

Resilience Now:

 MarshMcLennan

Closing the Adaptation
Gap in Latin America
and the Caribbean



Inter-American
Development Bank



**Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library**

Resilience now: closing the adaptation gap in Latin America and the Caribbean (LAC) / Inter American Development Bank; editors, Swenja Surminski, Rene Rios, Juan Sebastian Morales, Alfred Grunwaldt, Hilen Meirovich, Yuri Soares, Esperanza Gonzalez, Juliana Almeida.

p. cm. — (IDB Monograph ; 1314)
Includes bibliographical references.

1. Climatic changes-Latin America. 2. Climatic changes-Caribbean Area. 3. Resilience (Ecology)-Latin America. 4. Resilience (Ecology)-Caribbean Area. 5. Climate change adaptation-Latin America. 6. Climate change adaptation-Caribbean Area. I. Surminski, Swenja, editor. II. Rios, Rene, editor. III. Morales, Juan Sebastian, editor. IV. Grunwaldt, Alfred, editor. VI. Soares, Yuri, editor. VII. González-Mahecha, Esperanza, editor. VIII. Almeida, Juliana S., editor. IX. Inter-American Development Bank. Climate Change Solutions Division. X. Title. XI. Series.

IDB-MG-1314

Keywords: adaptation to climate change, vulnerability, building climate resilience, closing adaptation gap, private sector led adaptation, innovative financial solutions for adaptation, adaptive capacity.

JEL Codes: Q50, Q54, O21

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Acknowledgments:

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Executive summary

Latin America and the Caribbean (LAC) is confronting increasing climate risks that threaten its economic stability, social cohesion, and environmental sustainability. The region, home to 660 million people and a GDP nearing USD 7 trillion¹, is increasingly vulnerable to extreme weather events. Indeed, about \$1.2 million are lost every hour due to natural disasters, including hurricanes, droughts, and flooding. These climate hazards disproportionately impact marginalized communities, deepen poverty, and strain public health and infrastructure systems, potentially leading to a decline of up to 23% of per capita GDP in some countries by 2050².

Despite growing awareness and the expansion of adaptation tools — including engineered infrastructure, nature-based solutions, technological innovations, and financial instruments — current resilience efforts remain insufficient. Key barriers include fragmented governance, limited financial resources, inadequate institutional capacity, and significant protection gaps, particularly in insurance coverage. The annual financing gap for adaptation in LAC is estimated at approximately \$47 billion by 2035, underscoring the urgent need for scaled-up, sustainable investments.

To increase current and future resilience and to build a well-adapted LAC, four strategic priorities are essential: (1) moving from assessing to addressing risks by enabling iterative adaptation management; (2) mainstreaming adaptation by embedding resilience into development planning, climate mitigation, and nature-conservation efforts (3) harnessing technological innovation to enhance data-driven decision-making and proactive risk management; and (4) deploying finance and insurance intelligently to incentivize resilience investments, expand access to risk transfer mechanisms, and scale innovative adaptation finance approaches.

The Inter-American Development Bank Group (IDBG) exemplifies leadership in these areas by delivering innovative financial and sustainable solutions to scale impact in the region. It also does so by acting as a bridge between the private and public sectors and enabling new ways for the much-needed flow of climate and nature finance and by providing means of implementation on the ground. Successful projects demonstrate the value of integrated approaches that combine infrastructure upgrades, ecosystem restoration, and inclusive governance. Delivering those at scale and moving from individual projects to a programmatic adaptation approach is needed to match the scale of the challenge.

Climate impacts are projected to intensify as greenhouse gas emissions continue to rise. These effects — considering temperature shocks and sea level rise alone — could reduce average GDP per capita by nearly 10% as a forthcoming analysis from the Grantham Research Institute³ shows. In this context, investing in adaptation is no longer optional; it is an urgent necessity that delivers a “triple dividend”: it helps avoid economic losses, stimulates growth through new opportunities, and generates broader social and environmental co-benefits. To be effective, countries must adopt context-specific strategies that prioritize mainstreaming

1. Unless otherwise indicated, all amounts are in U.S. dollars

2. Economic Commission for Latin America and the Caribbean (ECLAC), The economics of climate change in Latin America and the Caribbean, 2023: financing needs and policy tools for the transition to low-carbon and climate-resilient economies (LC/TS.2023/154), Santiago, 2023.

3. Grantham Research Institute on Climate Change and the Environment (forthcoming): The Macroeconomic Case for Adaptation Investment, London School of Economics and Political Science.

adaptation into development planning. They must mobilize innovative financing mechanisms and strengthen domestic markets for adaptation technologies and services.

This report underscores the critical urgency as well as the opportunities for LAC in accelerating climate adaptation through coordinated, well-funded, and innovative actions that address both current vulnerabilities and future risks.

Introduction

LAC is a vibrant and resource-rich region, home to 660 million⁴ people and a combined GDP of nearly USD 7 trillion⁵. It is the world's fourth largest economy after the United States, China, and Europe⁶. Over the past two decades, despite global shocks like the 2008-2009 financial crisis and the COVID-19 pandemic, the region has sustained an average annual GDP growth of approximately 2.5%⁷. This has been driven primarily by commodity exports, increased foreign direct investment, and regional integration initiatives. At the same time, the region has made meaningful progress in social development, reducing rates of poverty and extreme poverty from 44% and 12.2% in 2001 to 27.3% and 10.6% in 2023, respectively⁸.

Yet, beneath this progress lie persistent challenges, including high debt-to-GDP ratios, substantial fiscal gaps, elevated interest rates, and the urgent need for comprehensive fiscal reforms⁹. Rapid urbanization, and high levels of inequality also threaten the region's development. Despite significant achievements in reducing poverty, the region continues to be the most unequal globally, underscoring persistent social and economic disparities¹⁰.

Compounding these challenges is the escalating threat of climate change. LAC is among the most climate-vulnerable regions globally, facing extreme events such as hurricanes, heatwaves, floods, and wildfires that are intensifying, alongside chronic shifts like more drought and rising sea levels. These physical climate risks jeopardize not only environmental stability, but also economic growth, social cohesion, and long-term development. Lessons from past events and projections of future development demand urgent action focused on emissions reductions, natural recovery, and the strengthening of community resilience.

In keeping with COP30's focus on scaling up adaptation, this flagship report emphasizes the urgent need for forward-looking action in LAC. Climate impacts are accelerating, and adaptation needs — as well as the financing gap to meet them — are rapidly growing. These developments

4. World Bank Group. Population, total – Latin America & Caribbean. Retrieved from: Population, total - Latin America & Caribbean | Data

5. OECD. Latin America and the Caribbean. Retrieved from: <https://www.oecd.org/en/regions/latin-america-and-the-caribbean.html>

6. World Bank Development Indicators 2023 figures. OECD. Three Decades Advancing Better Policies For Better Lives. Retrieved from: <https://www.oecd.org/content/dam/oecd/en/about/directorates/grc/lacrp/oecd-lac-strategic-partnership.pdf>

7. World Bank Group. GDP growth (annual %) – Latin America & Caribbean. Retrieved from: GDP growth (annual %) - Latin America & Caribbean | Data

8. Latin America & Caribbean Regional Social-Demographic Profile. ECLAC. Retrieved from: Perfil regional social-demográfico - CEPALS-TAT Portal de Datos y Publicaciones Estadísticas

9. Galindo, A., & Izquierdo, A. (2024). 2024 Latin American and Caribbean Macroeconomic Report: Ready for Take-Off? Building on Macroeconomic Stability for Growth. <https://doi.org/10.18235/0005667>

10. Bachelet, Pablo (2024). The Complexities of Inequality in Latin America and the Caribbean. IDBG. Retrieved from: IDB | The Complexities of Inequality in Latin America and the Caribbean



make it critical to operationalize the Global Goal on Adaptation, improve access to adaptation and loss and damage finance, and scale adaptation efforts across sectors and governance layers¹¹.

In response, the IDBG's climate adaptation ambition focuses on three priority areas:

- **Closing the gaps in climate, nature, and development financing** through partnerships, innovation, and a focus on measurable impact.
- **Acting as a bridge** by connecting governments and investors, the public and private sectors, and individuals and communities.
- **Supporting national priorities** by helping countries assess and address their own resilience needs and improving lives across the region.

Encouragingly, there are several public and private sector efforts underway in LAC, driving climate adaptation¹² and resilience¹³ in areas such as policy and planning, capacity building and knowledge sharing, and financial mechanisms.

These efforts can take on many forms, depending on the unique context of a community, business, organization, country, or region, and the kind of climate event faced (rapid-onset¹⁴ or slow-onset¹⁵). There is no “one-size-fits-all-solution.” Adaptation can range from building flood defenses and establishing early warning systems for windstorms, to switching to drought-resistant crops and redesigning communication systems, business operations, and government policies¹⁶.

Current efforts, however, are clearly not sufficient to keep pace with increasing risk levels. Scaling-up adaptation means not only boosting the overall volume of financial resources available. It also entails ensuring these resources are channeled through instruments suited to the region's needs, that the right enabling conditions are present, and that the limits of adaptation are recognized. Indeed, the faster the world heats up, the closer we get to adaptation limits in both natural and human systems.

11. COP 30: The UN Climate Change Conference

12. The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In natural systems, adaptation refers to the adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.” (IPCC AR6, Chapter 4, Box 4.1)

13. The capacity of a system, community, or society exposed to hazards to resist, absorb, accommodate, or recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of essential basic structures and functions.” (IPCC AR6, Chapter 4, Box 4.1)

14. Events such as floods, hurricanes, etc., which cause shocks and disasters

15. Events such as desertification, rise in average temperatures, progressively rising sea levels, etc.

16. Ibid

This report charts a path forward, drawing on decades of experience with disaster risk management as well as more recent efforts to move to iterative adaptive strategies and lessons learned from innovative approaches. Delaying adaptation will only increase economic costs and fiscal pressures, undermining the region's ability to cope with a warming world. Climate adaptation can no longer be considered an option for the future or a distant concern. It must be seen, alongside economic development, as a priority for nations and communities so that a sustainable future for LAC and its people is secured.

1. The urgency to act

The urgency of climate adaptation in LAC is clear – the region is already facing noticeable social, economic and environmental impacts from current risks, and future trends are expected to increase significantly unless significant adaptation action is taken now.

1.1 LAC is already having to deal with a wide range of physical climate events

Across LAC, a wide range of physical climate risks are already leading to deaths, damage, and disruptions, most notably hurricanes, wildfires, droughts, and floods. Over the last 25 years, the region has experienced 30% of the world's most severe storms and 22% of the world's most severe floods, and an IDB analysis suggests that over that time period approximately \$1.2 million have been lost every hour due to natural disasters.¹⁷

In 2024 alone, the Atlantic hurricane season had an above average number of storms (18 named storms compared to an average of 14 for 1991-2020). Three heatwaves affected Mexico between April and June, the Amazon basin faced one of the most severe droughts in its history, and Venezuela became the second country in the world to lose all its glaciers¹⁸.

For the past five decades, the number of climate-related events has increased (see **Figure 1**)¹⁹. This coincides with rising temperatures in the region (+0.90°C relative to 1991-2020²⁰) and is influenced by climate variability due to El Niño/La Niña effects.

