City Climate Action Plan Analysis in Latin America and the Caribbean

Summary Report

Argentina | Brazil | Chile | Colombia | Ecuador | Honduras | Jamaica | Mexico | Peru

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About

The following report presents the results of analyzing 30 city-level Climate Action Plans (CAPs) from Latin America and the Caribbean region, the cities analyzed are listed below.

Argentina:	Buenos Aires, La Paz, Rosario, San Carlos de Bariloche, San Carlos Sud, Villa General Belgrano
Brazil:	Recife, Rio de Janeiro, Salvador, Sao Paulo
Chile:	Independencia, Peñalolen, Santiago, Temuco, Vitacura
Colombia:	Bogota, Cali, Cartagena, Medellin
Ecuador:	Quito
Honduras:	Tegucigalpa
Jamaica:	Montego Bay
Mexico:	Bahia de Banderas, Culiacan, Guadalajara, Juarez, Madero, Mexico City, Zapopan
Peru:	Lima

The report presents a comparative analysis between climate action plans including information gaps, GHG emissions scenarios, and climate actions.

How do cities compare?
CAP Analysis

For all 30 CAPs, the following information was analyzed:

- **Mitigation diagnostic information**

GHG Emissions inventories,

Business As Usual Scenarios

Ambitious Emissions Reductions Scenarios

- **Adaptation diagnostics**

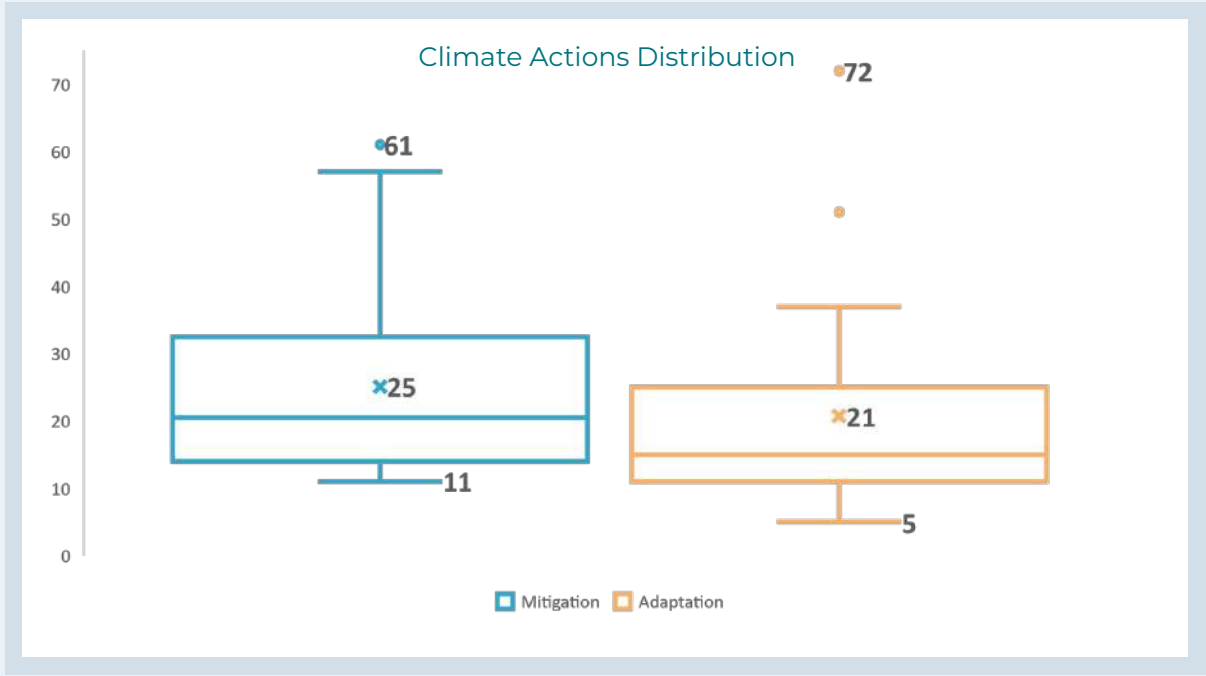
Climate Risk and Vulnerability Assessment

For more information on the technical information used for the CAPs, the **Climate Action Plan Stocktaking report** assessed if a CAP is evidence-based. Part of the criteria analyzed is the quality of both the GHG Inventories and the CR&V Assessments for each CAP analyzed.

- **Climate actions.**

All climate actions 753 mitigation and 622 adaptation actions were classified into sectors and subsectors.

For each city, between 10 and 20 actions were selected for a more detailed analysis which included quality of action design, costs, and emission reductions.



Climate Actions

CAPs varied significantly in the number of climate actions. On average CAPs had 25 mitigation and 21 adaptation actions. Although those numbers ranged from 11-61 mitigation actions and 5 to 72 adaptation actions.

