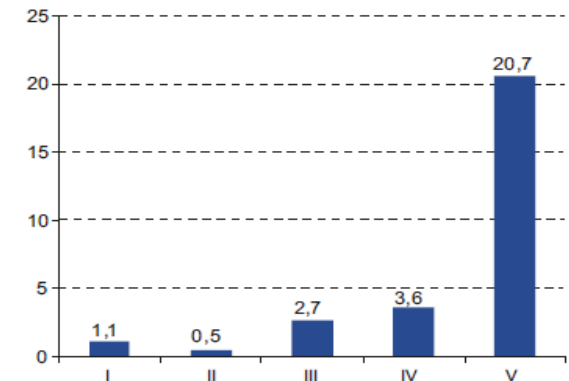
D. El Salvador, 2006



E. México, 2008



F. Nicaragua, 2006



Fuente: Comisión Económica para América Latina y el Caribe (CEPAL), sobre la base de Banco Mundial/Centro de Estudios Distributivos Laborales y Sociales (CEDLAS), Base de Datos Socioeconómicos para América Latina y el Caribe (SEDLAC).

# With a holistic vision: Investing in climate means investing in growth and well-being

● Develop an investment strategy and supporting policies for making economic growth sustainable...



● in order to decouple the consumption of energy and other inputs from income trends...



● and build a suitable energy matrix on the basis of high-quality public services.



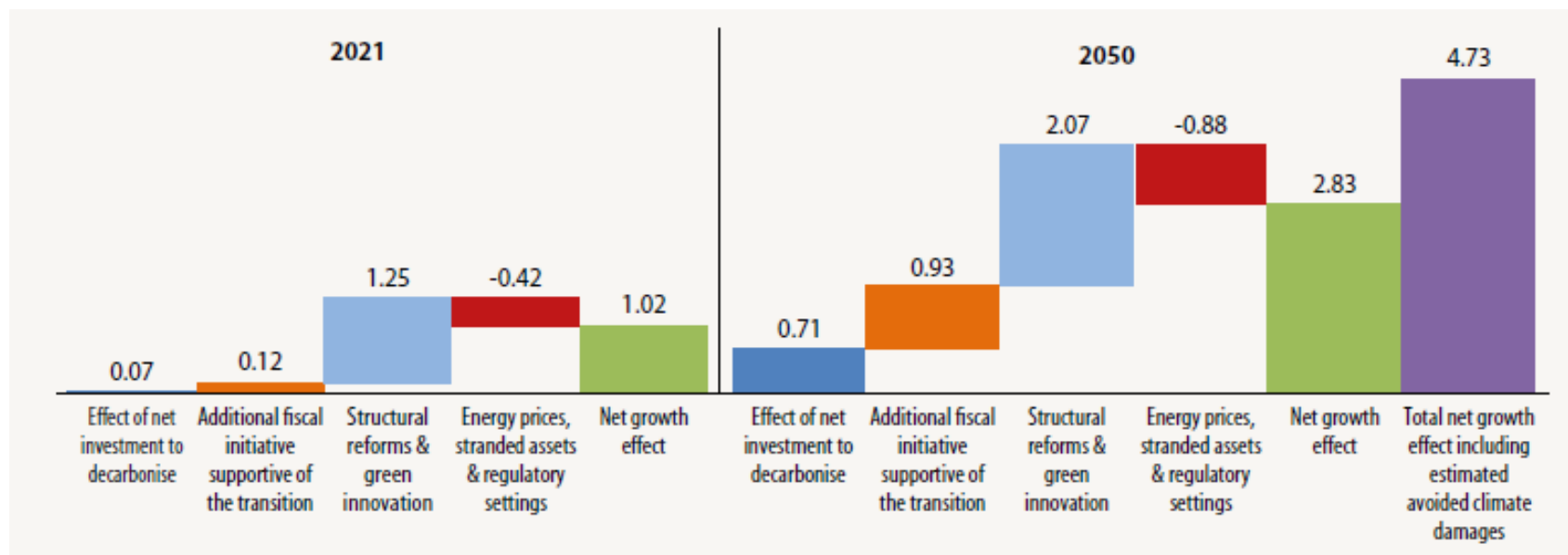
● Configure a universal social safety net that will diminish vulnerability and move forward with climate change adaptation.