The size of the impacts created by any of these events and by chronic changes, such as sea-level rise, depends on a variety of factors, as shown in **Figure 2**. Across LAC it is precisely this interplay of risk drivers that creates the devastating impacts that communities and businesses experience, including the loss of lives, direct and indirect damages and disruptions, health

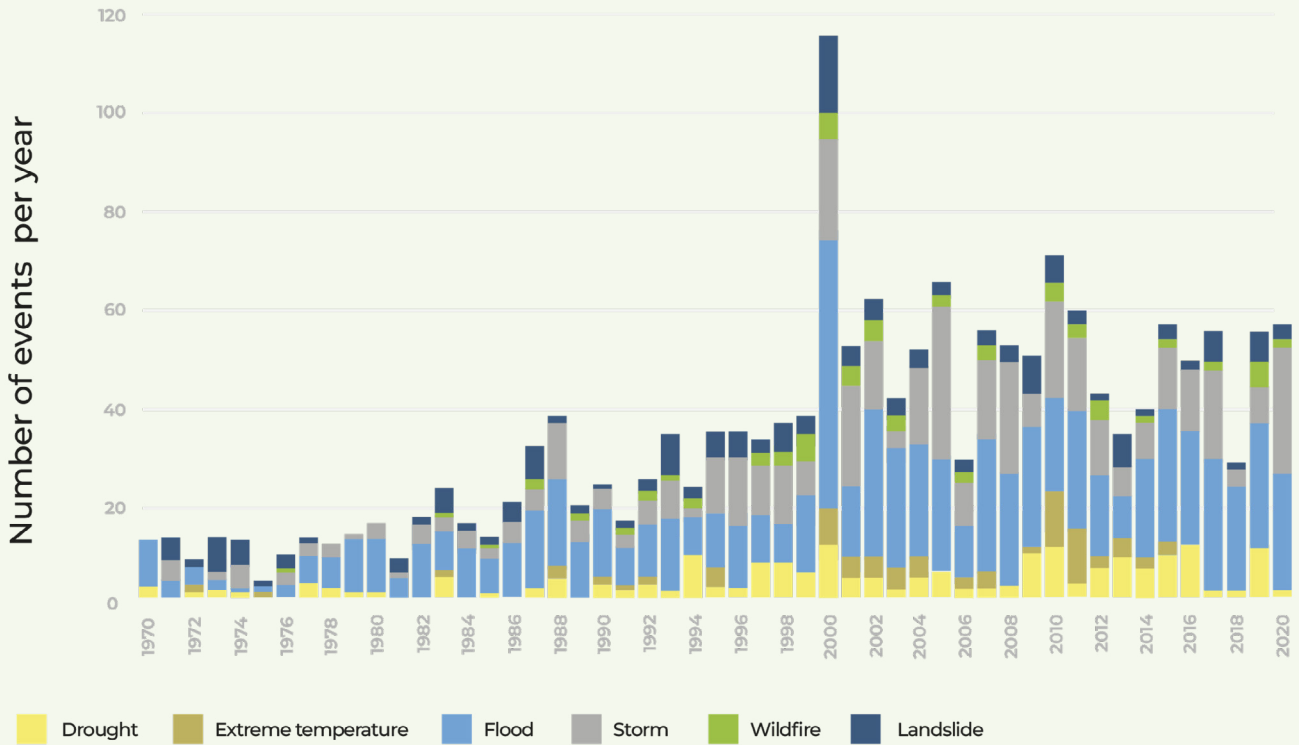
17. IDB (2024). *Peril and Promise: Tackling Climate Change in Latin America and the Caribbean*

18. World Meteorological Organization. (2025). *State of the Climate in Latin America and the Caribbean 2024* (WMO-No. 1367). Geneva, Switzerland: Author. <https://doi.org/10.0000/wmo.1367>

19. IDB (2024). *Peril and Promise: Tackling Climate Change in Latin America and the Caribbean*.

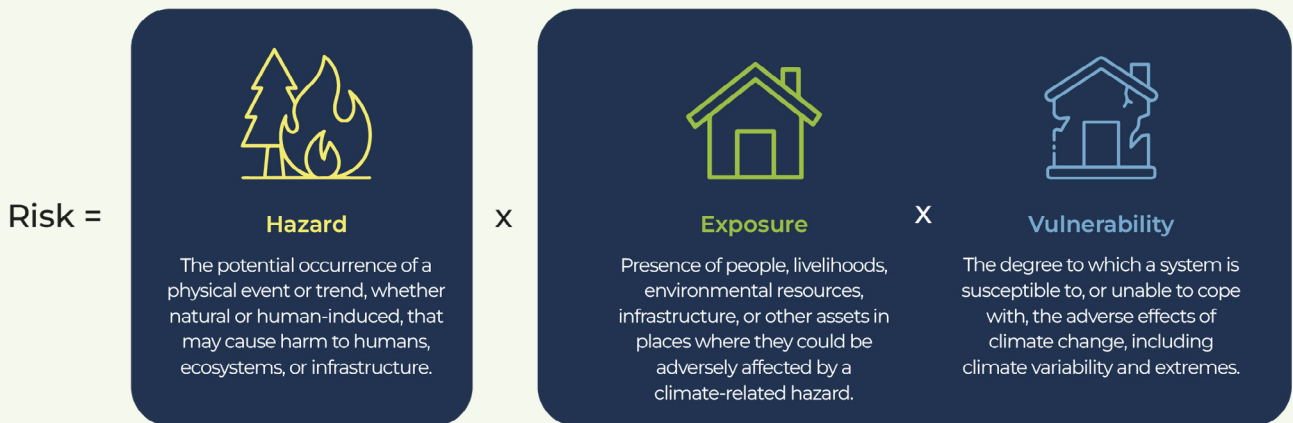
20. World Meteorological Organization. (2025). *State of the Climate in Latin America and the Caribbean 2024* (WMO-No. 1367). Geneva, Switzerland: Author. <https://doi.org/10.0000/wmo.1367>

FIGURE 1:
INCIDENCE OF CLIMATE HAZARD EVENTS BY TYPE BETWEEN 1970 AND 2020



Source: IDB (2024). *Peril and Promise: Tackling Climate Change in Latin America and the Caribbean*.

FIGURE 2:
PHYSICAL CLIMATE RISK DRIVERS



Source: Authors, based on Marsh McLennan: *Staying Above Water* (2023).



effects, and natural capital losses. Climate change, together with natural variability, affects the severity of hazards. At the same time, decisions about where and what to build determine how exposed people and assets are to these hazards. The vulnerability of individuals, communities, and systems is closely linked to poverty levels and their overall capacity to cope with and recover from adverse impacts. For instance, rapid and often unplanned urban growth tends to concentrate vulnerable populations and valuable assets in high-risk areas. In cities like Rio de Janeiro, Brazil, and Medellín, Colombia, millions of impoverished residents live in favelas or “comunas” located on steep, unstable hillsides where heavy rainfall frequently causes deadly landslides.

The impacts of these climate events go beyond immediate damage. They threaten food security, public health, economic stability, and human development, including education and job opportunities. These interconnected risks weaken communities’ ability to prepare for, respond to, and recover from disasters²¹.

In Central America’s drought-prone “Dry Corridor,” for example, climate change has led many men to migrate for work after repeated crop failures, leaving women to manage farms and households. These women, in turn, often have limited land rights and restricted access to credit, while also having to care for children and the elderly²².

Adaptive capacity can vary widely across countries, sectors, and social groups, and, as the “Dry Corridor” example shows, the poorest and most vulnerable often have the least access to adaptation tools, education, and finance, leaving them especially exposed to climate impacts.

In countries like Honduras, Guatemala, and Nicaragua, deep socioeconomic inequality intersects with high climate hazard exposure, creating a vicious cycle. Marginalized communities, often living in precarious locations, lack the resources to cope with or recover from climate shocks. At the same time, limited institutional capacity and scarce public resources constrain national resilience-building efforts. In this context, climate change further compounds existing vulnerabilities, posing a serious threat to the region’s most vulnerable populations, sectors, and communities. An estimated 78 million people living in poverty in the region reside in areas highly exposed

21. Source: UNDRR (2023) Overview of Disasters in Latin America and the Caribbean 2000-2022

22. Läderach P, Kommerell V, Schapendonk F, Van Loon J, Martinez-Baron D, Castellanos A, Gonzalez CE, Vega-Lira D, Ramirez-Villegas J, Achicanoy H, Madurga-Lopez I, Dutta Gupta T, Carneiro B, Resce G, Ruscica G, Pacillo G. 2021. Climate security in the dry corridor of Latin America. Position Paper No. 2021/2. CGIAR FOCUS Climate Security

to climate-related shocks. These shocks can result in devastating financial impacts, destroying housing, productive assets, sources of income, and support networks²³.

Beyond the immediate effects on the poor, there are also risks to those who are not currently in poverty but may fall into it due to shocks. Climate-related events thus not only deepen existing poverty but also generate new challenges associated with transitory poverty²⁴.

Flooding and tropical storms are the most frequent and destructive events in the region, causing widespread damages and costs, particularly in Central America and the Caribbean. Small-island states in the Caribbean are particularly vulnerable. It is estimated that on average, countries in the Caribbean suffer yearly losses due to storms equivalent to 17% of their GDP (during the years they were hit by storms²⁵). Moreover, between 2000 and 2023, tropical storms accounted for \$181.3 billion of the total estimated damages from natural disasters in the Caribbean²⁶. Meanwhile, **droughts and extreme heat** are intensifying, threatening agriculture, water supplies, and livelihoods. Across the northern Amazon, Maracaibo, and Gran Chaco regions, for example, the existence of warm, dry and flammable conditions increased from an average of 20 days per year over the period 1970-2000 to 70 days per year in recent decades²⁷.

Wildfires and landslides add to the region's climate risks, often exacerbated by drought and deforestation. For example, between 2013 and 2022, Chile experienced wildfires that burned over 120,000 hectares and affected more than 21,000 people²⁸. Such fires destroy homes and infrastructure, degrade ecosystems, increase soil erosion, and harm vegetation, especially where urban areas meet forests. Countries with diverse landscapes, like Brazil and Guatemala, face heightened risks to biodiversity and infrastructure. For example, in the Amazon region fires are now burning at least twice as much forest today as they did 20 years ago²⁹.

1.2 Climate change will continue to shape the frequency and severity of physical climate risks with growing direct and indirect impacts

Changes in hazards, along with rising exposure and vulnerability, are creating a disruptive and costly panorama. The outlook for LAC suggests that climate-related challenges are likely to intensify sharply in the coming decades. Still, the pace and extent of

23. Bagolle, A., Costella, C., & Goyeneche, L. (2023). *Social Protection and Climate Change: How can We Protect the most Vulnerable Households Against New Climate Threats?* <https://doi.org/10.18235/0004846>

24. Ibid

25. UNDP Latin America and the Caribbean. (n.d). After the Rain: The Lasting Effects of Storms in the Caribbean. Retrieved from: [https://www.undp.org/latin-america/after-rain-lasting-effects-storms-caribbean#:~:text=%20On%20average%20over%20time%2C%20we,GDP%20\(during%20Hurricane%20Erika\).](https://www.undp.org/latin-america/after-rain-lasting-effects-storms-caribbean#:~:text=%20On%20average%20over%20time%2C%20we,GDP%20(during%20Hurricane%20Erika).)