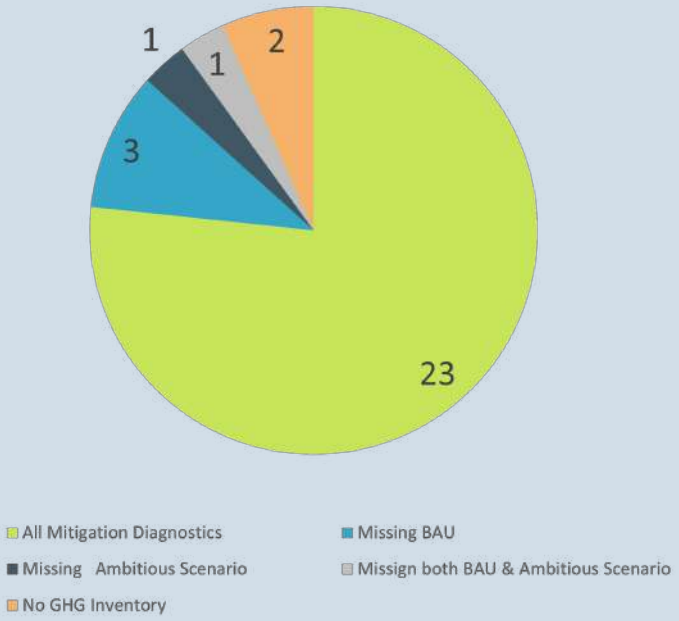
How do cities compare?

Information Gaps in CAPs

Of the 30 CAPs analyzed:

Only 23 (77%) had complete mitigation diagnostics information. 2 (6.7%) had no mitigation diagnostics information at all.

Mitigation Diagnostics



Detailed climate action analysis

To generate a more detailed analysis of climate actions a total of **170 mitigation and 160 adaptation actions were analyzed.** Actions were selected based on priority level. If the priority level was not specified in the CAP actions were selected based on relevance.

Although most cities state that they have identified financing sources for their climate actions most CAPs do not estimate costs per action. **The lack of costing information is problematic because without an estimated budget, funding sources might not be realistic.**

Mitigation Actions

Of the 170 mitigation actions

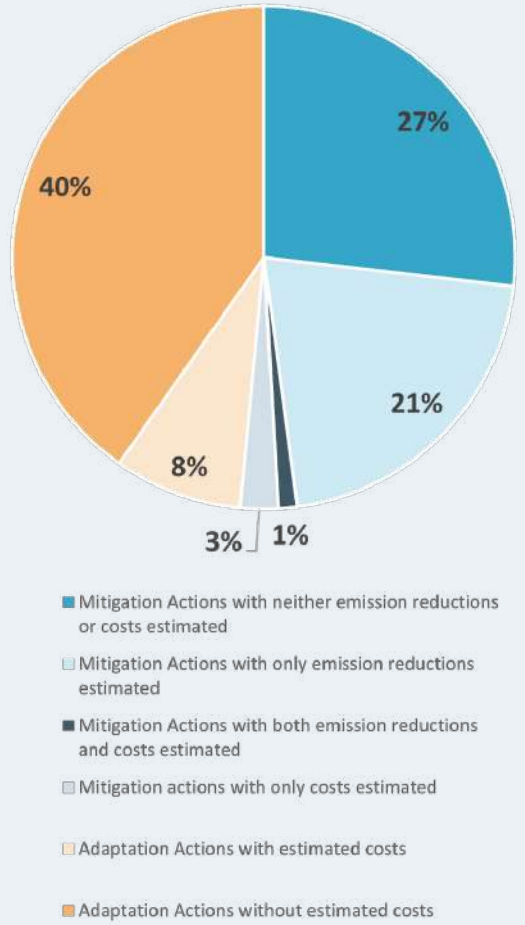
12 estimated action costs
73 estimated emission reductions
4 estimated both emission reductions and cost.

Adaptation Actions

Of the 160 adaptation actions

27 estimated action costs

Climate Actions Analized



Future GHG Emissions Scenarios BAU vs Ambitious Scenario

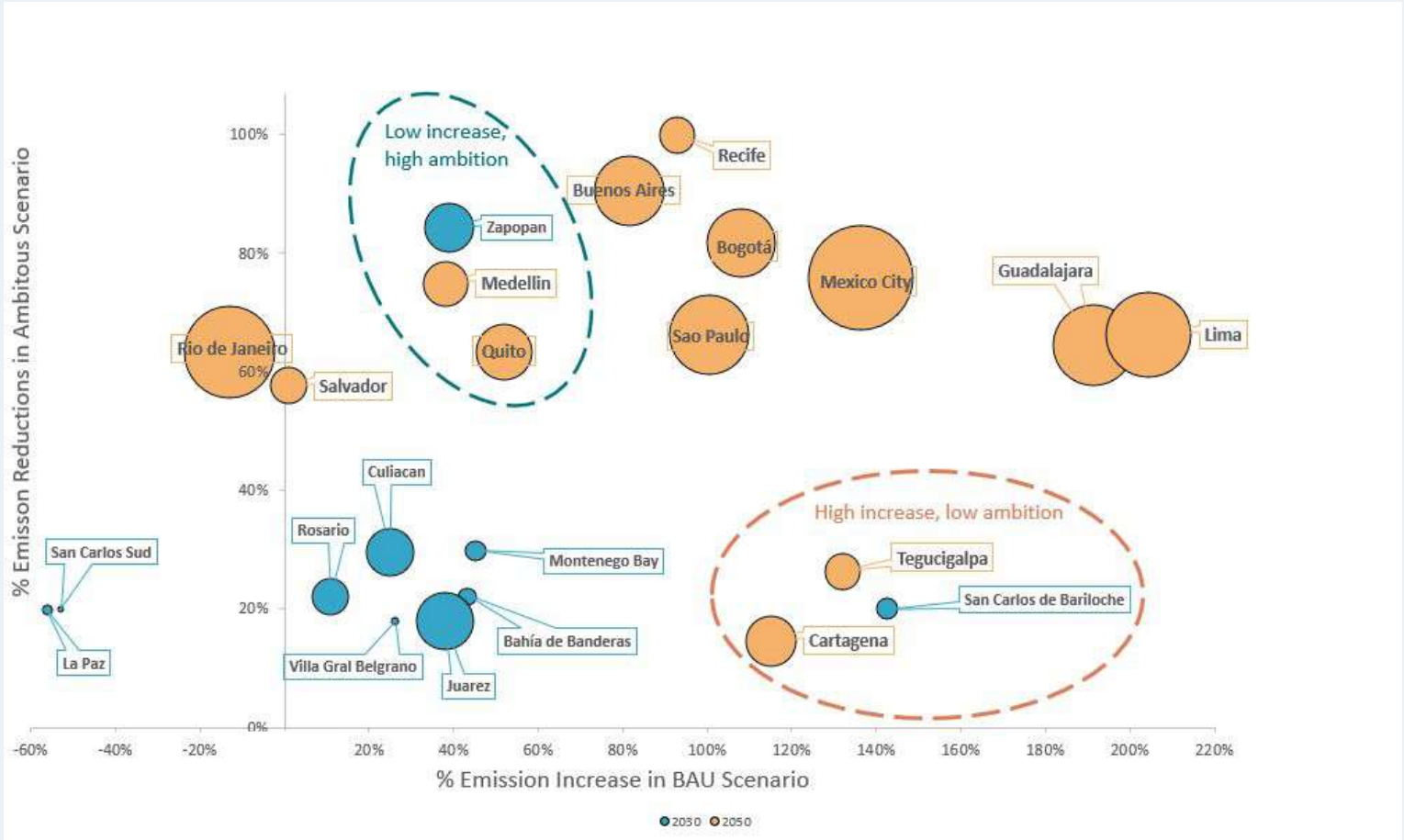
Of the 23 CAPs that had both a BAU and an ambitious Scenario, 43% model emissions up to 2030 and 57% model up to 2050.