# Investing in climate is investing in growth: OECD, 2017

**Positive effects on growth of the G20 of a decisive transition combining climate measures and economic reforms (50% probability of reaching the 2°C target \*)**

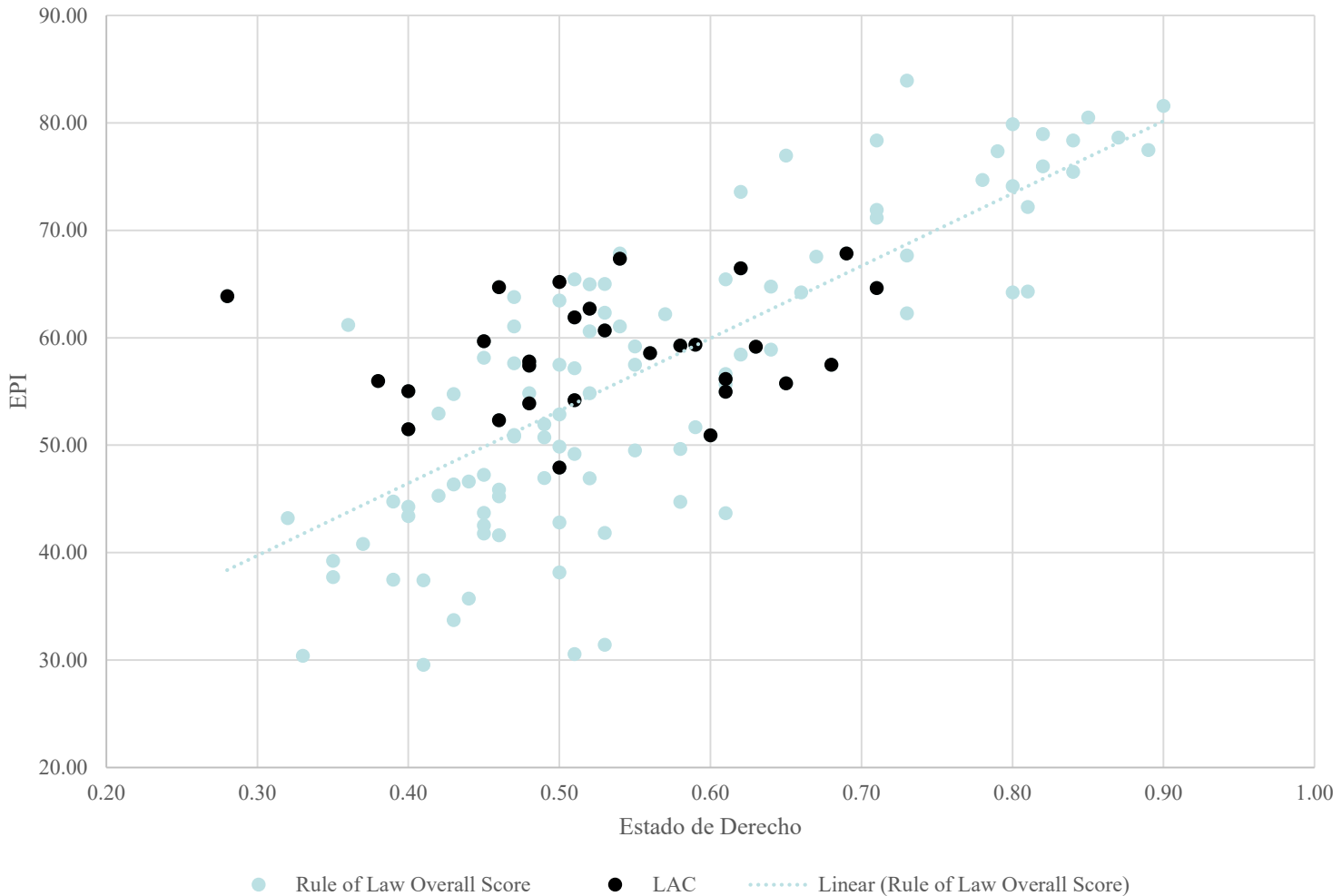
**G20 average, difference of GDP with respect to the baseline scenario, in %**





# Not forgetting that good governance, the rule of law and capable institutions are enablers for advancing the environmental sustainability of development.

