

Challenges and Opportunities

Emissions, Impacts and Responses in LAC.

An examination of sectoral approaches in the context of current policies within the region.

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LATIN AMERICA PARTICIPATION IN GLOBAL EMISSIONS

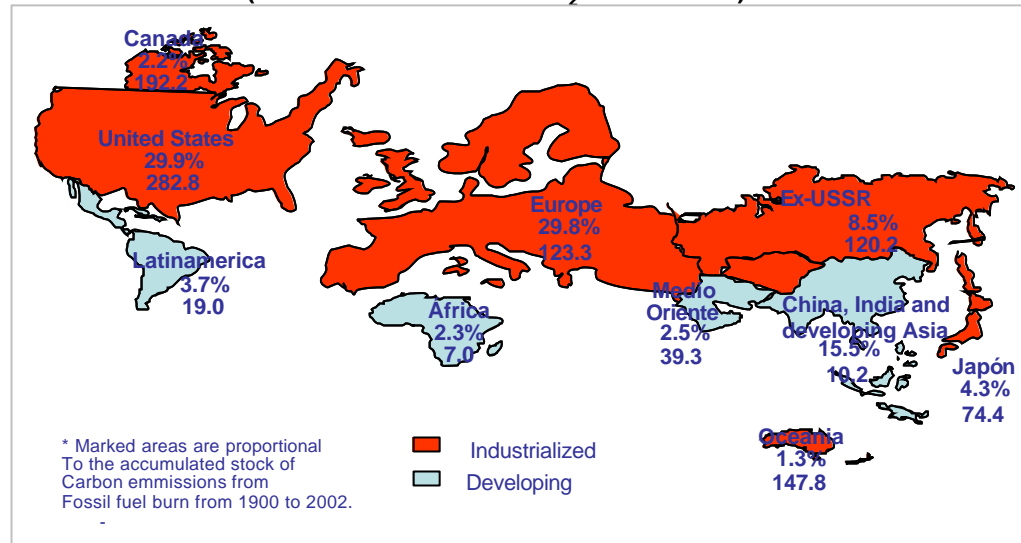
Latin America's percentual contribution to the stock of GHG in the atmosphere is only slightly more than its contribution to world's population.

The percentage increases if current emissions are considered.

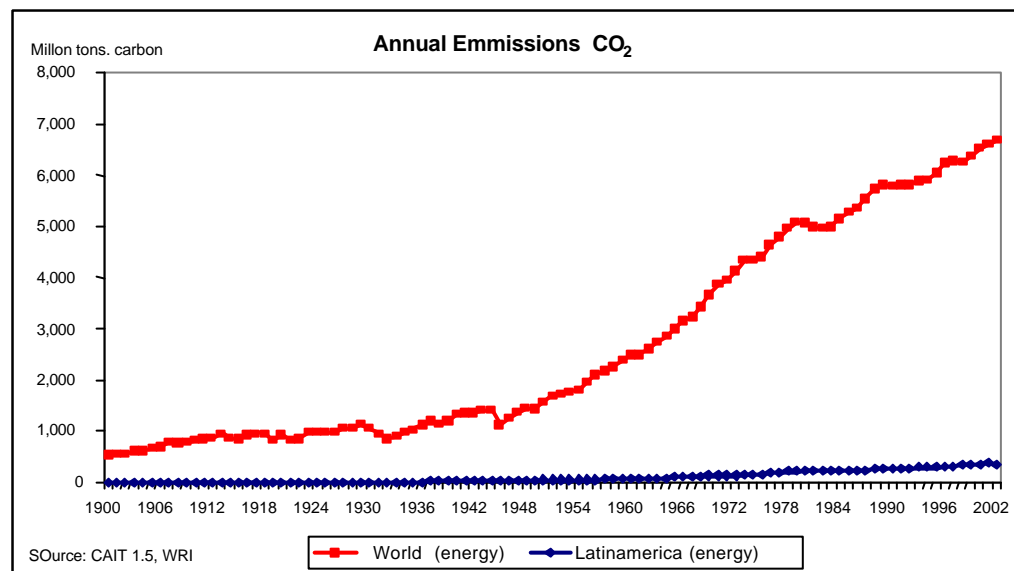
Large amount of resources implied in any solution to climate change.

- By 2000, the region had 25% of the world forest cover (around 960 million hectares); 47% of its land is forests (vs. 30% of the world's average).
- It has 15% of the world's territory, but receives almost 30% of its precipitations, as well as a third of its freshwater resources.
- Concentrates 22% of the world's potential hydro power, as well as significant wind, solar and geothermal resources.
- Significant gas resources in Bolivia, Peru, Mexico, et al.

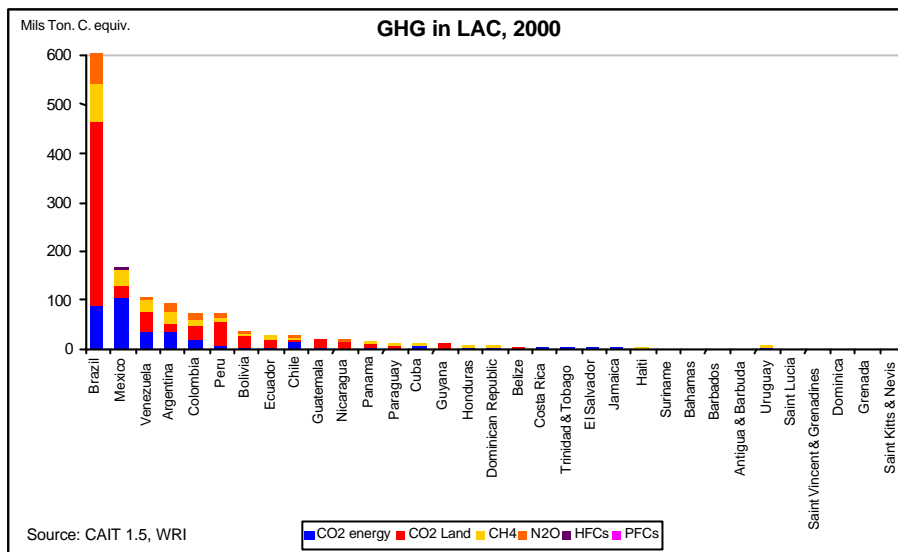
CO₂ Stock 1900-2002 per region
(Total stock and total /CO₂ *hab. for '99)