The cities with the highest total GHG emissions all had 2050 future emission scenarios.

Salvador and Rio de Janeiro had difficulties using the Pathways tool in their future emission projections. As a result, Salvador had almost no change between the BAU scenario and current emissions, while Rio de Janeiro's BAU scenario was lower than current emissions.

San Carlos Sud and La Paz quantified AFOLU emissions in their GHG emission inventory but not in their future emission scenarios which is why their BAU emissions decreased.

Tegucigalpa, San Carlos de Bariloche, and Cartagena were the least ambitious in their mitigation goals relative to their expected BAU emission increase.



The graph shows % emission increase in BAU Scenario vs % emission decrease in the Ambitious Scenario. Circle size is proportional to total current emissions.

How do cities compare?

Climate Actions: Mitigation

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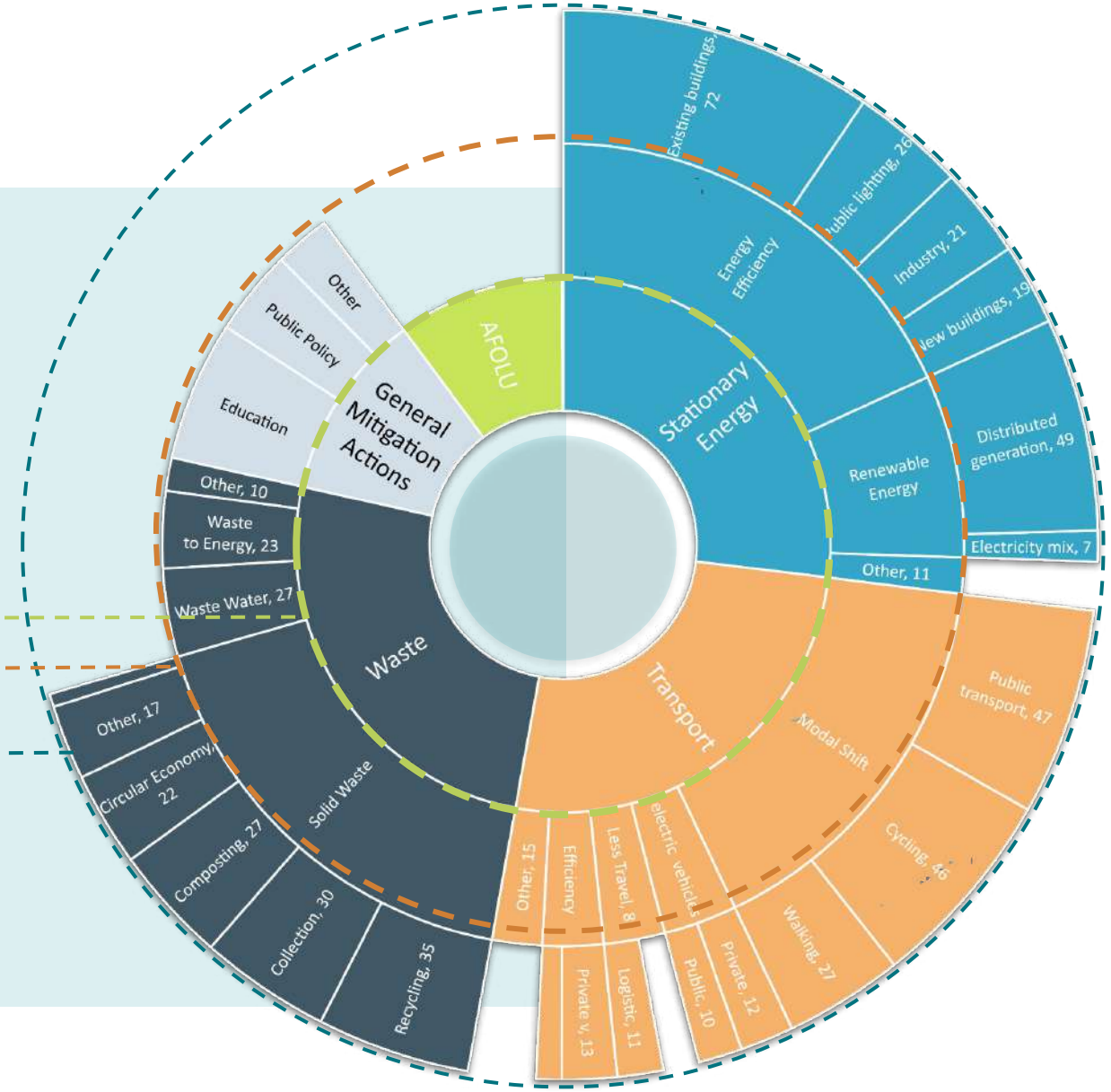
All CAP mitigation actions were **classified into five sectors:** general mitigation, stationary energy, transport, waste, and AFOLU.