26. Central Bank of Barbados. (2024). The Cost of Climate Change for Caribbean Economies. Retrieved from: <https://www.centralbank.org.bb/news/press-releases/the-cost-of-climate-change-for-caribbean-economies>

27. Feron, S., Cordero, R.R., Damiani, A. et al. South America is becoming warmer, drier, and more flammable. *Commun Earth Environ* 5, 501 (2024). <https://doi.org/10.1038/s43247-024-01654-7>

28. Pontificia Universidad Católica de Chile (2023), Incendios en Chile: impactos en los territorios y desafíos de su recuperación. <https://www.uc.cl/noticias/incendios-en-chile-impactos-en-los-territorios-y-desafios-de-su-recuperacion/>

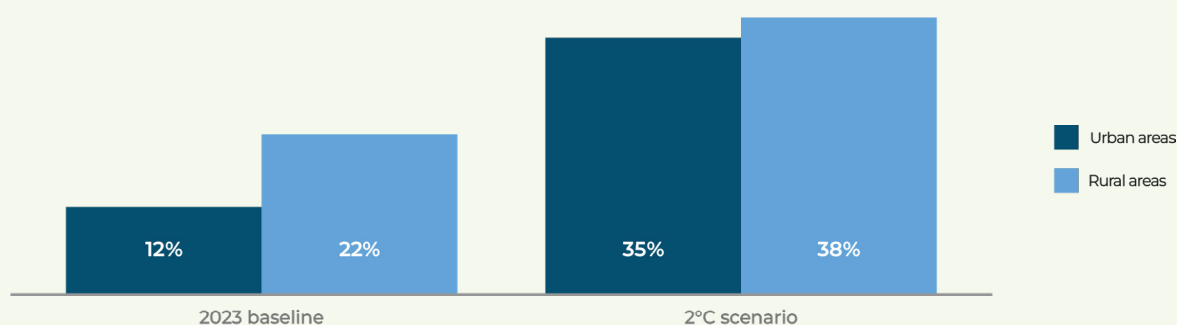
29 World Resources Institute. (2024). 6 Graphics Explain South America's Forest Fires. Retrieved from: <https://www.wri.org/insights/amazon-forest-fires-2024#:~:text=South%20America%20is%20ablaze%2C%20with,in%20the%20Amazon%2C%202001%2D2023>

future warming remain uncertain. (For detailed projections and scenario analyses, see specialized reports such as ECLAC's 2023 study on the economics of climate change in LAC)³⁰.

The region is projected to face growing risks to coastal communities and infrastructure from hurricanes and tropical storms, as well as more intense droughts and floods. These phenomena could threaten water supplies, disrupt agriculture, and increase the risk of landslides and other disasters³¹.

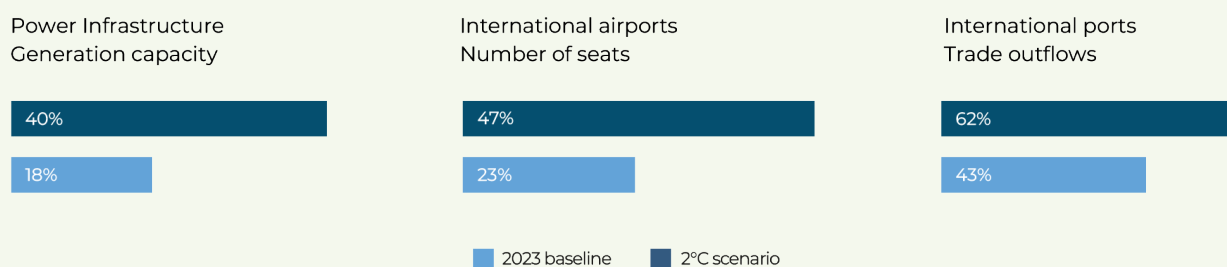
A recent Marsh McLennan study estimates that under a 2°C warming scenario about one third of LAC's urban population could be at risk of flooding (see **Figure 3**) along with almost 40% of the region's power and transport infrastructure (see **Figure 4**).

FIGURE 3:
POPULATION AT RISK OF FLOODING FOR DIFFERENT TEMPERATURE SCENARIOS



Source: Marsh McLennan (2023): Staying Above Water)

FIGURE 4:
INFRASTRUCTURE AT RISK OF FLOODING



Source: Marsh McLennan (2023): Staying Above Water)

30. ECLAC. (2023). The economics of climate change in Latin America and the Caribbean, 2023: financing needs and policy tools for the transition to low-carbon and climate-resilient economies. Retrieved from: <https://repositorio.cepal.org/server/api/core/bitstreams/ac-b6ea5d-b85a-4cd6-abac-d9fee68189c6/content>

31. IPCC Sixth Assessment Report (2021), Working Group II: Climate Change Impacts, Adaptation, and Vulnerability. <https://www.ipcc.ch/report/ar6/wg2/>

Changing rainfall patterns are expected to boost the chances of landslides and floods, putting additional pressure on communities and infrastructure. Rising sea levels pose a growing threat to coastal infrastructure, freshwater supplies, and vulnerable populations particularly in Caribbean countries, with their relatively low elevations and dependence on coastal areas for settlement³². Marine ecosystems are likely to suffer from warmer waters. Repeated exposure to elevated temperatures can cause net losses of coral while impacting coral reproduction³³, potentially harming fisheries and marine biodiversity.

Rising temperatures are expected to lead to additional challenges, including greater impacts on labor supply and labor productivity (as well as heat related stress and illness), especially among outdoor workers in construction and agriculture. Yields of beans, maize, rice, soybean and wheat (all relevant for LAC economies and food security) are likely to decline by 2050 — with some exceptions depending on the type of crop and region³⁴ — threatening food security. Students attending schools that are ill-equipped for extreme heat may suffer from reduced educational outcomes³⁵. And in mountainous areas, glacier retreat and shrinking snowpacks are projected to cause water shortages in the long term³⁶, affecting ecosystems and farming.

Longer dry seasons and extreme weather events could disrupt biodiversity and the ecosystem services they provide. This would affect key sectors like agriculture and tourism, highlighting the key role that the loss of natural capital is having on current and future impacts. The link between climate change and natural capital loss is amplifying outcomes, a phenomenon also demonstrated by deforestation in LAC, which heightens climate impacts and reduces adaptation capacity (see box below).

The Twin Crisis: The increase of deforestation in LAC amplifies the severity of the impacts and reduces the adaptive capacity of the agriculture sector.

The agricultural sector is highly vulnerable to climate shocks. It faces potential productivity losses of 20%-30% in coming decades due to increasing droughts that are aggravated by deforestation (IDB, 2020).

The Amazon forest influences rainfall patterns through a mechanism known as flying rivers. In this phenomenon, currents of moisture-laden air carry water from the Amazon towards the Andes in a westward and southeastward direction. This ensures the supply of water to rivers and for the irrigation of crops. When air currents pass through deforested areas, however, they do not receive the necessary recharges of water from the forest. They become less humid, reducing the amount of rain along their path. As a result, flying river flows decrease, as does the water available for agriculture, cities, and hydropower generation.

The ongoing loss of Amazon forest impairs the sector's adaptive capacity to droughts, leading to productivity losses exceeding \$1 billion annually in Brazil's southeastern region alone. By 2030 rising global temperatures and droughts are projected to shift more than half of Brazil's agricultural lands out of their optimal growing conditions (Nature, 2021). Similarly, the reduction of the Gran Chaco Forest, the region's second largest forest after the Amazon, is projected to reduce rainfall patterns, posing a challenge for the agricultural sector's resilience.

Adapting this sector to increasing water stress and droughts will depend on safeguarding "water reservoirs" like forests, which regulate rainfall patterns and amounts. Maintaining native vegetation is also crucial for stabilizing the regional climate and water availability. Securing forests ("water reservoirs") not only enhances the agricultural sector's adaptive capacity. It also increases opportunities for trade in international markets through compliance with trade regulations (i.e. EU Regulation 2023/1115 deforestation-free requirement). Policies that would avert a tipping point in the Amazon, including by avoiding deforestation, adopting climate-smart agriculture, and improving fire management, are projected to generate \$339 billion in additional wealth (e.g. Banerjee et al. 2021). Lastly, nature-based solutions — including, for instance, the protection and expansion of mangroves as a natural barrier against hurricane impacts, like sand erosion — offer not only an economically viable option, but also important collateral benefits, such as an increase in the carbon sink (IDB, 2022; IDB 2023; IDB 2025).

32. Maitland, D.O., Richter, K., Raj, R.P. et al. Determining sea-level rise in the Caribbean: A shift from temperature to mass control. *Sci Rep* 14, 10387 (2024). <https://doi.org/10.1038/s41598-024-60201-8>

33. Ewan Trégarot, Juan Pablo D'Olivo, Andrea Zita Botelho, Andrea Cabrito, Gabriel O. Cardoso, Gema Casal, Cindy C. Cornet, Simon M. Cragg, A. Karima Degia, Stein Fredriksen, Elisa Furlan, Georg Heiss, Diego K. Kersting, Jean-Philippe Maréchal, Erik Meesters, Bethan C. O'Leary, Géraldine Pérez, Cristina Seijo-Núñez, Rémy Simide, Matthijs van der Geest, Silvia de Juan. Effects of climate change on marine coastal ecosystems – A review to guide research and management, *Biological Conservation*, Volume 289, 2024, <https://doi.org/10.1016/j.biocon.2023.110394>

34. Climate Change Impacts on Agriculture in Latin America and the Caribbean: An Application of the Integrated Economic-Environmental Modeling (IEEM) Platform / Onil Banerjee, Martín Cicowiez, Ana R. Rios, Cicero Z. de Lima. p. cm. — (IDB Working Paper Series; 1289)

35. Eva O. Arceo-Gomez, Alejandro López-Feldman. (2024) Extreme temperatures and school performance of the poor: Evidence from Mexico, *Economics Letters*, Volume 238. Retrieved from: <https://doi.org/10.1016/j.econlet.2024.111700>

36. IPCC. FAQ 2.1: How does glacier shrinkage affect river runoff further downhill? Retrieved from: <https://www.ipcc.ch/srocc/about/faq/faq-chapter-2/>



Assessing the scale of the sectoral or macro-economic impacts of these developments is an emerging field, and the results range widely, depending on model assumptions, scenarios and calibrations.³⁷ However, it is clear that physical climate change and its direct and indirect impacts threaten the region's economic stability and long-term growth.³⁸ Recent IDBG analysis projects that all countries in LAC, except for Chile, will be adversely affected by rising annual average temperatures, with the largest impacts in the Bahamas and El Salvador. The expected decline in GDP ranges from 1.2% to 22%.³⁹ A new meta-analysis conducted by the Grantham Research Institute finds that in just the next 25 years temperature shocks could reduce GDP per capita by close to 10%. Significantly, this estimate considers only temperature shocks and sea level rise, omitting substantial impacts from flooding, wildfire, and drought. People in low- and lower-middle-income countries are expected to be disproportionately affected, with some facing losses exceeding 20% of GDP per capita by 2050.⁴⁰

Extreme events and chronic changes in the environment also add fiscal pressures, which are projected to continue mounting to 2050, with governments expected to face growing demands for disaster response, reconstruction, and investments in adaptation that divert resources from development priorities. Damaged infrastructure, meanwhile, may slow recovery. It may prolong fiscal strain and hinder economic rebound, especially in countries with limited access to international aid or weaker governance.⁴¹ This strain is expected to be especially severe in high debt-to-