World Resource Institute data - Climate Analysis Indicators Tool (CAIT), produced by Energeia

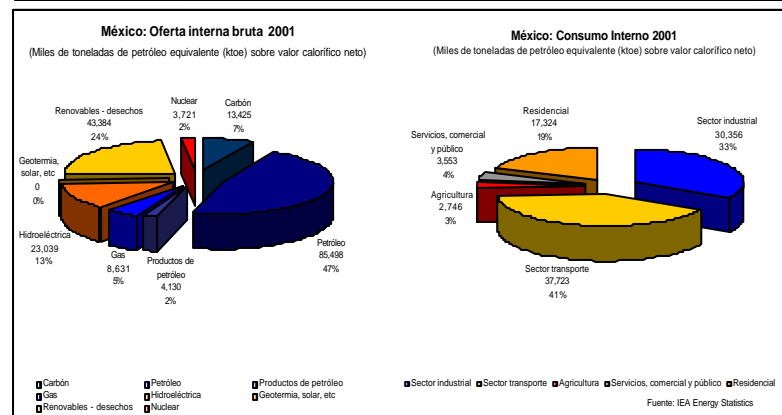
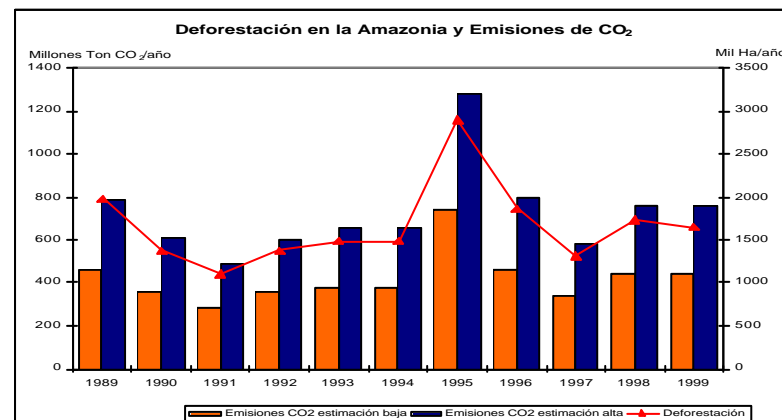
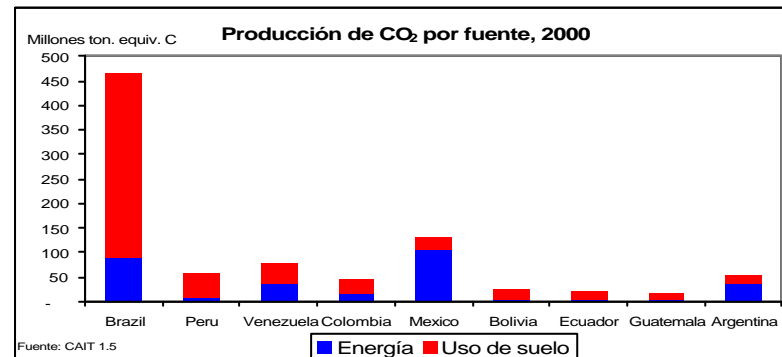


Regional Emissions - CO₂

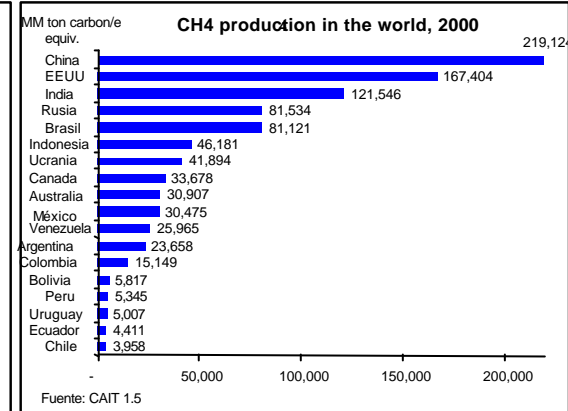
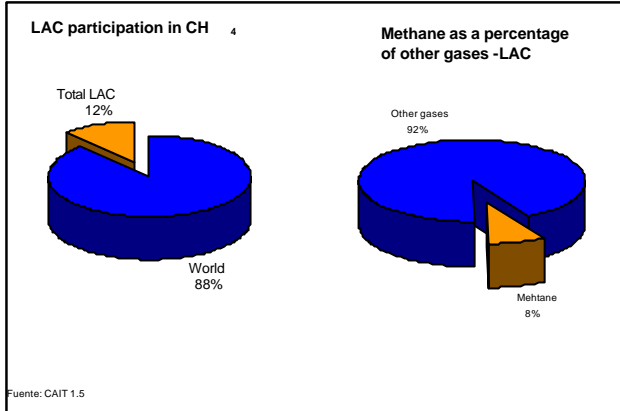
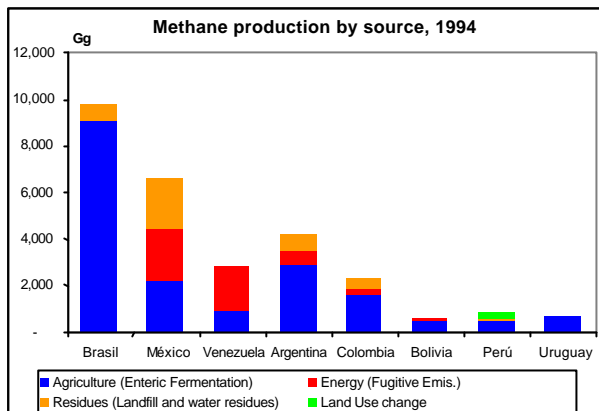


Almost 70% of GHG emissions in the LAC region is explained by 4 countries (Brazil, Mexico, Venezuela and Argentina). If Colombia and Peru are added, the percentage reaches 83%.