Each sector was divided according to **action type.**

In some cases, **subsectors were further divided** to give a more detailed description.

Stationary energy, transport, and waste had an even distribution of mitigation actions with 27%, 26%, and 26% respectively.



The Sunburst chart shows the sum of all mitigation actions found in the 30 CAPs analyzed that fall into a specific category. In total 753 actions were classified.

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How do cities compare?
Mitigation Actions

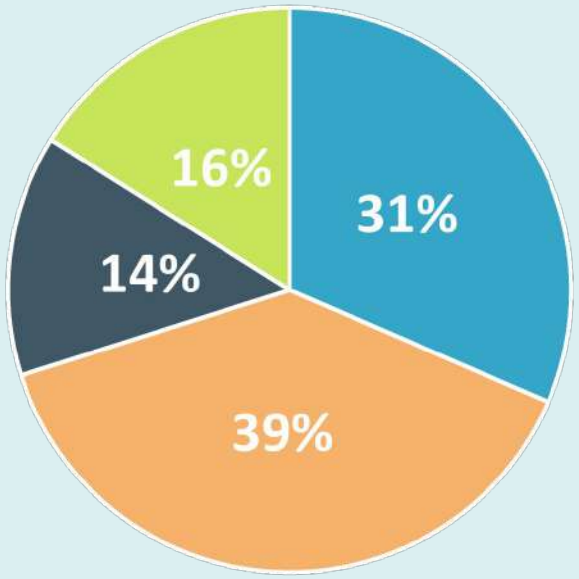
Ambitious Scenario vs Mitigation Actions

The number of mitigation actions is evenly distributed across Stationary Energy, Transport, and Waste sectors.
In contrast, **expected emission reductions in the CAPs' ambitious scenarios are heavily focused on transportation** with 39% of emission reductions followed by stationary energy with 31% of emission reductions. Because a single transportation action could have a large impact in reducing emissions this is not necessarily a discrepancy.

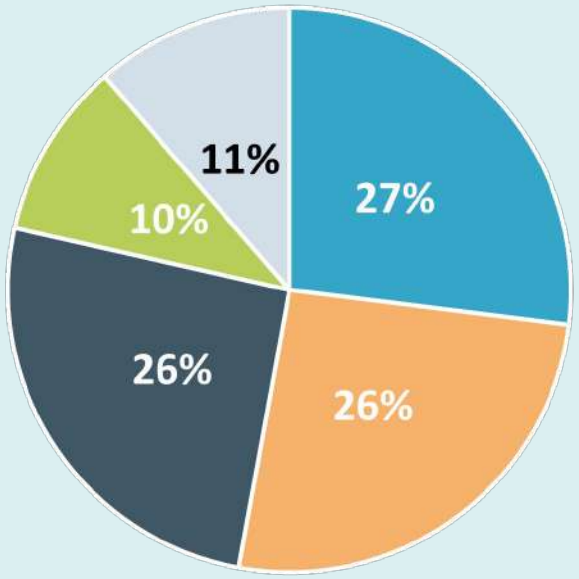
Despite the relatively low emission reduction potential of the waste sector, **on average there is the same number of waste mitigation actions as transportation or stationary energy actions**.

A possible explanation for this is that cities' take into account factors such as co-benefits, ease of implementation, city's jurisdiction, and public opinion as well as potential emission reductions when selecting mitigation actions.

Emission Reductions Distribution in Ambitious Scenario



Mitigation Actions Distribution



Stationary Energy Transport Waste AFOLU General Mitigation

How do cities compare?
Mitigation Actions

How do subsectors compare?

Energy:

- On average, energy efficiency actions had a larger emission reduction potential than renewable energy actions.