37. For an overview see Coalition of Finance Ministers for Climate Action (2025) How Ministries of Finance Can Assess and Manage Physical Climate Risks and Adaptation: Available Analytical Tools and Emerging Good Practice. Report for the HP4 initiative 'Economic Analysis for Green and Resilient Transitions'. - <https://www.financeministersforclimate.org/sites/default/files/2025-06/CFCMA%20HP4%20Thematic%20Paper%20-%20Physical%20Climate%20Risks%20and%20Adaptation.pdf>

38. Macroeconomic Impacts of Physical Climate Risks in Latin America and the Caribbean (ECLAC 2023) [The economics of climate change in Latin America and the Caribbean, 2023](#)

39. IDB (2024). Peril and Promise. Retrieved from: <https://publications.iadb.org/en/publications/english/viewer/Peril-and-Promise-Tackling-Climate-Change-in-Latin-America-and-the-Caribbean.pdf>

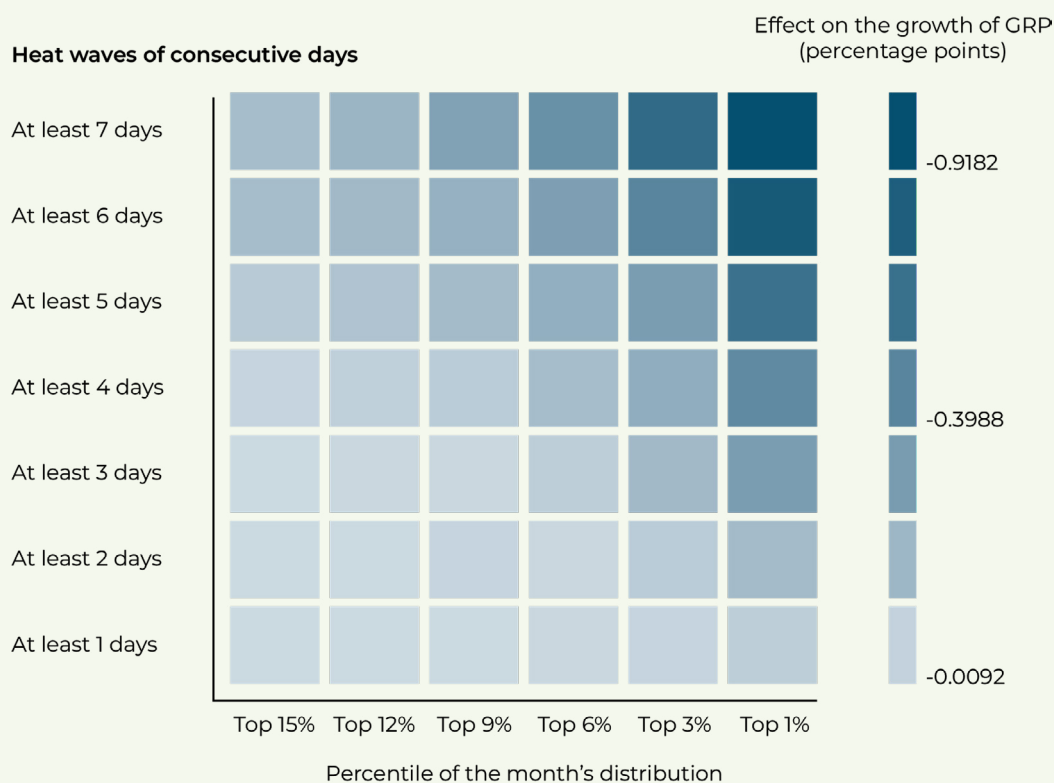
40. Grantham Research Institute on Climate Change and the Environment (forthcoming): The Macroeconomic Case for Adaptation Investment, London School of Economics and Political Science.

41. Fiscal Impacts of Climate Disasters in Emerging Markets and Developing Economies. Fuje, Yao, Choi, and Mighri. 2023. "Disasters in Emerging Market and Developing Economies". International Monetary Fund. Working Paper. WP/23/261

GDP countries of LAC like Argentina (83.2% debt), Bolivia (95%), and Brazil (76.5%),⁴² where limited fiscal space may restrict public spending and social protection during crises.

Repeated shocks can also cause lasting harm to communities by worsening health and disrupting education and early childhood development. This could depress growth and increase long-term public costs. An example can be seen in the economic impacts of heatwaves, with recent studies suggesting they can result in significantly slower economic growth over time⁴³ (see **Figure 5**). There is growing evidence of labor productivity having already been significantly influenced by temperature increases, particularly in regions reliant on weather-exposed labor. As underlined by a new meta-analysis, total factor productivity growth rates will likely decline in warmer climates, further exacerbating economic vulnerabilities.⁴⁴

FIGURE 5:
IMPACT OF HEATWAVES ON ECONOMIC GROWTH⁴⁵



Source: IDB staff calculations, based on Dueñas, Goytia, and Hoffman (2024)
 Note: Each square represents the magnitude of the coefficient from a separate regression of the annual count of heatwaves of each intensity (in percentiles of location's monthly heat index distribution shown in the x-axis) and duration (in days shown on the y-axis) on the growth rate of GRP.

42. Country List Government Debt to GDP | America. Retrieved from: <https://tradingeconomics.com/country-list/government-debt-to-gdp?continent=america#:~:text=Login,several%20countries%20part%20of%20America>.

43. Hoffmann, B., Dueñas, J., & Goytia, A. (2024). The Effect of Extreme Heat on Economic Growth: Evidence from Latin America. Inter-American Development Bank. Retrieved from: <https://publications.iadb.org/en/publications/english/viewer/The-Effect-of-Extreme-Heat-on-Economic-Growth-Evidence-from-Latin-America.pdf>

44. Grantham Research Institute on Climate Change and the Environment (forthcoming): The Macroeconomic Case for Adaptation Investment, London School of Economics and Political Science.

45. IDB, based on Dueñas, Goytia and Hoffman (2023)



It is important to recognize that current analyses, while offering useful insights, likely underestimate full economic impacts,⁴⁶ especially regarding tipping points. This is particularly relevant for LAC in the context of the Amazon dieback.

Other aspects often overlooked in economic analyses are health and wider social impacts. The Pan American Health Organization emphasizes direct health impacts from climate change, including injuries and deaths from extreme weather. It also points to increased health burdens, such as increased vector, food- and water-borne diseases,⁴⁷ as well as increased conflict and violence.⁴⁸ As climate risks increase, overlapping crises could also drive forced displacement.⁴⁹ By 2050, LAC could see up to 17.1 million climate migrants under a pessimistic scenario.⁵⁰

Climate shocks are also projected to deepen poverty and strain social protection systems.⁵¹ That would disproportionately affect marginalized groups and increase inequalities and social fragility.⁵² Greater fiscal and macro-economic pressure may be amplified if existing safety nets, including insurance systems, become unaffordable or unable to cope with ever increasing physical risks. Moreover, LAC faces these mounting climate risks amid a challenging economic landscape marked by high informal employment, fiscal vulnerabilities, geopolitical tensions, and global interest rate uncertainties, exacerbating the wider economic impacts of climate change.⁵³

46. Coalition of Finance Ministers for Climate Action (2025) How Ministries of Finance Can Assess and Manage Physical Climate Risks and Adaptation: Available Analytical Tools and Emerging Good Practice. Report for the HP4 initiative 'Economic Analysis for Green and Resilient Transitions'. - <https://www.financeministersforclimate.org/sites/default/files/2025-06/CFCMA%20HP4%20Thematic%20Paper%20-%20Physical%20Climate%20Risks%20and%20Adaptation.pdf>

47. World Bank. The Cost of Inaction: Quantifying the Impact of Climate Change on Health in Low- and Middle-Income Countries (English). Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/099111324172540265>

48. Climate Change and Health. Pan American Health Organization. Retrieved from: <https://www.paho.org/en/topics/climate-change-and-health>

49. Climate change and displacement Retrieved from: <https://www.unhcr.org/what-we-do/build-better-futures/climate-change-and-displacement>

50. Internal climate migration in Latin America (English). *Groundswell policy note no. 3* Washington, D.C.: World Bank Group. (2018) <http://documents.worldbank.org/curated/en/983921522304806221>

51. IPCC (2021). Sixth Assessment Report, Working Group II: Climate Change Impacts, Adaptation, and Vulnerability. Retrieved from <https://www.ipcc.ch/report/ar6/wg2>

52. IDB (2024). Peril and Promise. Retrieved from: <https://publications.iadb.org/en/publications/english/viewer/Peril-and-Promise-Tackling-Climate-Change-in-Latin-America-and-the-Caribbean.pdf>

53. Ayres, J., Izquierdo, A., & Parrado, E. (2025). *2025 Latin American and Caribbean Macroeconomic Report: Regional Opportunities Amid Global Shifts*. <https://doi.org/10.18235/0013475>

2. Despite growing urgency, current resilience efforts remain inadequate in Latin America and the Caribbean

A growing number of adaptation measures and interventions are available to address current and future climate risks, but many of these remain underutilized, underfunded or inefficiently implemented

2.1 Current impacts and future risks make a strong case for urgent action on adaptation

As climate risks grow and threaten to reverse decades of economic progress across LAC, the region must adopt proactive adaptation and resilience strategies. This will require integrated risk management and significant investment in different adaptation and resilience measures.⁵⁴ By embedding comprehensive climate risk assessments into planning, governments and organizations can identify key vulnerabilities and help prioritize targeted actions.

Delivering adaptation requires an iterative risk management approach that continuously assesses risks and exposure, considers uncertainty and changing projections, and then selects the most appropriate action to address those risks deemed unacceptable. Applying such adaptive management and ongoing monitoring ensures resilience efforts remain sustainable and effective over time. Climate-resilient development pathways, for example, offer a structured, staged framework for sequencing interventions to maximize risk reduction and prevent maladaptation. For decision-makers, such pathways support building adaptive capacity by prioritizing cost-effective measures, phasing investments to fit fiscal constraints, preserving flexibility, and translating complex risks into clear guidance for communities and stakeholders. Linking monitoring milestones to governance and financing routines promotes transparent decision-making, prudent capital allocation, and measurable progress towards resilience. Equally important is avoiding maladaptation⁵⁵ — actions that may seem resilient but cause harm, such as grey infrastructure that leads to deforestation.

Such efforts can take many forms, depending on the unique context of a community, business, organization, country, or region and the kind of climate risks faced (including extreme events⁵⁶ and slow-onset chronic changes⁵⁷). There is no “one-size-fits-all-solution.” Adaptation can range

54. Adaptation is a process that includes a mix of measures that address climate risks, for example by reducing exposure or vulnerability. It includes a mixture of soft and hard measures (e.g., flood defenses, droughtresilient crops or earlywarning systems). Resilience refers to the broader capacity of communities, institutions and systems to absorb shocks, recover, adapt, and learn

55. Maladaptation refers to actions that may lead to an increased risk of adverse climate-related outcomes, including increased vulnerability to climate change, exposure to climate hazards, or diminished welfare, now or in the future. (IPCC AR6, WGII, Glossary)

56. Events such as floods, hurricanes, etc., which cause shocks and disasters

57. Events such as desertification, increases in average temperatures, and progressively rising sea levels

from building flood defenses and establishing early warning systems for cyclones, to switching to drought-resilient crops and redesigning communication systems, business operations, and government policies.

There are a range of interventions that can be applied to address current and future physical climate risks as shown in **Table 1**.