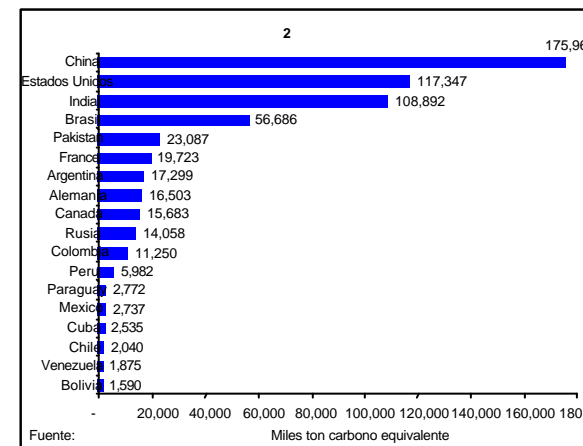
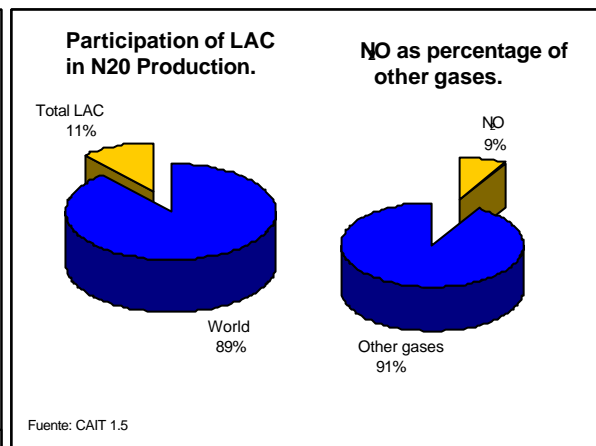
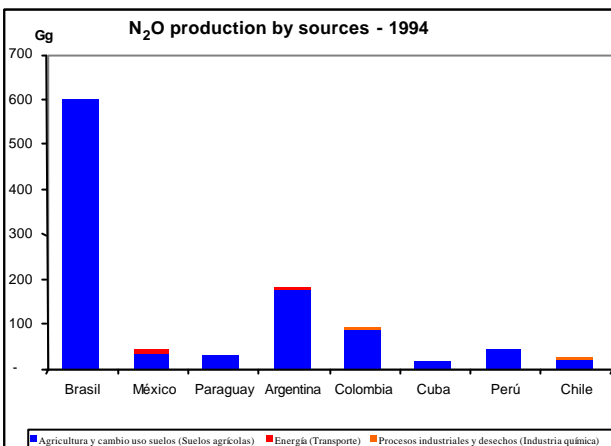
Brazil is the most important source of CH₄ and CO₂ emissions from Land use change, while Mexico is the largest emitter of CO₂ emissions from fossil fuel burning.



REGIONAL EMISSIONS CH₄ - N₂O



- N₂O emissions follow regional average with regards to other gases (11%).
- Brasil is the main emitter, followed Argentina and Colombia.
- Most of the regional N₂O come from fertilizer use (almost 80%) or transportation (a little less than 20%).



REGIONAL EMISSIONS – 100 year horizon

	Emissions	Global Warming Potential (100 year horizon)	Relative Total	Porcentual Relative Contribution
LAC (27)				
CO ₂	1.088.795,0	1	1.088.795,0	45,0
CH ₄	42.690,5	23	981.882,3	40,6
N ₂ O	1.184,6	296	350.653,4	14,5

Caribbean (11)				
CO ₂	23.561,0	1	23.561,0	15,3
CH ₄	856,0	23	19.688,0	12,8
N ₂ O	372,7	296	110.307,4	71,8

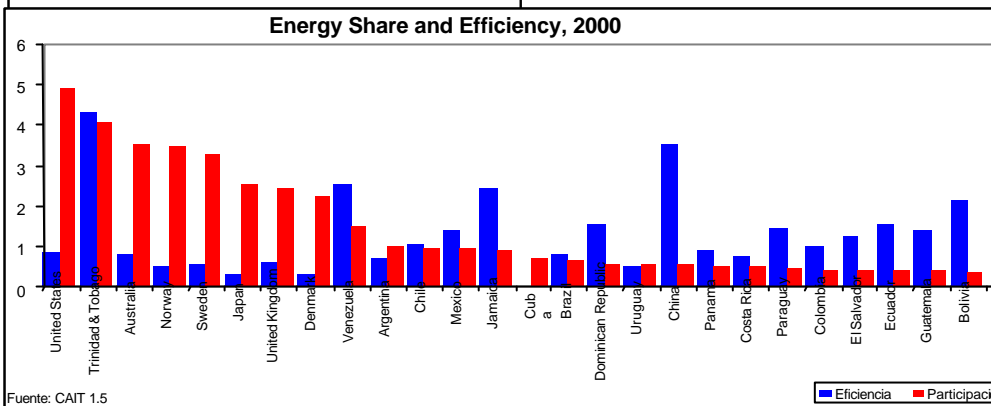
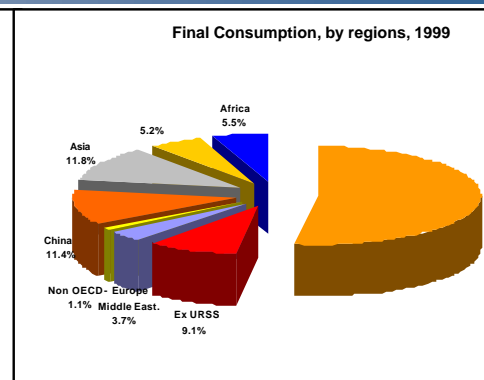
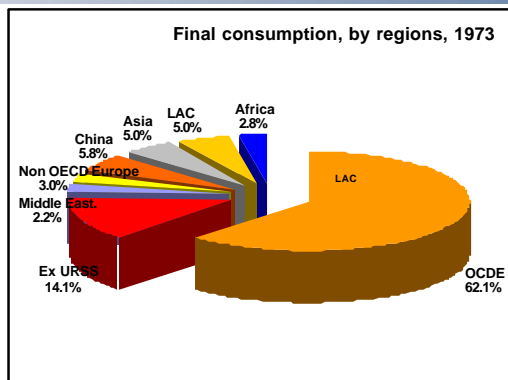
Central America (6)				
CO ₂	444.493,0	1	444.493,0	77,4
CH ₄	4.914,0	23	113.022,0	19,7
N ₂ O	57,6	296	17.037,8	3,0