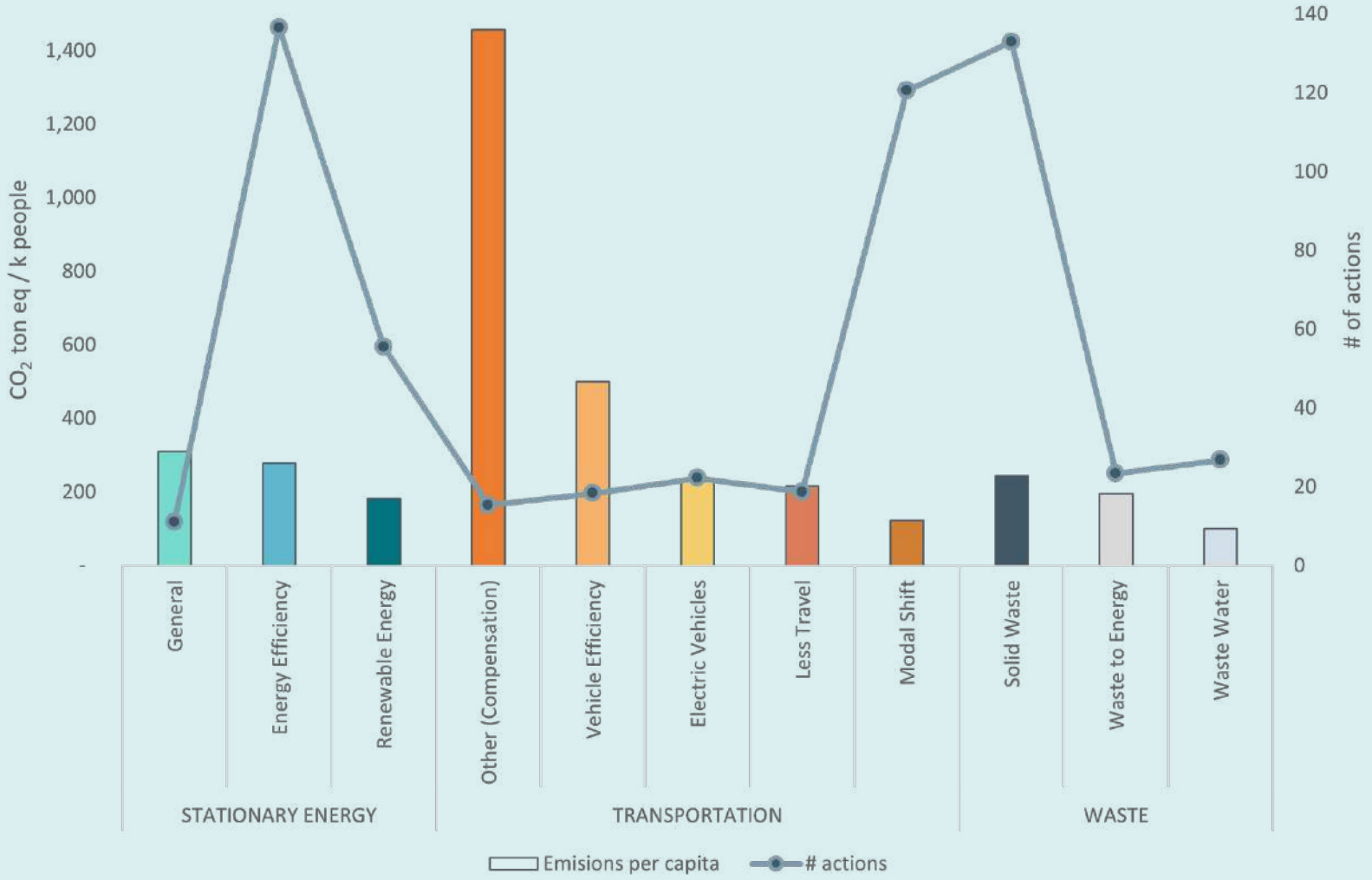
Transport

- Modal shift actions are the most recurrent transportation actions although their emission reductions per capita are smaller than all other subsectors.
- Improving vehicle efficiency, particularly in private vehicles shows the largest transportation emission reductions, besides compensation of transportation actions.

Waste

- On average solid waste actions were the most popular and had the biggest emission reduction potential of all waste mitigation actions.

Average Emission Reductions per capita & sum or mitigation actions for each sub-sector



Only 73 of the 170 selected mitigation actions had emission reduction information. All mitigation actions were classified and considered in the sum of mitigation actions.

1 Quito, Tegucigalpa, Montego Bay, and Lima

How do cities compare?
Mitigation Actions

	Best Sellers	# actions	Largest Emission Reduction	CO_2 ton $_{eq}$ / k people
Stationary Energy	**Energy efficiency** in existing buildings	71.5	**Energy efficiency** in existing buildings	740
	Distributed **renewable energy**	48.5	**Energy efficiency** in the industrial sector	370.2
	Energy Efficiency in Public lighting	25.8	**General** stationary energy reductions	309.6
Transport	**Modal Shift** to:		Emission **Compensation**	1,456.3
	Public Transport	47.3	Increase in private **vehicle efficiency**	791.6
	Cycling	36.2	Increase **vehicle efficiency** and electric vehicles	366.9
	Walking	37	Urban Planning to **reduce travel**	356.8
Waste	Recycling of **solid waste**	34.9	Composting of **solid waste**	508.5
	Improving **solid waste** collection	29.8	Promotion of **Circular Economy**	341.3
	Wastewater treatment	26.7	Not specific **waste to energy**	206.6

How do cities compare?
Mitigation Actions

Mitigation Actions & Nationality

Stationary Energy

The largest % of stationary energy mitigation actions can be found in Argentinian and Mexican CAPs, while "other"[1] CAPs have the lowest % of mitigation actions.

Transport

The largest % of transportation mitigation actions can be found in Colombian CAPs, while Chilean CAPs have the lowest % of actions. This makes sense given that only 1 Chilean city quantified their transportation GHG emissions.