**TABLE 1:
EXAMPLES OF DIFFERENT ADAPTATION MEASURES**

Domain	Category	Examples of Adaptation Measures
Engineered Adaptation Measures	Coastal and Flood Protection Structures	Sea walls, flood levees, culverts, cyclone shelters, beach nourishment
	Water Management & Storage	Water storage facilities, stormwater management, sewage works, drainage improvements
	Built Environment & Infrastructure	Smart zoning, green and blue infrastructure integration, decentralized and distributed systems
	Energy & Utilities	Power grid adjustments, renewable energy installations, cooling technologies
Nature-Based Adaptation Measures	Ecosystem Restoration	Wetland and floodplain restoration, mangrove conservation, ecological corridors, reforestation, afforestation
	Ecosystem Services	Wetland restoration for water quality and flood control, community-based natural resource management, fisheries co-management
R&D & Innovation	Agricultural Technologies and practices	New crop varieties (drought resilient seeds), conservation agriculture, crop-switching, changing cropping practices, agroforestry
	Genetic Techniques	Genetic modification, breeding for resilience
	Traditional Technologies & Methods	Indigenous water harvesting, passive cooling
	Monitoring & Early Warning Systems	Ground-based sensors, satellite technology, weather and hydrological stations, ocean buoys
	Fire Management	Bushfire reduction, prescribed burns, invasive species management
Policies, Regulations & Governance	Laws & Regulations	Building standards, land use laws, water/marine regulations, protected areas, fishing quotas
	Government Policies & Programs	National/subnational adaptation plans, urban/watershed management, disaster management, ecosystem-based management
	Land & Property Rights	Easements, land zoning, property rights, land tenure security
Risk Transfer & Economic Resilience	Insurance & Financial Instruments	Index-based weather insurance, catastrophe bonds, microfinance, savings groups, cash transfers
	Economic & Trade Resilience	Supporting international trade, economic diversification, market access
Financial mechanisms	Financial Instruments & Market-Based Approaches	Contingent credit lines, green, resilience and/or catastrophe bonds and swaps, public-private partnerships, carbon pricing, climate risk financing
Social & Behavioral	Education & Knowledge Sharing	Climate awareness, traditional knowledge, education programs, media communication
	Community Participation	Participatory planning, social learning, community surveys, gender equity, indigenous observations, social safety nets, food banks, vaccination programs.
	Disaster Preparedness & Evacuation	Household planning, evacuation drills, migration/relocation strategies
	Livelihood & Agricultural Practices	Livelihood diversification, changing livestock/aquaculture practices, crop diversification

Source: Adapted from IPCC AR5 examples of adaptation measures and Marsh McLennan Adaptation toolbox

Together, these measures form a layered approach operating across levels — from local communities to national policies—highlighting the need for integrated, comprehensive action embedded in strong policy and governance frameworks that set out adaptation ambitions and measurable objectives.



Addressing the complex interaction of hazards, vulnerability, and exposure requires a combination of different actions and initiatives. Integrating engineered solutions that directly protect assets and communities, with nature-based approaches (e.g. wetland conservation), for example, can enhance ecosystems' natural buffering capacity. These physical interventions can be reinforced by strong government policies, such as risk-informed land-use planning that prevents the creation of new vulnerabilities. They can also be complemented by risk finance strategies that provide the liquidity needed to absorb shocks and finance recovery. It is the synergy between these physical, institutional, and financial layers that creates sustainable resilience.

To be successful, these actions need to be embedded in climate resilient development strategies and dynamic resilient pathways, underpinned by capacity building, public policies, stakeholder engagement, effective use of risk data, and knowledge sharing.

The need to acknowledge uncertainty and allow for flexible, adaptive pathways is related to the need to prioritize and time actions with immediate benefits as well as those required to improve the impact of future decisions. Among such measures, no-regret interventions stand out for their practicality and immediate benefits under current climate conditions. Examples include strengthening early warning systems and improving water efficiency by reducing leakage — actions that provide benefits and boost community resilience today while remaining valuable even if future climate impacts differ from projections.

Measures can also be taken that boost the climate-smart design and climate proofing of long-lived investments or of decisions that will be made in the near-term. There is an urgent need (and an opportunity) to include adaptation in near-term investment decisions that have long lifetimes (such as infrastructure or land-use plans) to reduce lock-in. This involves an incremental cost but delivers high net benefits by avoiding future climate impacts.⁵⁸ An example would be the climate proofing of new transport infrastructure by building to higher design standards that take climate change into account. There are also low-cost preparatory activities that can help to improve the efficacy of future decisions as part of adaptive management plans (adaptation pathways). This can involve information gathering, research and monitoring, as well as governance

58. Hallegatte, Stephane; Rentschler, Jun; Rozenberg, Julie. 2019. Lifelines: The Resilient Infrastructure Opportunity. Sustainable Infrastructure; World Bank. Retrieved from: <http://hdl.handle.net/10986/31805>

and coordination (and relevant enablers) — all of which are valuable for future decisions that have long lead times or involve large but uncertain impacts. Integrating adaptation and mitigation into development planning also improves cost-effectiveness and the appeal to stakeholders.^{59,60}

Evidence shows that investing in resilience delivers clear benefits by lowering recovery costs, protecting livelihoods, and maintaining fiscal stability.⁶¹ Studies estimate that every dollar invested in adaptation can generate up to \$10.50 in economic benefits over ten years.⁶² Upgrading infrastructure to withstand extreme weather, for example, helps maintain essential services, reducing economic and social disruption. When combined with robust financial tools and institutional support, these strategies make for a comprehensive approach that builds adaptive capacity, reduces risks, and promotes long-term resilience. Together, these efforts help the region better absorb shocks, recover faster, and thrive in a changing climate.⁶³ Empowering local communities through tailored, community-led adaptation initiatives also builds social cohesion and resilience at the grassroots level.

The effectiveness of these measures depends on local context, timing, goals, available resources, and the specific climate risks faced. Fast-onset events like storms and floods require immediate protective actions, while slow-onset processes such as sea-level rise call for anticipatory, long-term strategies. The scale and trends of these risks also influence decisions about which measures are most appropriate.

It is crucial to recognize that for all its benefits climate adaptation also has limits—technical, economic, biological, social, or institutional. These limits represent points beyond which further efforts cannot effectively reduce climate impacts. In natural systems, for example, they emerge when ecosystems lose their capacity to recover from climatic disturbances, such as floods or droughts, or from gradual changes, like desertification and sea-level rise. In human systems, limits arise when economic, technological, or institutional capacities are exceeded, restricting the ability of societies to adapt effectively. According to the IPCC, such limits may be considered “soft” when additional resources or innovation could expand adaptive capacity, or “hard” when irreversible ecological or physical thresholds make further adaptation impossible. Such hard limits have already been reached in some places and in some ecosystems.⁶⁴ When such thresholds are reached, residual risks remain in hazards and vulnerabilities that persist despite adaptation. This means loss and damage are likely to increase, underscoring the need to understand and plan for impacts that cannot be fully avoided.⁶⁵

59. UNFCCC (2022) Information paper on linkages between adaptation and mitigation. Retrieved from: [linkages_mitigation_adaptation_infpaper.pdf](#)

60. Klein, R.J.T., S. Huq, F. Denton, T.E. Downing, R.G. Richels, J.B. Robinson, F.L. Toth, 2007: Inter-relationships between adaptation and mitigation. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 745-777.

61. IDB (2024). *Peril and Promise: Tackling Climate Change in Latin America and the Caribbean*. Retrieved from <https://publications.iadb.org/en/peril-and-promise>

62. Brandon, C., B. Kratzer, A. Aggarwal, and H. Heubaum. 2025. “Strengthening the investment case for climate adaptation: A triple dividend approach.” Working Paper. Washington, DC: World Resources Institute. Available online at <https://doi.org/10.46830/wriwp.25.00019>

63. Ibid

64. “Hard and soft limits to adaptation have been reached in some ecosystems and regions.” (IPCC AR6 Synthesis Report, Summary for Policymakers, 2023, A.3

65. IPCC, 2021: *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [Masson-Delmotte, V., et al. (eds.)]. Cambridge University Press. DOI: 10.1017/9781009157896

2.2 Awareness and a sense of urgency are growing, but this has not translated into sufficient action given the dramatic rise in risks

Current efforts at climate adaptation and boosting resilience in LAC reveal both progress and major challenges. Growing climate-related losses have pushed countries to recognize adaptation as a critical part of their policy agendas. Many nations are taking proactive steps by passing legislation, creating strategic plans, and setting clear roadmaps for adaptation actions. As of July 2025, 17 out of 33 countries in the region had submitted National Adaptation Plans (NAPs), focusing on key priorities such as building climate-resilient infrastructure, halting deforestation, and protecting biodiversity and ecosystems.⁶⁶

However, significant obstacles remain. Many countries face critical gaps in their ability to plan, finance, and implement adaptation measures. By 2035, the estimated annual cost of fully implementing these NAPs across LAC will be around \$47 billion.⁶⁷ In addition, plans tend to get only partially implemented. There is a pressing need to turn them into fully financed, concrete actions, and accompany them with monitoring, evaluation, and learning programmes to ensure real impact.⁶⁸ For too long, climate resilience was sidelined, viewed as an add-on rather than a core component of development goals such as economic growth, urban planning, and energy security. This separation resulted in missed opportunities when designing strategies and implementing plans and, in some cases, maladaptive outcomes that may undermine long-term resilience.

In terms of financing, there has been progress. International public adaptation finance to developing countries, originating from bilateral providers, multilateral development banks, and dedicated climate funds, has increased. Excluding domestic public spending and most private flows, such financing has grown from \$22 billion in 2021 to \$28 billion in 2022.⁶⁹ Nonetheless, the global adaptation finance gap remains significant. Defined as the difference between estimated adaptation needs and available tracked finance, it is projected to range from between \$310 billion to \$365 billion annually by 2035.⁷⁰ For Latin America and the Caribbean, adaptation finance still represents less than 10% of total global flows, underscoring the urgency of mobilizing region-specific instruments and investments.⁷¹ The challenges arise from a shortage of financial resources, fragmented governance, weak institutional capacity, and poor data systems—especially due to inadequate monitoring networks and infrastructure. Significantly, socioeconomic data is often unreliable or incomplete, with tools like national censuses providing little climate-relevant information. This hampers targeted adaptation efforts.⁷²

High inequality in the region further complicates adaptation planning. Addressing gender equality and social inclusion (GESI) is essential to ensure vulnerable and marginalized groups

66. UNFCCC. NAP Tracking Tool. As of October 1, 2025. Retrieved from: <https://napcentral.org/nap-tracking-tool>

67. Based on estimations from Paul Watkiss for the AGR 2025

68. United Nations Development Programme (UNDP). (2021). *Regional Brief on Climate Change Adaptation in Latin America and the Caribbean*. https://www.adaptation-undp.org/sites/default/files/resources/regionalbrief-fulldocument_0.pdf

69. Source: United Nations Environment Programme (2024). *Adaptation Gap Report 2024: Come hell and high water — As fires and floods hit the poor hardest, it is time for the world to step up adaptation actions*. Nairobi. <https://doi.org/10.59117/20.500.11822/46497>.