S.America (10)				
CO ₂	620.741,0	1	620.741,0	36,7
CH ₄	36.920,5	23	849.172,3	50,2
N ₂ O	754,4	296	223.308,3	13,2

DEVELOPMENT AND CLIMATE CHANGE – Some Indicators

Solving XXI century problems in XIX century settings.

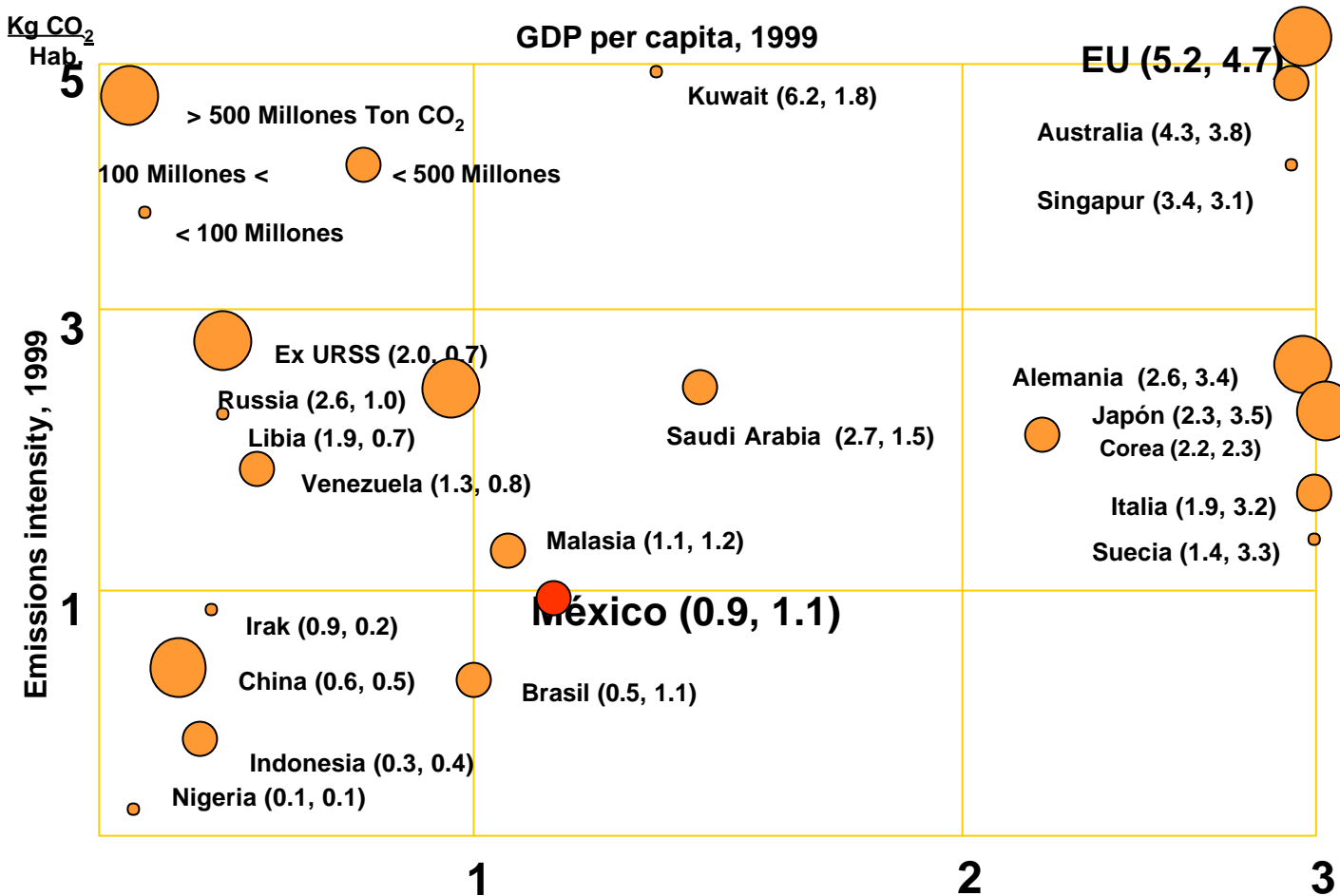
- Extreme income inequalities throughout the region, and high level of poverty (44% average)
- Low per capita income (\$3,6M; 2002) and growth rate (1%,2002)
- Underconsumption of energy in several countries, sectors (691MTpe, 2002).
- Expansion in infrastructure needed.
- Acute processes of environmental degradation.
- Demographic transition finished (1% Growth rate)
- Transectoral policies already active
- Capacity for regional cooperation in specific areas
- Increasing public consciousness of the problem.