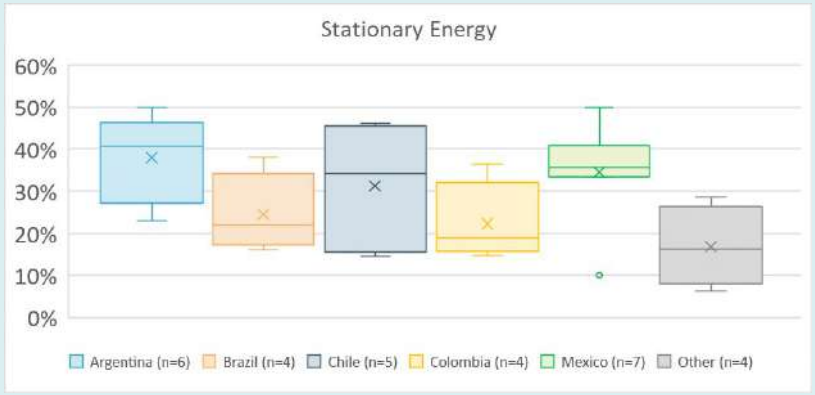
WASTE

On average, **there is less variability per country in % of waste actions** compared to the stationary energy and transportation sectors. The largest % of waste mitigation actions can be found in "other"[1] CAPs.

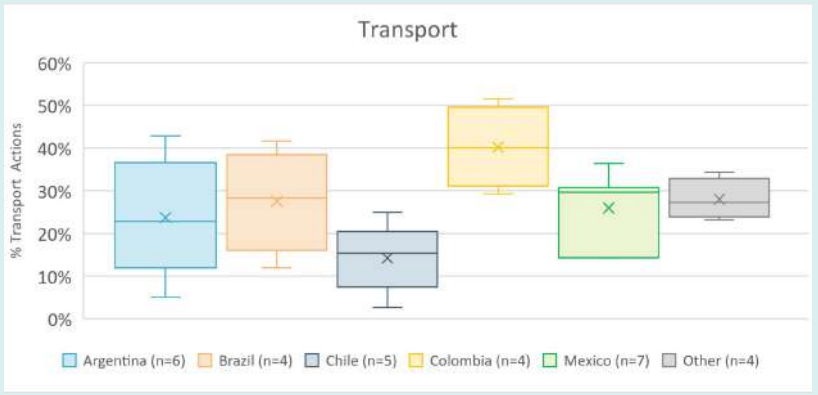
AFOLU

On average, **% of AFOLU actions are lower than other sectors.** The largest % of AFOLU mitigation actions can be found in "other"[1] CAPs.

Stationary Energy

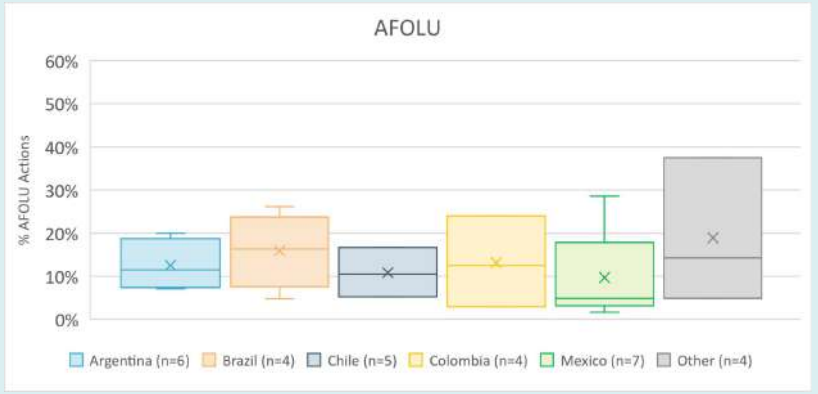


Transport



Waste

AFOLU



On average, the country to which the city belongs appears to have a larger effect on mitigation action distribution by sector than the partner organization, main economic activity, rural-urban categorization, GDP and population.

1 Quito, Tegucigalpa, Montego Bay, and Lima

How do cities compare?

Climate Actions: Adaptation

Adaptation actions were **classified by threat**: rain floodings/sea level rise, biodiversity loss, drought, extreme heat, mass movement, wildfire, chemical change, vector-borne diseases, and general adaptation.

Each sector was divided according to **action type.**

In some cases, **subsectors were further divided** to give a more detailed description. Chemical change and vector-borne diseases were not subdivided.

The Sunburst chart shows the sum of all adaptation actions found in the 30 CAPs analyzed.

General adaptation, rain flooding/sea level rise, and biodiversity loss had the most adaptation actions with 39.4%, 15.8%, and 14.7% respectively.

The Sunburst chart shows the sum of all adaptation actions found in the 30 CAPs analyzed that fall into a specific category. In total 622 actions were classified.