70. Paul Watkiss AGR 2025 forthcoming

71. Source: United Nations Environment Programme (2024). *Adaptation Gap Report 2024: Come hell and high water — As fires and floods hit the poor hardest, it is time for the world to step up adaptation actions*. Nairobi. <https://doi.org/10.59117/20.500.11822/46497>

72. tereza Cavazos, Maria Laura Bettolli, Donovan Campbell, Roberto A Sánchez Rodríguez, Michelle Mycoo, et al. Challenges for climate change adaptation in Latin America and the Caribbean region. *Frontiers in Climate*, 2024, 6, ff10.3389/fclim.2024.1392033ff. ffin-su-04875748f

benefit fairly from adaptation initiatives. Globally, only about 20% of Nationally Determined Contributions (NDCs) and NAPs include dedicated funding for GESI, highlighting a significant gap.⁷³

2.3 Key gaps in adaptive capacity, governance, and finance hamper progress

Overall adaptation progress is slowed by several barriers: limited access to localized climate risk data, uncertain or low financial returns for adaptation projects, and long payback periods that do not match short-term investment horizons. Many organizations assess climate risks only at the “asset level,” focusing on physical assets, operations, personnel, and emergency response, with an emphasis on operational and financial resilience strategies.⁷⁴

Policy uncertainty, weak governance, and the lack of standardized metrics and capacity-building programs further limit private sector participation in adaptation finance.⁷⁵

To accelerate climate adaptation, countries in LAC must overcome persistent barriers in financing, governance, and technical capacity. Key priorities include:

1. Financing gaps: Adaptation funding remains fragmented and insufficient, relying heavily on post-disaster public spending.⁷⁶ Despite progress, access to international public climate funds is held back by fiscal constraints and complex application processes. Private sector investment in adaptation is still emerging. Many countries face challenges such as economic instability, insufficient fiscal space, and unfavorable policy environments that restrict their ability to invest proactively in resilience measures like climate-resilient infrastructure and disaster risk transfer solutions.⁷⁷

2. Governance challenges: Political cycles, limited institutional capacity, and poor coordination across government and sectors (at all levels) undermine sustained adaptation efforts. Without inclusive stakeholder engagement, projects risk misalignment with local needs and reduced community ownership.

3. Capacity shortfalls: Technical expertise, technology, and strong monitoring, evaluation, and learning (MEL) systems are still insufficient.⁷⁸ Fragmented, short-term efforts across ministries and government levels hinder integration, while the lack of standardized metrics makes it difficult to track and compare progress.

4. Threats to natural capital and ecosystem services: Although nature plays a vital role in adaptation, biodiversity loss—especially in freshwater ecosystems — is eroding the effectiveness of natural capital and the ecosystem services they provide. The Living Planet Report emphasizes that Latin America has seen the steepest decline in monitored wildlife populations over the past 50 years.⁷⁹

73. United Nations Environment Programme (2023). Adaptation Finance Gap Update 2023. In Adaptation Gap Report 2023: Underfinanced. Underprepared. Inadequate investment and planning on climate adaptation leaves world exposed. Nairobi. Retrieved from: [Finance_Gap_Update.pdf](#)

74. Marsh Climate Adaptation Survey 2025,

75. Zurich Climate Resilience Alliance. (2025). *Private Finance for Climate Resilience: Evidence and Opportunities*. Retrieved from <https://zcralliance.org/resources/item/adaptation-finance-and-the-private-sector-opportunities-and-challenges-for-developing-countries/>

76. Guy Carpenter. Public-Private Insurance Partnerships Bolster Latin American/Caribbean Resilience: Part II. Retrieved from: [Public-Private Insurance Partnerships Bolster Latin American/Caribbean Resilience: Part II](#)

77. Maguire, Liam. Unlocking Finance for Least Developed Countries: Innovations and Opportunities. Climate Policy Initiative (2025). Retrieved from: <https://www.climatepolicyinitiative.org/unlocking-climate-finance-for-least-developed-countries-innovations-and-opportunities/>

78. Monitoring, Evaluation, and Learning for National Adaptation Plans in Latin America. Webinar. <https://unfccc.int/documents/649499>

79. WWF (2022). Living Planet Report 2022 – Building a nature-positive society. Retrieved from: <https://www.wwf.org.uk/our-reports/living-planet-report-2022>

5. High and growing protection gaps: As of early 2025, the insurance protection gap — the portion of disaster losses uninsured or unfunded — in LAC is estimated at \$300 billion.⁸⁰ Millions of people and businesses remain financially vulnerable after disasters due to underinsurance or lack of coverage. Insurance penetration is low, with premiums accounting for only about 3.1% of GDP, less than half the global average of 7%.⁸¹ Small and medium-sized enterprises (SMEs), which make up 99.5% of firms and employ 60 million people in the region, are especially underinsured, with roughly 85% lacking adequate coverage.⁸² This leaves a critical economic sector highly exposed to climate shocks.

Overall, the current adaptation landscape in LAC comes up short. While some progress has been made, adaptation tools remain underused, and climate risks are outpacing resilience efforts despite emerging innovative technologies and evidence of their economic benefits (see **Table 2**). Many projects lack clear implementation plans and stable funding. There is also untapped potential to better integrate mitigation and adaptation efforts, but progress in linking these remains limited.

Addressing these interconnected challenges requires a coordinated approach that accelerates innovation, improves information sharing, and clarifies regulatory frameworks to strengthen resilience efforts across the region.

TABLE 2:
ADAPTATION: PROGRESS AND REMAINING CHALLENGES IN LAC

Progress	Ongoing challenges /gaps
Insurance innovations	Protection gap is still rising
Unprecedented amount of data	Many stakeholders lack the information needed.
Financial innovations	Often not sustainable/ no long-term funding solutions. Lack of clear revenue models or benefits difficult to monetize (private sector)
Growing recognition of nature's role	Nature loss and biodiversity crisis threaten these solutions.
Evidence of mainstream adaptation success	Many new infrastructure projects still lack adaptation
Opportunity to link mitigation and adaptation	Only a small number of integrated projects
Significant number of innovations/ new technologies	Building the market takes time.
Increasing number of rules, legislation and regulations	Implementation often unclear
Evidence of economic benefits, co-benefits and strong narratives	Adaptation is still seen as costly and for the future, with limited immediate payoffs

Source: Authors

80. IDB Invest supports cutting-edge insurance solutions with investment in Mundi Ventures Latam Fund. Retrieved from: [IDB Invest Supports Cutting-Edge Insurance Solutions with Investment in Mundi Ventures Latam Fund I | IDB Invest](#)

81. Ibid.

82. Mulville, Guillermo, De Beaufort, Lucas. (2025) Insurance, Technology, and a \$267 billion opportunity. IDB Invest. Retrieved from: [Insurance, Technology, and a \\$267 Billion Opportunity | IDB Invest](#)

3. What is needed to achieve a well-adapted LAC?

There are significant opportunities to shift the region towards greater climate resilience, to avoid the worst impacts and to let countries, communities and businesses prosper despite a changing climate. This section sets out key areas of action to put LAC on a more resilient pathway.

3.1 Putting in place the “ingredients” for successful adaptation and applying an iterative framework that captures current and future risks and uncertainty

After many decades of learning from disaster risk reduction, poverty reduction, and development strategies, we know how interconnected these areas are. Due to competing priorities, governance barriers, or lack of financial mechanisms, however, the key ingredients, resources, coordination, and strategic focus of this adaptation approach are often missing or exist in plans, rather than in practice. Addressing these gaps will require stronger collaboration, targeted technical support, and innovative financing, ensuring that adaptation strategies are mainstreamed into national development priorities and capable of delivering long-term resilience. Of course, it is not possible to achieve everything in all places. So, prioritization, selection, and timing must be considered when devising resilient pathways for communities, cities, and countries.

Several key “ingredients” are needed to enable adaptation, as illustrated in **Figure 6**. These include risk awareness and access to data and information, political will and clear mandates, sustainable and scalable financing, and enabling governance and legislation. They also include stakeholder engagement and inclusive narratives, as well as a smart combination of tools and strategies. Such an approach involves implementing tools through new modes of collaboration. Local actors can be empowered, recognizing their needs and knowledge, and the role of the private sector can be harnessed, domestically and through international investments. Adaptation cannot depend on only a few players: an “all society approach” is needed.

Together, these ingredients of adaptation create the foundation for long-term resilience. In the academic and policy literature, they are often referred to as “enabling factors” — the conditions that determine whether adaptation measures succeed or fail.⁸³⁸⁴ Building a well-adapted LAC therefore requires strengthening these factors across governance levels, mobilizing finance, and fostering innovation to embed resilience into everyday decision-making.

83. Nature Climate Change (2024). The enablers of adaptation: A systematic review. Retrieved from <https://www.nature.com/articles/s44168-024-00128-y>

84. NAP Global Network (2023). Effective National Adaptation Plan (NAP) Figure: Enabling factors for adaptation. Retrieved from <https://napglobalnetwork.org/2023/03/effective-national-adaptation-plan-figure/>

**FIGURE 6:
INGREDIENTS FOR SUCCESSFUL ADAPTATION**



Source: Authors

At the heart of successful adaptation is an iterative process that moves from assessing to addressing risks on a continuous basis. For that to take place, data and analytical tools are required, alongside information about current and future risk trends and uncertainty levels, including for hazards. Vulnerabilities and exposure must also be identified. Once risks and impacts have been recognized, targeted adaptation strategies can be selected and assessed in terms of feasibility and potential impacts. Evaluating the costs and benefits of these solutions is essential, considering their distributional effects across different communities and sectors. This should include a consideration of co-benefits using a systems approach which recognizes the environmental, social, and physical impacts of adaptation. Reducing societal vulnerability to climate change both requires and can benefit from efforts to secure ecosystem services that support climate adaptation and resilience. For that reason, some areas of adaptation are closely related to the ability to manage nature and maintain the integrity and function of ecosystems.

Embedding adaptation into relevant national, sector, regional or local development plans (urban planning, mitigation efforts, etc.)⁸⁵ to avoid losses caused by physical climate risks, promote collaboration between stakeholders, and align multiple priorities can improve the cost effectiveness of implementing climate strategies. Clear and effective communication of these options to stakeholders and the public is crucial to building support, driving informed decision-making, and ensuring successful implementation.⁸⁶ Integrating climate resilience into financial decision-making processes is difficult. But risk assessment, stress testing and insurance analytics can help when developing adaptation strategies.

85. Climate Adapt. (2024). Step 5.2 Mainstreaming – integrating adaptation into existing plans. Retrieved from: [Step 5.2 Mainstreaming – integrating adaptation into existing plans | EU Mission on Adaptation to Climate Change Portal](#)

86. Emanuele Massetti, and Matthieu Bellon. "Planning and Mainstreaming Adaptation to Climate Change in Fiscal Policy", Staff Climate Notes 2022, 003 (2022). Retrieved from: <https://doi.org/10.5089/9798400201950.066>

3.2 Harnessing technical and financial innovations and deploying incentives

Technological innovation can accelerate and enhance climate adaptation by changing how societies anticipate and respond to climate change impacts. Technologies can empower a critical shift from reactive crisis management to proactive, data-driven preparedness and resilience building by enabling real-time environmental monitoring, sophisticated predictive modeling for extreme climate events, and optimized resource management. The ability of new technologies to bridge data gaps, democratize information, and foster unprecedented levels of collaboration is particularly significant for a region characterized by diverse socio-economic landscapes and varying capacities.

The region is home to a wide range of climate technology companies, leveraging advanced tools such as big data and satellite imagery to deliver precise irrigation recommendations, enabling farmers to significantly reduce water usage.⁸⁷ Innovative firms are enhancing transparency in forest conservation through AI and satellite data, verifying and monitoring carbon offset projects to ensure vital funding is effectively channeled into protecting critical ecosystems.⁸⁸

Significantly, technology and financial innovations can also be interlinked. For example, digital technologies are reshaping how some adaptation instruments operate: insurtech platforms enable faster payouts and more inclusive coverage; blockchain-based smart contracts can trigger automatic disbursements; and satellite data combined with big data analytics improve the accuracy of risk models, making financial products more affordable and scalable.