## Correlation between Rule of Law and Environmental Performance

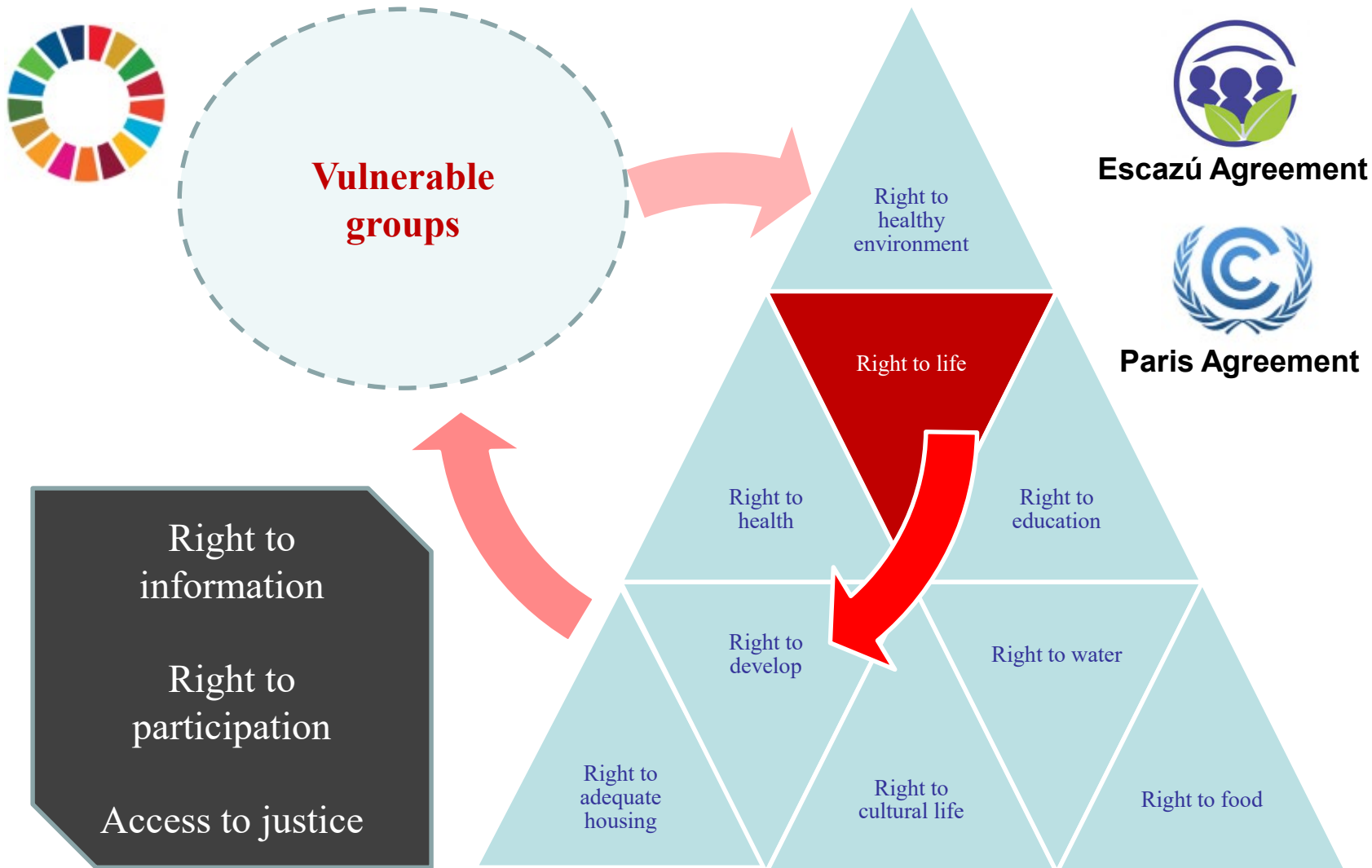




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# And that the agenda is integral and the link between climate change and human rights is inseparable