How do cities compare?
Adaptation Actions

General Adaptation

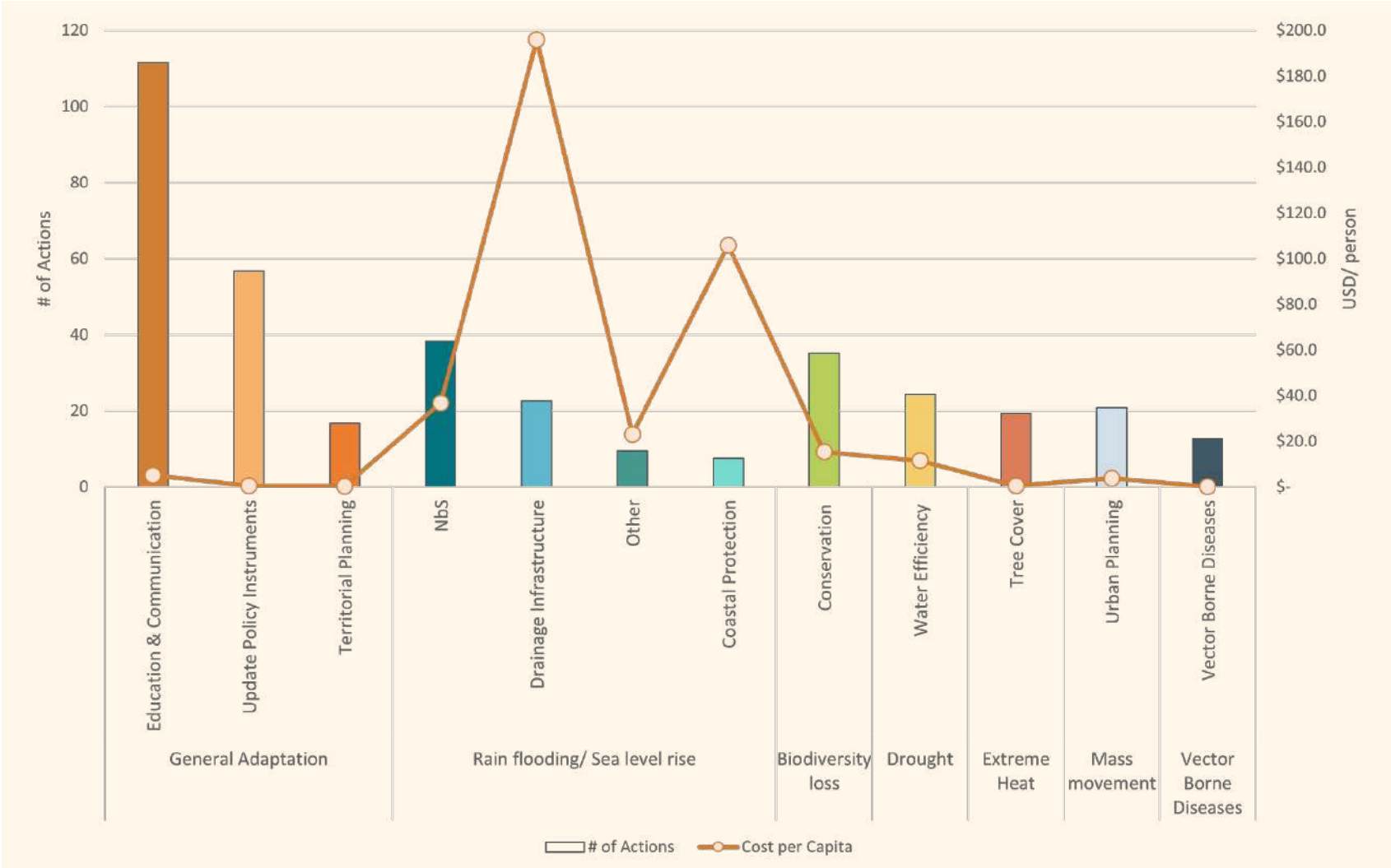
- General Adaptation actions such as Education & Communication, and Policy Instruments Updates were both the most recurrent adaptation actions and much less expensive than other actions with costs ranging from $0.5 to 5.2 USD per capita.

Rain flooding/sea level rise

- Flooding & sea-level rise actions, particularly Nature-Based Solutions (NbS), were the most recurrent actions, after General Adaptation actions.
- The highest average action costs per capita are $195.9 from drainage infrastructure although those are largely driven by two actions, the implementation of Cartagena's Drainage Master Plan ($836 USD) and the rehabilitation of Tegucigalpa's sewage system ($93.8 USD).
- All other drainage infrastructure costs range from $4.3to 38.5 USD per capita.

Biodiversity Loss

- Conservation actions had an average cost of $15 USD per capita. The conservation of Natural Protected Areas ($1.07) is less expensive than conservation efforts in unprotected areas ($29.6).



1 Quito, Tegucigalpa, Montego Bay, and Lima

How do cities compare?
Adaptation Actions

	Best Sellers	# actions	Costs	USD per capita
General Adaptation Actions	○ **Education** & Communication	111.6	○ **Education** & Communication	5.16
	○ Update **Policy Instruments**	56.7	○ Territorial Planning	0.39
	○ Increase **Civil Defense** Capabilities	22	○ Update **Policy Instruments**	0.50
Flooding/ Sea level rise	○ Drainage **Infrastructure**	22.6	○ Drainage Infrastructure	195.91
	○ New **Green Spaces**	19.7	○ Wave Breakers	172.88
	○ Wetland **Conservation**	10.3	○ Coastal Protection	65.76
Biodiversity loss	○ Urban **Afforestation**	27.1	○ **Conservation** of unprotected areas	29.6
	○ **Conservation** of Natural Protected Areas	23.3	○ **Conservation** of Natural Protected Areas	1.07
	○ **Monitoring & restoration**	20		
Drought	○ **Water Efficiency**	19.1	○ **Water Efficiency**	11.53
	○ **Rainwater recovery**	11.5		
	○ **Conservation** of water basin	11		
Extreme Heat	○ Increase **tree cover**	19.3	○ Increase **tree cover**	0.53
	○ **Green roofs** and/or **walls**	7.8		
Mass Movements	○ **Urban Zoning**	10.2	○ **Urban Zoning**	3.90
	○ **Urban resettlement**	6.8		