Looking ahead, the region will require substantially increased financing to meet its adaptation goals. Implementing necessary measures often involves high upfront costs, particularly for infrastructure and technological upgrades. This underscores the importance of embedding resilience standards in any new development. For example, the Energy Transitions Commission (2020) estimates that an annual investment of between \$1.4 trillion and \$1.8 trillion globally — for green energy generation, transmission, storage, transportation infrastructure (such as electric vehicle chargers), and industrial modifications — will be needed to reach net zero emissions by 2050. Unless designed with resilience in mind, these investments are likely to be affected by changing physical risks. If recent patterns of adaptation and mitigation spending continue, the region alone could need an additional \$14 billion to \$17 billion annually for adaptation efforts. As a result, there is an urgent need to scale up financial flows to bridge the gap between current investments and future climate resilience requirements.⁸⁹

Such efforts must include the scaling and promotion of instruments that provide rapid liquidity and support in response to disasters. That can strengthen the fiscal space, encourage investment in resilience, and make the financial system more robust in the face of climate shocks. Climate resilient debt clauses (CRDCs) are one example. Launched by the IDBG in 2021, they allow countries to defer loan principal payments for two years following the occurrence of an eligible natural disaster, with those amounts repaid through future amortization instalments. Another example is the Contingent Credit Facility for Natural Disasters and Public Health Emergencies (CCF). Created by IDBG, such loans provide cost-effective ex-ante financial coverage for its member countries. They

87. Kilimo. About us. (2025). Retrieved from: [Kilimo | About us](#)

88. Pachama. About. (2025) Retrieved from: [Pachama | Learn about the team behind nature](#)

89. Walker, C., & Cevik, S. (2024). "Chapter 10: Financing Climate Policies in Latin America and the Caribbean". In *Climate Change Challenges and Opportunities in Latin America and the Caribbean. USA: International Monetary Fund*. Retrieved from <https://doi.org/10.5089/9798400240577.071.CH010>

seek to offer a significant source of liquidity to support humanitarian aid and the restoration of basic services following a natural disaster or a public health emergency with two modalities available (parametric and non-parametric).

Finance ministries can play a catalytic role by embedding physical risks into their fiscal frameworks, introducing incentives, and leveraging instruments such as bonds, insurance solutions, and blended finance.⁹⁰ Adopting a set of principles to develop realistic economic assessments of climate impacts and opportunities is important and includes using a precautionary approach and developing risk management capacity.⁹¹ By doing so, finance ministers get an opportunity to participate in the development of national climate strategies and development plans. They can help shape industrial and innovation strategies and assess investment needs for a resilient transition in partnership with relevant line ministries.⁹² Using their core responsibility for the regulation of state-owned banks and enterprises, sovereign wealth funds, financial institutions, and debt markets — and their interfaces with central banks, shareholdings and relationships with international finance institutions (IFIs) and MDBs — they can help improve financial resilience and stability and mobilize finance into sustainable investments. This can be achieved through frameworks for green and resilience finance, the catalyzing of private capital, adaptation and disaster risk finance and insurance, and international climate finance in partnership with central banks and the private sector.⁹³ It can also support a shift toward pre-event risk transfer mechanisms, including public-private insurance partnerships, to build financial resilience and reduce fiscal burdens on governments.⁹⁴

In economic terms, investing in adaptation is not merely a defensive strategy for reducing current and future risks. It also has a broader economic rationale: it has clear economic benefits, enhances societal well-being, and paves the way for sustainable development. Demonstrating the value of resilience investments, especially in terms of avoided costs and avoided losses, can strengthen the case for proactive action.

However, given the scale of the challenge, it is essential to balance the roles of the public and private sectors. Public institutions have a responsibility to create regulatory frameworks and provide infrastructural support. Private entities, meanwhile, contribute innovation, investment, and efficiency to adaptation efforts.⁹⁵

90. Source: Coalition of Finance Ministers for Climate Action (2023). Strengthening the Role of Ministries of Finance in Driving Climate Action: A Framework and Guide for Ministers and Ministries of Finance. Retrieved from: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2023/08/Strengthening_the_role_of_Ministries_of_Finance_in_driving_action_Framework_and_guide_FULL_REPORT.pdf

91. The urgent need for Ministries of Finance to factor systemic climate risk into their economic analysis and modeling approaches and principles for doing so: a view from the insurance and pensions industry (2025) The Coalition of Finance Ministers for Climate Action. Retrieve from: https://greenandresilienteconomics.org/wp-content/uploads/2025/06/The_urgent_need_for_Ministries_of_Finance_to_factor_systemic_climate_risk_into_their_economic_analysis_and_modeling_approaches-.pdf

92. CFCMA HP4 Thematic Paper - Physical Climate Risks and Adaptation.pdf

93. Strengthening the Role of Ministries of Finance in Driving Climate Action (2023) The Coalition of Finance Ministers for Climate Action. Retrieved from: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2023/08/Strengthening_the_role_of_Ministries_of_Finance_in_driving_action_Framework_and_guide_FULL_REPORT.pdf

94. Guy Carpenter. Public-Private Insurance Partnerships Bolster Latin American/Caribbean Resilience: Part II. Retrieved from: [Public-Private Insurance Partnerships Bolster Latin American/Caribbean Resilience: Part II](#)

95. Watkiss & England 2025

4. Delivering a well-adapted LAC

There are a number of promising initiatives that point to a new wave of adaptation interventions, with the potential to move the needle on a regional, national and local scale. The following section offers insights and observations from a selection of recent interventions across LAC.

4.1 The Inter-American Development Bank Group's approach

The Inter-American Development Bank Group (IDBG) has been a key player in advancing climate change adaptation across LAC. It has acted as a bridge between the private and public sectors, providing innovative solutions to close the financing gap and enabled implementation for the benefit of the climate, nature, and people. In doing so, it has recognized the region's heightened vulnerability to climate risks and its role as a catalyst for systemic change.

IDBG has been investing progressively in resilience and adaptation. It supports countries' efforts to align climate policy frameworks and laws to leverage synergies between climate adaptation and national priorities. It has also boosted private investments to foster long-term adaptation projects. These efforts include adopting a programmatic intervention approach to lending that results in country strategies where sector-specific targets are jointly defined with governments, and a mix of financial instruments is deployed to achieve them. These instruments include policy-based loans (PBLs), which provide budget support linked to regulatory or institutional reforms, and investment loans, which finance the implementation of concrete adaptation measures. A policy-based loan, for example, may support regulatory reforms for coastal risk management and be followed by direct investment loans to retrofit vulnerable public infrastructure, ensuring that policy change and implementation are mutually reinforcing. The Bank is also strengthening coordination through country platforms.⁹⁶ It is supporting national priorities by helping countries deliver on their Nationally Determined Contributions (NDCs), their nature goals, and their plans to build resilience and improve lives. Similarly, there is growing emphasis on results-driven instruments — financial mechanisms that link disbursements to measurable results or performance indicators, thereby enhancing accountability and effectiveness.⁹⁷

Looking forward, there will be a need for more targeted action on adaptation to deal with growing climate risk — that is, adaptation that changes the fundamental attributes of the so-

96. Country Platforms (CPs) are voluntary, country-led mechanisms designed to foster collaboration among development partners, based on a shared strategic vision and priorities. They are emerging to be effective mechanisms through which national governments can drive transformational goals - particularly in climate and development - by mobilizing international partnerships and finance. Source: Climate Finance Reform Compass. Retrieved from: <https://compass.climatepolicyinitiative.org/themes/country-platforms/country-sector-platforms>

97. IDB Group Institutional Strategy 2030

cial-ecological system in anticipation of climate change and its impacts.⁹⁸⁹⁹ The early stages of this transformational adaptation approach are progressing across IDB's workstreams, such as IDBG CLIMA, where the Bank is actively defining transformative adaptation within its institutional framework. Through this initiative, the Bank incentivizes borrowers to achieve measurable nature and climate outcomes by providing a 5% grant on the loan amount when agreed targets are met.¹⁰⁰ In parallel, innovative debt-conversion operations, supported by the IDBG and its partners, are helping countries free up fiscal resources that are then channeled into investments that strengthen water security and biodiversity conservation.

Recognizing the existing challenges in the region, IDBG aims to unlock public-private synergies, foster gender equality and inclusion and prioritize climate action across key areas such as biodiversity conservation, resilient infrastructure, and low-carbon development. It seeks to do so while mobilizing resources at scale to strengthen regional resilience and long-term growth. An example is Reinvest+, an innovative investment loop mechanism. This bridges local projects to international institutional investors, enabling mobilization at scale and building a systematic pipeline for investments in attractive, new climate-aligned projects in the region. The goal is to deliver impactful, sustainable solutions that support regional resilience and promote long-term growth.¹⁰¹

To strengthen effective adaptation, the Bank enhances institutional capacity by assisting governments in developing resilient policies, establishing robust regulatory frameworks, and fostering private sector engagement.¹⁰² Flagship regional initiatives supported by the IDBG illustrate how institutional capacity for resilience is being built at scale. For instance, the One Caribbean initiative, fosters regional cooperation, knowledge sharing, and capacity building across Caribbean countries to address common climate vulnerabilities. Meanwhile, the Amazon Forever initiative strengthens conservation, sustainable development, and governance in the Amazon basin, embedding critical institutional capacity development across several countries. These initiatives exemplify how regional approaches can complement national strategies and reinforce the Bank's broader mandate to enable transformative adaptation in LAC. Another initiative is the **Regional Program for Disaster Resilience's Ready Resilient Americas**. This aims to bolster disaster preparedness, response, and financial protection across LAC. It focuses on advanced risk modeling tools and early warning systems, strengthening the regional disaster response coordination network, innovative resilience financing, and risk-transfer instruments. The program is backed by 37 committed member countries, 16 strategic partners, and \$10 million in non-reimbursable IDBG funding for 2025–2030.¹⁰³¹⁰⁴

IDBG Invest is also playing a pivotal role in advancing climate adaptation by leveraging innovative financial solutions and strategic partnerships in the private sector. Through the deployment of tailored financial instruments, such as outcome-based lending and climate-resilience clauses, it is creating flexible, impactful pathways for projects that prioritize long-term resilience and risk mitigation.