	Scenarios		
	Non regulated market	Reforms (regtd. markets)	Large Scale transition
Land Degradation –	R	R	M
Deforestation	R	M	S
Emissions	VR	R	M
Uncontrolled Land Change	R	M	S
Vulnerability	VR	R	M

A comparative perspective

A development path should take into account not only the environmental and climate impact of policy measures, but also their relation with economic and poblational growth. This allows to measure not only the contribution of each country to absolute emissions levels, but also the sustainability of their development effort.



Source: AIE, CO₂ Emissions from fuel combustion, edición 2001.

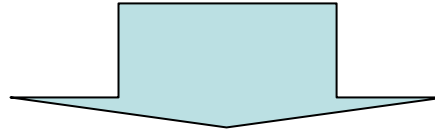
Impacts and Adaptation

REGIONAL IMPACTS – Main areas

INCREASED
RAINFALLS

INCREASED
TEMPERATURES

SEA LEVEL RISE



Health

Water

Coastal Areas

Forests

Agriculture

CLIMATE RELATED
MORTALITY

INFECTIOUS
DISEASES

RESPIRATORY
DISEASES

WATER PROVISION

WATER QUALITY

INCREASED
COMPETENCE
FOR WATER ACCESS

COASTAL EROSION

LOWLANDS EROSION

PROTECTION
INFRASTRUCTURE
COST

FOREST
COMPOSITION

GEOGRAPHIC
DISTRIBUTION

VEGETABLE
HEALTH &
PRODUCTIVITY

AGRICULTURE
PRODUCTION

WATER DEMAND

HABITAT LOSS

BIODIVERSITY AFFECTED

GLACIERS, PERMANENTLY FROZEN SOILS AND SNOW COVERED SOILS DIMINISHED

- Impacts expected on extremes of latitude, altitude and humidity.
- The region already experiencing large scale economic losses through hurricanes and El Niño.
- Additional impacts on health, water, forests, agriculture, habitat loss and glacier change.

Increases in frequency and intensity of hurricanes and tropical storms

In 2004, nine tropical storms and five hurricanes. Highlights:

- Mitch: 8,500US\$ millions, higher than the combined GDP from Honduras and Nicaragua.
- Charley – Cuba US\$1,000 in damages: 73,500 US\$, over 4,000 houses collapsed.
- Iván: Hit Barbados, Trinidad y Tobago, St. Vicent and Grenadines, Jamaica, Cuba, Florida

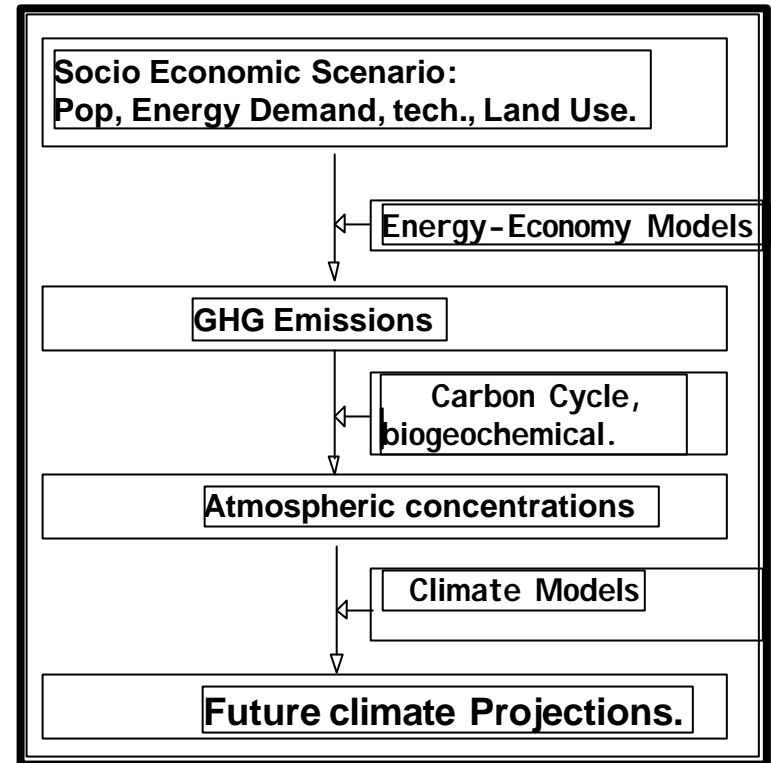
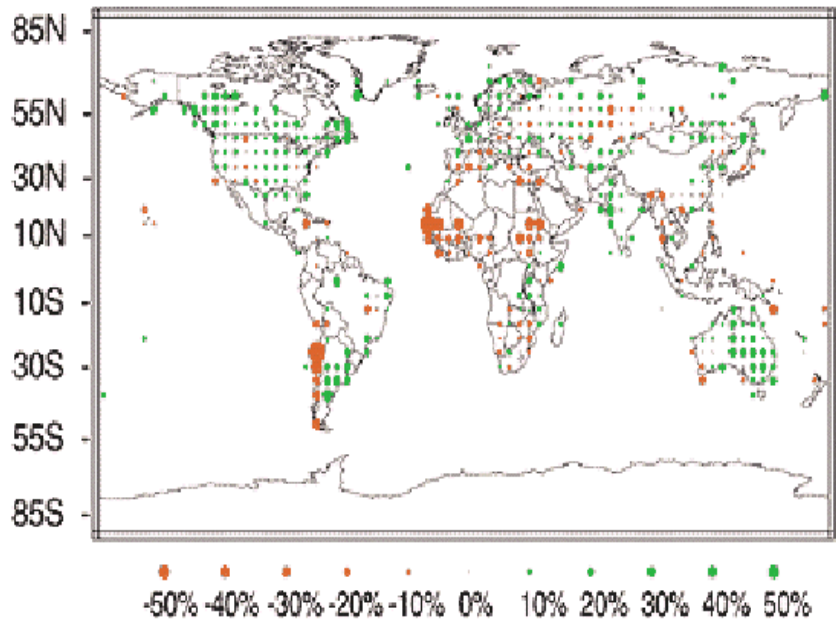
Increase in frequency and intensity of El Niño event.