How do cities compare?
Adaptation Actions

City Characteristics & Adaptation Actions

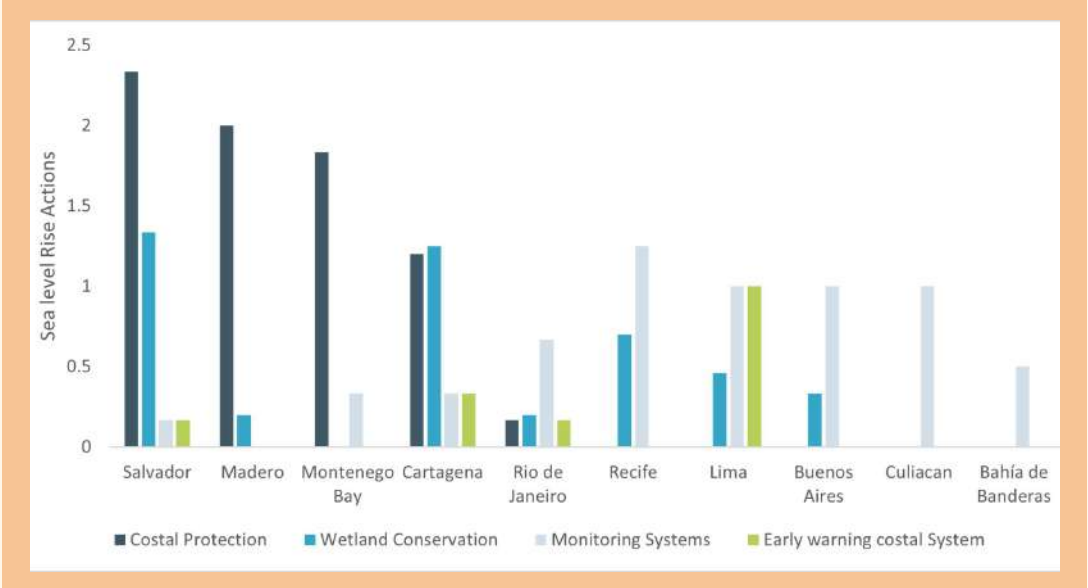
When comparing adaptation actions to city characteristics there was no correlation between:

- Average **precipitation** and % of **flooding** actions (All cities have identified and addressed flooding risks in their CAPs).
- Maximum or average **temperature** and % **extreme-heat** actions
- Low **precipitation** and % of **drought**-related actions
- Cities implementing **drought** adaptation actions and those that include **wildfire** adaptation actions.
- **Temperature** or **precipitation** and % **vector-borne diseases** actions.

General Adaptation Actions

In cities developing their 1st or 2nd CAP, general actions such as strengthening public policy instruments and education were between 30-40% of total adaptation actions. In contrast, cities with more experience in CAPs had a lower % of general adaptation actions. **It is noteworthy that these actions are important first steps for a city to develop enabling conditions for effective climate adaptation actions.**

We can expect that as cities gain more experience, their climate actions become more specific



Coastal Cities

All coastal cities had at least one type of sea-level rise mitigation action.

Madero was the only coastal city not to include a monitoring or early warning action, although it did include coastal protection actions such as the construction of wave breakers. **Only 4 cities included coastal protection actions which tend to be more expensive.**

Takeaways

Mitigation

- Some cities need to improve their mitigation diagnostic information, mostly Chilean cities.
- **Energy efficiency measures were the most popular stationary energy action and had the largest emission reduction potential of all stationary energy mitigation actions,** this might be because cities often have very little control over their electricity mix but more control over public lighting and building regulations.
- **The transport sector shows the largest emission reduction potential, particularly in increasing vehicle efficiency. CAPs tend to focus more on modal shift actions,** probably because they align with other municipal development plans and are easier to implement than programs aimed at increasing vehicle efficiency.
- **Waste is the only sector where the % of sector actions is consistently larger than emission %.** An explanation could be that waste management usually falls directly under the municipalities' administration and is, therefore easier for most cities to implement mitigation actions. Also, improving waste management has a series of health co-benefits

Adaptation

- Some cities destine a large percentage of their adaptation actions towards strengthening education and communication programs as well as updating policy instruments. **This actions are important first-steps for a city to develop the conditions that might enable further climate adaptation actions.** We can expect that as cities gain more experience and **create enabling conditions for climate action, their climate actions will become more specific**
- **Most cities focus on flooding risk much more than on any other climate hazard.** Because of the different methodologies and reporting formats used across CAPs, it is difficult to compare flooding risk per city. However, all cities have identified flooding as a climate hazard and include adaptation actions that directly address flooding risk.

  An explanation for the larger focus on floods could be that climate change adaptation includes disaster risk management and floods are one of the most recurrent natural disasters.
  Despite their larger costs drainage infrastructure actions were the second most common flood adaptation action.
- **Nature-based solutions actions were the most common flood and extreme heat adaptation actions.** This could be due to their lower implementation cost and multiple co-benefits.

Glossary

Climate Action Plan Recommendations

Biological Hazards: bacteria, viruses or parasites, and insects carrying disease-causing agents.

Chemical Change: chemical pollution in the air, water, and soil.

General Adaptation Actions: actions that do not address any of the listed mitigation hazards specifically but create enabling conditions for adaptation actions.

General Mitigation Actions: actions that i) do not focus on any of the listed emission sectors but create enabling conditions for mitigation actions.

Mass Movements: movement of soil under the force of gravity. The most common mass movements are landslides.

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