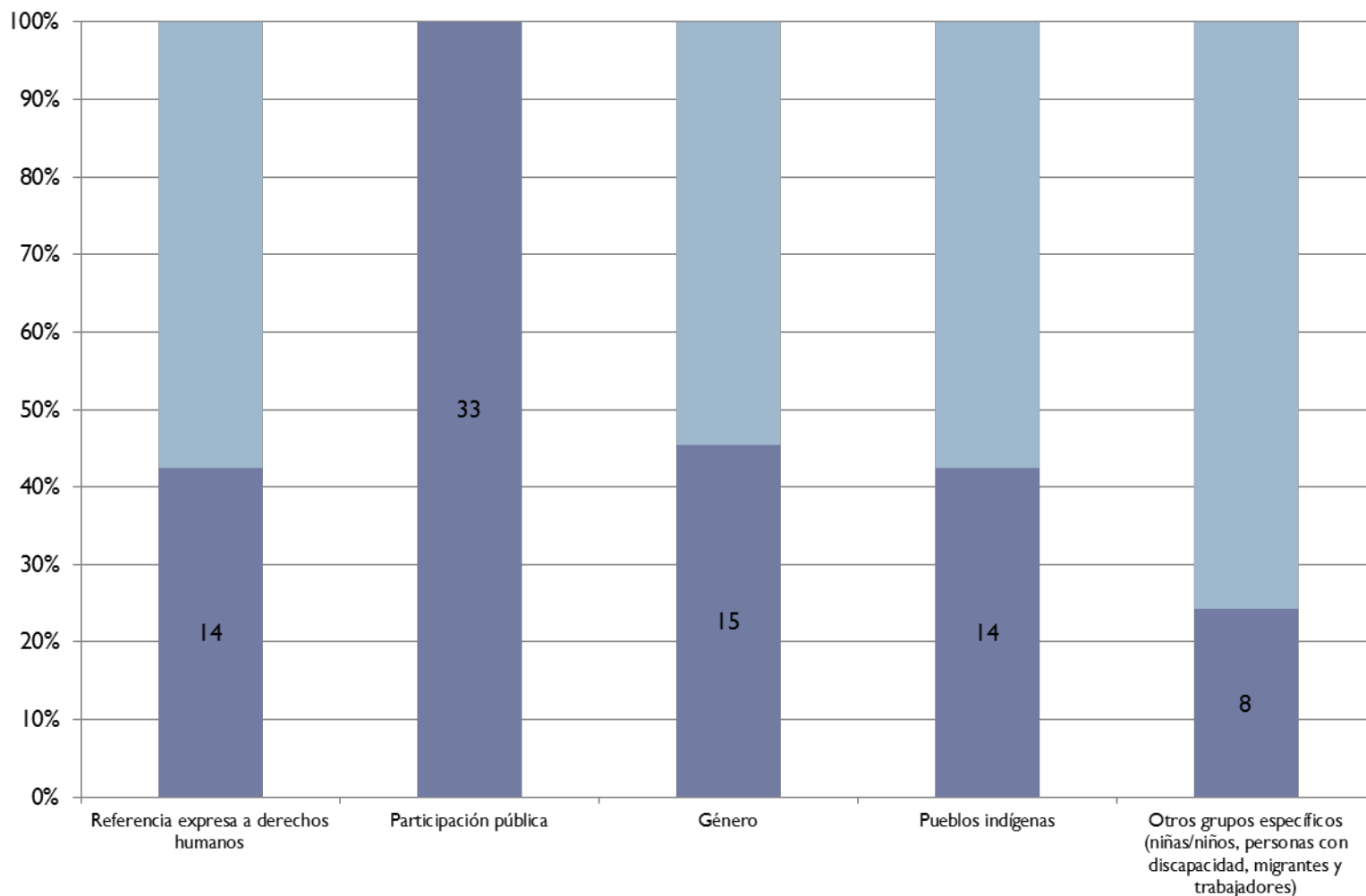


# Paris Agreement

- Stresses the need to respect and promote **human rights** obligations.
- It affirms the importance of **education, training, public awareness and participation, public access to information and cooperation** at all levels in matters covered by the Agreement.
- In order to achieve the agreed goals, the Paris Agreement establishes **a system of transparency** and global balance. The purpose of the enhanced transparency framework is to foster mutual trust and promote the effective implementation of the Agreement by increasing clarity and facilitating the monitoring of progress.
  - **Obligation to provide** national emissions inventories and information on climate change impacts and adaptation; and,
  - **Nationally Determined Contributions (NDC)** will be recorded in a public registry maintained by the secretariat.
- Establishes the **Capacity-Building Initiative for Transparency** to improve institutional and technical capacity that will help developing countries meet enhanced transparency requirements in a timely manner.
- Creates **a mechanism to facilitate implementation of and promote compliance with the provisions of the Agreement** and will be an expert-based and facilitative in nature and function that will operate in a transparent, non-adversarial and non-punitive manner.

**Article 12:** The Parties shall cooperate in taking measures, as appropriate, to enhance **climate change education, training, public awareness, public participation and public access to information**, recognizing the importance of these steps with respect to enhancing actions under this Agreement.

# Human rights approach to NDCs in Latin America and the Caribbean





# The rights-based approach to climate laws in Latin America and the Caribbean



ombres que figuran en este mapa no implican su apoyo o aceptación oficial por las Naciones Unidas. | Fuente: CEPAL - Principio 10

**100%**

- Focus on vulnerability
- Right to information
- Right to participation

**63%**

Right to health

**38%**

- Right to a healthy environment
- Right to water
- Gender focus

A stylized map of Latin America and the Caribbean region, rendered in a light blue color against a dark blue background. The map shows the outlines of Mexico, Central America, the Caribbean islands, and South America.

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