The 1997 and 1998 El Niño caused:

- In the Andean region, US\$ 7,545 losses, or almost Bolivia's GDP for that year. Countrywise, Ecuador suffered the most (a 14% loss of its GDP).
- In the LAC region, total losses amounted to 15,480 US\$ millions.

REGIONAL IMPACTS – The Unknowns

While there is information on extremes of latitude and some on altitude, there are still unknowns regarding the impacts in the region, including large sections of South America.

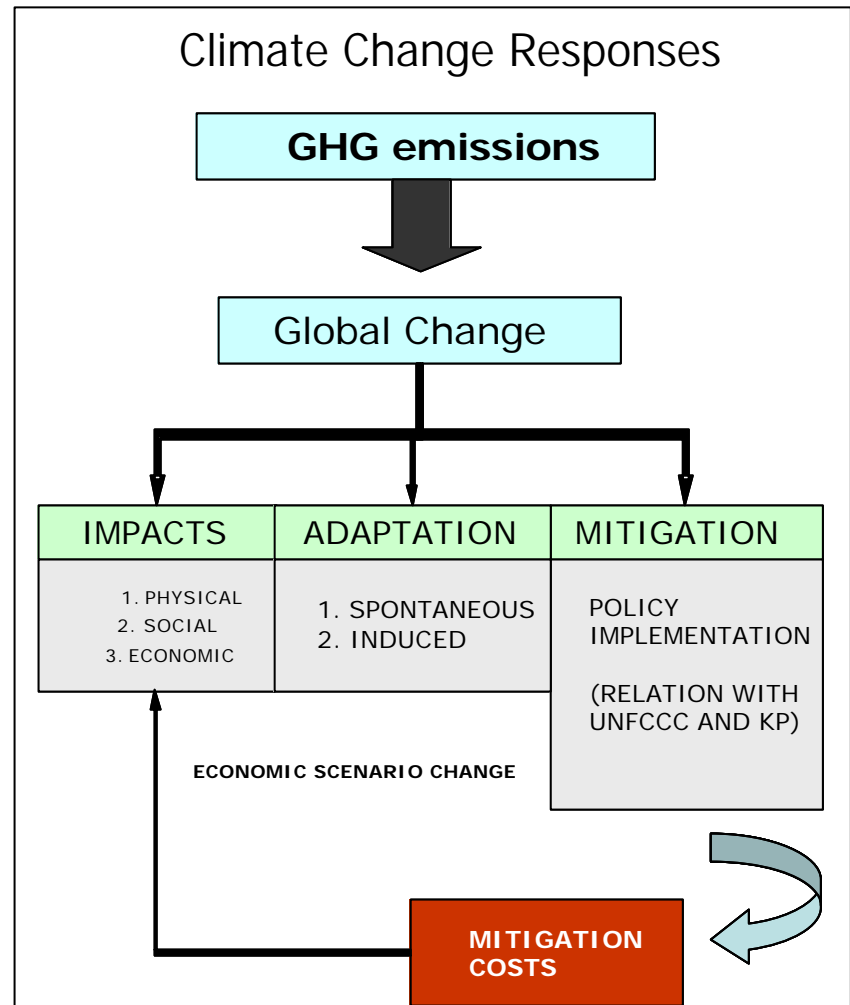


Climate change alters one of the basic assumptions of previous planning; past climate is not an indication of current climate. This will add uncertainty to current planning models. Information is crucial.

Responses

Policies and Measures

- Region already active in both adaptation and mitigation measures
- Start activities to develop coordinated adaptation responses in several sub – regions:
 - The Caribbean
 - Central America
 - The Andean region .
- Developed mitigation measures in both large scale and small emitters



Policies and Measures – Adaptation

Several cases of reactive adaptation already experienced in the late 1980s and 1990s. However, additional efforts underway for planned adaptation, as well as for adaptation institution – building.

Central America, Caribbean and Mexico

- **Long history on adaptation: mitigation is not crucial in the Caribbean; but adaptation and vulnerability certainly are.**
- **CARICOM active since 1994; Capacity for adaptation planning since 1997.**
- **Pilot Projects for capacity development for Adaptation: C.America and Mexico.**
 - Adaptation in at least three human systems: water, agriculture, and health.
 - Third stage includes policy development.

Andean Countries.

- **Andean Program for the Prevention and Mitigation of Disasters (PREANDINO)**
 - Seeks to develop national and sectorial policies to prevent & mitigate disaster risk.
 - Develop Institutions focused on including disaster prevention within development planning.
- **Andean Committee for the Prevention and Attention of Disasters.**
 - Based at the Andean Council of Foreign Ministers
 - Seeks to diminish risk in the region.

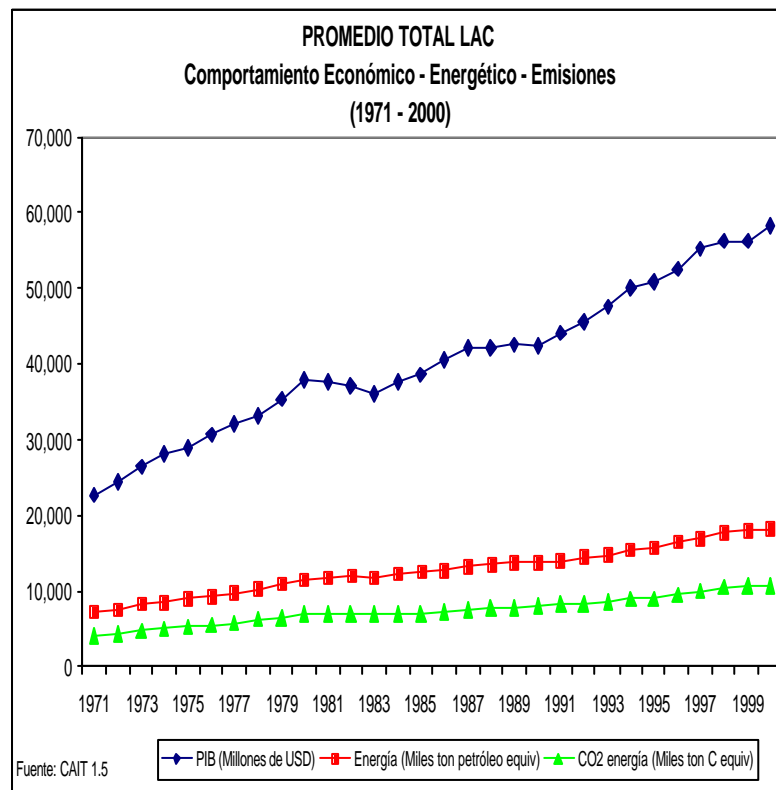
Following recommendations from non annex 1 groups of experts, emphasis on adaptation shifting to impact on human systems.

Links between climate conditions, policies and measures, and development

Policies and Measures - Mitigation

• Most of the countries in the region have already been advancing mitigation measures since at least the 1990s. Several reasons behind this development:

- **Synergies between climate change, energy and environmental policies**
- **Cobenefits an important element of policies.**
- **Increase in efficiency / savings components in many energy sector policies**
- **Development of an institutional background in the environment/science/energy nexus useful for virtuous cycles in policy development.**

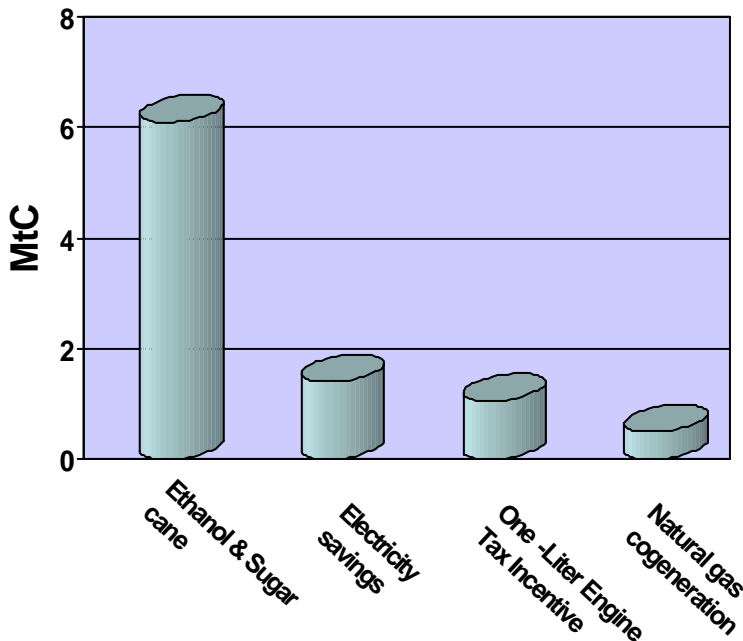


While impact varies, these has been accompanied by some decoupling in certain sectors, particularly in energy and fossil fuel burning. GDP is growing at a higher rate than emissions.

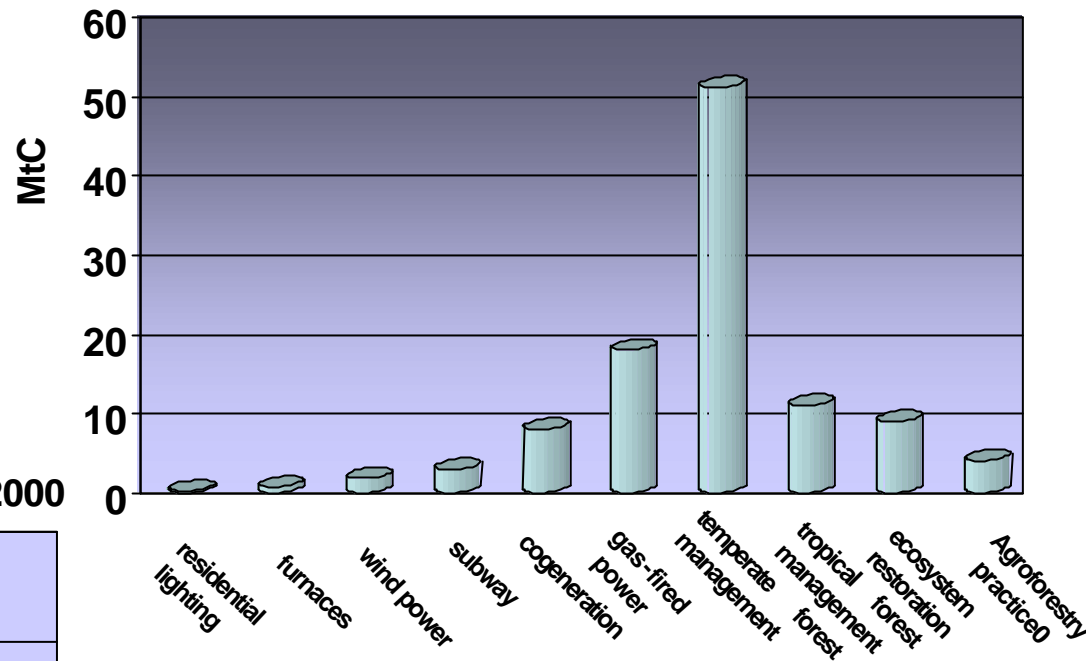
Mitigation Potential – Two largest emitters.

Mitigation potential In Mexico high in Forest mangement and in Energy efficiency related measures.

Mitigation Measures - Brasil 2000



México 2010



Data available for mitigation potential in Brasil presents largest opportunities in energy efficiency (25.2MTC), renewables (8MTC) and sugar cane (5.3) per year by 2020.

Economic potential for region with current PM around 320MTC.

The CDM Market: Characteristics in the Pre Kyoto period.

- CDM has created significant interest throughout the region for business opportunities in mitigation options.
- The LAC region has been one of the main providers for CDM projects in the pre-kyoto approval period.
 - Including only pipeline projects for the two largest buyers (or almost half of the market) and following a conservative estimate, LAC contributes:
 - Around 31% of PCF Projects
 - Almost 50% of CERUPT projects.
 - Similar ratio in minority buyers.
 - Brasil, Chile and Colombia largest providers of projects.
- Most of the projects focused on renewables; minority on efficiency or removal of other gases.
 - Hydropower accounts for 50% of projects by technology (or 54% of total amount negotiated)
 - Residue management, wind and biomass follow, accounting up to 16, 15 and 13% of technology (with 9, 15 and 13% of negotiated amounts)
 - NO₂ removal and Energy Efficiency not much used, at 3 and 5% (but 9% each of total negotiated amount).

Obstacles for CDM evolution

- **However:**
 - Relatively small market (only US\$210 million in the market so far)
 - Only relatively small projects (no project over 100MWs capacity)
 - Large scale projects shunned.
- **Current CDM Market:**
 - Hampered by high transaction costs
 - Ignores political and institutional developments & advances
 - Takes a “delicatessen” approach
 - Low number of buyers and sellers
 - Low flow of resources
- **Some reasons:**
 - Taken as a developmental aid problem, rather than as a market.
 - Assumes countries decision to implement policies implies actual implementation of the policy.
 - Considers technology change and/or improvements; does not take into account organizational and/or institutional improvements
 - Most gains would come from policies; however, policies preclude the development of CDM projects.

Possibilities for Flexible Mechanisms Evolution

- **But:**
 - Kyoto entry into force should provide significant additional impetus.
 - Carbon ton should increase in price –around US\$ 20 ton conservative by 2008)
 - European market should increase size of demand: 2,000 MTc traded annually; a 4,000 MM Euro market annually.
- **Current structure:**
 - Significant bottleneck for expanded supply of projects.
 - No capacity for provision of large scale projects (transport, cement, power sector, regional gas exports and imports)
 - Difficulty in providing sectoral, regional, or international projects (for cities, countries, or regions)
 - Demand could be met through other means.

Some possibilities :

- Sectoral Flexible mechanisms linked to policies and measures.
- Quantify costs for sectoral mitigation options
- Allow for regional agreements to create volume i.e regional bubbles (e.g. Mercosur, Andean Pact, Subregional energy agreements –Bolivia, Argentina, Chile; Bolivia, Peru, Mexico).
- Do not lose conditions already gained within negotiations.
- Emphasize agreements between markets; mainstream climate change into national policies.

A significant expansion of flexible mechanisms could be linked to financial resources for adaptation.

Opportunities and further work

Sectoral Approaches and Climate Change: Options for Development

Potential for sector level options – Examine power sector in Mexico as an example.

- Assessment of potential for sectorial approaches together with CCAP
 - Examine BAU and current policy options
 - Impact of policy options to diminish GHG production
 - Possible interaction with international architecture.
- Components:
 - International architecture options
 - Institutional and political economy constraints: legal and constitutional reform
 - Power sector:
 - Overview: capacity, fuel resources transmission, financing, expansion & costs; demand
 - Renewables
 - Energy efficiency
 - Distributed generation
 - Potential options
 - Domestic options
 - International options
 - Possible links
 - Long term modelling analysis with policy options
 - BAU
 - Alt BAU with current options
 - Possible combinations with int. support

Sectoral Approaches and Climate Change: Options for Development

Regional Strengths.

Active participation in negotiation

- Principles within the convention
- CDM has a Latin American heritage (both Scandinavian and Brazilian proposals, Central America pioneered its use)
- Countries have advanced both negotiation schemes and possible compromises.
- Active participation in LULUCF and Sinks

Adaptation

- Importat experience in México, expansion to Caribbean
- Coordination mechanisms already in place subregionally (Andean, Central America, Caribbean).

Co – benefit policies & Mitigation :

- First experiences in Uruguay, Argentine.
- Current experience in Brazil, most Andean Countries, Mexico.
- Experience at quantification developing through national communications.

Flexible Mechanisms

- Important experience already gained in Brasil, Southamerica.
- Business & Regional financial institutions
Interest

Potential for cooperation at sub regional level

Cooperation among countries

- In similar policy situations
- With similar adaptation and/or mitigation challenges
- In same subregiones.
- Further engagement of regional institutions into climate change (IBD, AFC, Research Institutions, Regional Parliaments)

Adaptation

- Share experiences and policies.
- Take advantage of policies already developed.
- Continue Instituion building and development.

Co – benefit policies:

- International architecture options
- Develop policies and measures for specific sectors
- Complementarities and linkages across policies to build momentum.

Flexible Mechanisms

- Quantify and measure potential for mitigation
- Expand flexible mechanisms for sectoral use.
- Link regional energy and fuel agreements to flexible mechanisms

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