98. IPCC (2022). Sixth Assessment Report (AR6), Working Group II – Annex II: Glossary. Definition of transformational adaptation: "Adaptation that changes the fundamental attributes of a social-ecological system in anticipation of climate change and its impacts." Retrieved from https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Annex-II.pdf

99. IPCC (2018). Special Report on Global Warming of 1.5°C: Chapter 4 – Strengthening and implementing the global response. Retrieved from <https://climatereadyclimate.org.uk/wp-content/uploads/2020/12/What-does-transformational-adaptations-look-like-FINAL2.pdf>

100. IDB CLIMA Retrieved from: <https://www.iadb.org/en/who-we-are/topics/climate-change/climate-change-finance/idb-clima>

101. Ibid.

102. IDB Group Climate Change Action Plan 2021-2025

103. IDB Group Disaster Risk Management Action Plan 2026-2030

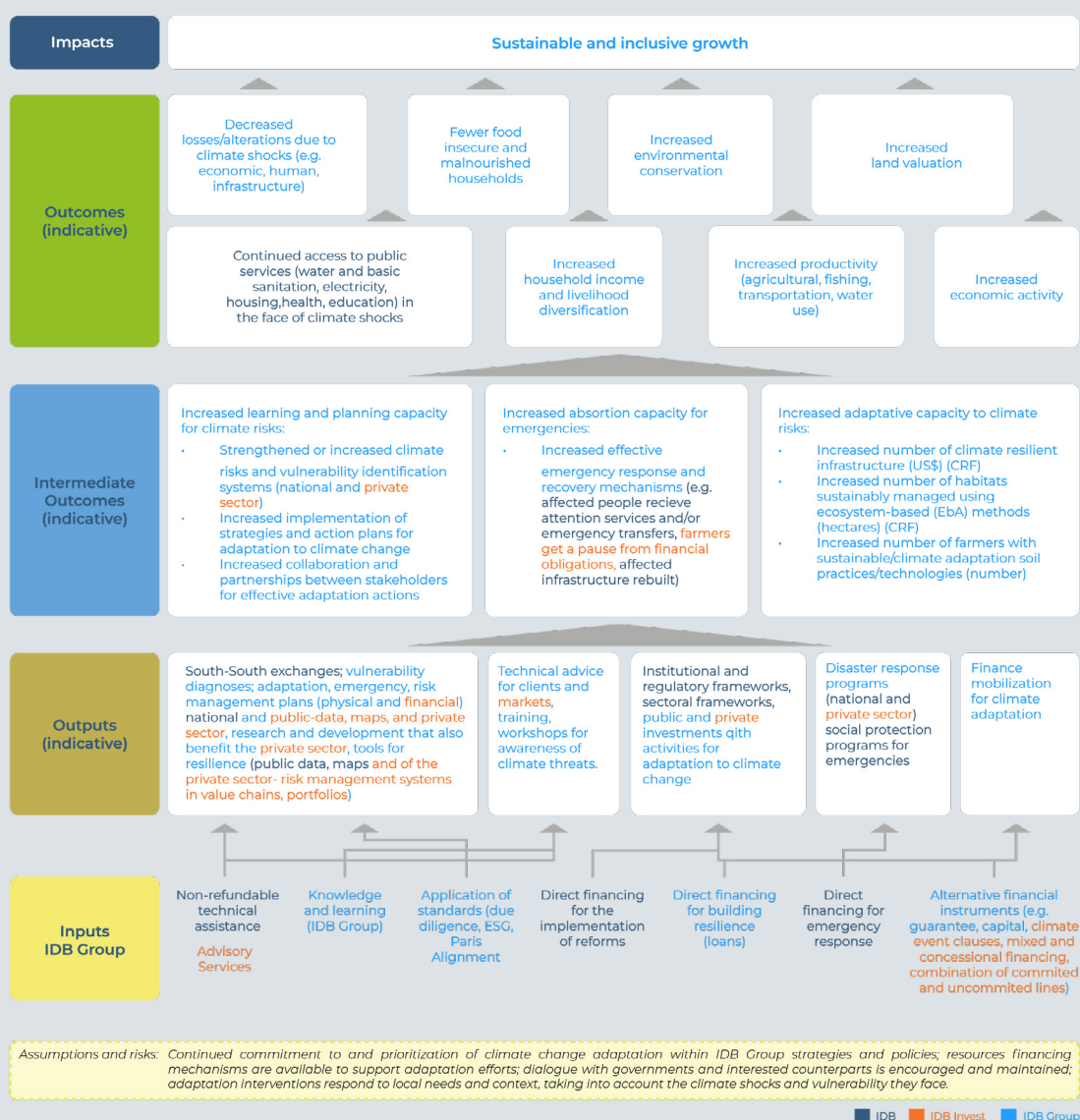
104. IDB Launches Regional Program for Disaster Resilience. (2025). Retrieved from: [IDB | IDB Launches Regional Program for Disaster Resilience](#)

In addition to financial innovation, IDBG Invest emphasizes capacity building and risk assessment. Using sophisticated tools to evaluate climate vulnerabilities and embed resilience measures into project design, it helps clients and financial institutions better understand and manage climate risks, encouraging clients to integrate resilience into their strategic planning and core business practices.

In parallel, the IDBG Lab is actively advancing climate adaptation by supporting innovative projects and solutions that enhance resilience to climate change impacts across multiple sectors. Since 2014, it has been investing in entrepreneurial ecosystems that promote adaptation across the region to drive economic growth and resilience. The focus is on fostering scalable and sustainable initiatives that help vulnerable communities adapt to changing environmental conditions. Through strategic investments, partnerships, and knowledge sharing, the IDBG Lab aims to accelerate the development and deployment of effective adaptation strategies, ultimately strengthening the capacity of regions to withstand climate-related challenges.

Through these comprehensive efforts, the IDBG aims to foster resilient development pathways that safeguard communities and ecosystems from the escalating impacts of climate change.

FIGURE 4.1:
THEORY OF CHANGE FOR CLIMATE CHANGE ADAPTATION



Source: OVE. CRF: corresponds to indicators included in the Corporate Results Framework



4.2 Moving from assessing to addressing risks: examples that enable iterative adaptation management

To secure a resilient future, the region must pivot from reactive, isolated interventions to proactive, interconnected strategies that build systemic resilience. Such integrated approaches go beyond siloed risk assessments to deliver technically sound and socially relevant strategies.

Traditional methodologies often focus on single hazards or isolated assets, failing to capture the systemic and interconnected nature of climate impacts. The new paradigm addresses this by employing a holistic approach that integrates forward-looking climate data with a broader understanding of socioeconomic, governance, and institutional factors. This aligns with emerging interdisciplinary frameworks for risk assessment, such as the IPCC's AR6 risk framework, which emphasizes systemic interactions between hazards, exposure, and vulnerability; the UNDRR's comprehensive risk management approach, which integrates disaster risk reduction with climate adaptation; and the OECD and World Bank methodologies that link infrastructure resilience with socioeconomic systems.¹⁰⁵ Similarly, there are new approaches for integrating climate risk assessment and adaptation into fiscal policy and macro-economic decision making. These harness the growing number of tools and frameworks that are available to assist governments and financial institutions in assessing and managing physical climate risks and adaptation strategies. A notable resource is the report "How Finance Ministries Can Assess and Manage Physical Climate Risks and Adaptation,"¹⁰⁶ published by the Coalition of Finance Ministers on Climate Action. This report provides insights and guidelines on integrating climate risk assessment with fiscal policy and decision-making processes, highlighting existing methodologies that can be employed to ensure sustainable adaptation investments.

¹⁰⁵ The global stocktake: an opportunity for ambition. (C2ES, 2021). Retrieved from: [Landscape Analysis of Adaptation Opportunities for Climate Ambition - Center for Climate and Energy Solutions Center for Climate and Energy Solutions](#)

¹⁰⁶ Coalition of Finance Ministers for Climate Action (2025) [How Ministries of Finance Can Assess and Manage Physical Climate Risks and Adaptation: Available Analytical Tools and Emerging Good Practice](#). Report for the HP4 Initiative "Economic Analysis for Green and Resilient Transitions"

In practice, this means utilizing diagnostics and analytical tools that combine downscaled climate projections with vulnerability mapping and socioeconomic baselines, making risks and resilience needs visible to stakeholders from the outset.

Developing clear, measurable indicators that can track progress over time is essential to further enhancing the visibility and understanding of resilience. Recognizing the global importance of such an effort, various initiatives are underway to develop a standardized framework for assessing climate resilience. The UNFCCC, for example, is working to define a core set of indicators aligned with the Global Goal on Adaptation. The Intergovernmental Panel on Climate Change (IPCC), meanwhile, is providing new guidance on adaptation metrics for its upcoming assessment cycle. Efforts in this direction, however, remain complex. Adaptation and resilience metrics can be difficult to capture and monitor in practice. In response, multilateral development banks and financial institutions are designing and implementing their own resilience metrics to inform project and portfolio decision-making. For instance, the IDBG has developed a dedicated framework to assist project teams in identifying resilience opportunities and establishing relevant metrics.¹⁰⁷ Equally important is the way stakeholders engage in this process: from governments and local authorities to community organizations and the private sector, inclusive participation ensures that adaptation tools reflect diverse needs and priorities. By combining “hard” tools, such as engineering models, climate projections, and geospatial analysis, with “soft” ones like participatory workshops, governance reforms, and institutional strengthening, projects can create solutions that are technically robust and socially anchored.

Another approach involves fostering cross-sector collaboration and knowledge-sharing platforms. Such platforms can facilitate the exchange of best practices, innovative solutions, and lessons learned, making resilience efforts more accessible and easier to replicate across different regions and contexts. As initiatives aimed at capacity-building, they are crucial to equipping local authorities, community leaders, and practitioners with the skills and knowledge needed to design, implement, and communicate resilience projects effectively.

Developing an enabling environment is fundamental. An example of such an endeavor is the Urban Infrastructure Insurance Facility (UIIF) project, financed by KfW Development Bank and implemented by ICLEI. The initiative supports cities in LAC by developing tailored insurance and risk financing solutions, informed by comprehensive urban risk assessments (URAs). These assessments, led by Marsh McLennan, help identify contingent liabilities, describe exposure and vulnerabilities, and design disaster risk reduction and financing guides. The project illustrates how international cooperation can strengthen local governance, risk knowledge, and financial resilience — key ingredients for defining national and subnational adaptation ambition. This empowerment can foster a culture of resilience that is embedded within local development practices.

Such a strategic shift in approach is evident in projects that focus on building the institutional capacity for resilience itself, rather than simply on physical intervention. The **Program to Strengthen the Peruvian State’s Capacity for Climate Resilience (PE-L1104)**, for example, directly tackled the problem of a fragmented institutional landscape. It focused on strengthening the legal, institutional, and policy frameworks needed to implement comprehensive risk management. By equipping the state with these foundational “tools,” it created a durable and well-informed governance structure that could be applied across sectors.

Similarly, in the Dominican Republic, the **Climate Resilience Program for Bridge Infrastructure (DR-L1166)**, currently being implemented, showcases a proactive, tools-based approach to a common infrastructure problem by investing in the pre-investment studies and technical support

¹⁰⁷ Grunwaldt, A., Glass, M., & McCarthy, N. (2021). *Identification of Climate Resilience Opportunities and Metrics in Financing Operations: A Technical Reference Document for IDB Project Teams*. <https://doi.org/10.18235/0003432>



required to design climate-resilient infrastructure from the outset. By utilizing sophisticated hydrological-hydraulic models that accounted for future climate scenarios, it ensured that every new bridge was engineered to withstand extreme precipitation and flooding, thereby preventing future losses. The integration of both hard diagnostic models and soft governance coordination mechanisms exemplified how tools can be combined to adapt infrastructure to future climate conditions. As such, the project illustrated the power of applying integrated diagnostic tools to embed resilience as a core design principle, ensuring that infrastructure investments are durable, functional, and fit for a changing climate.

In El Salvador, the education sector faces significant exposure to climate-related risks. A majority of its infrastructure has limited adaptive capacity to withstand increasing climate volatility. This vulnerability poses a direct threat to educational continuity and undermines long-term human capital development. Historically, capital investment planning for the sector has not integrated climate risk analysis, resulting in a systemic resilience deficit. The **Program for Complete Educational Trajectories and Their Climate Resilience (ES-L1167)**, directly address this challenge. It moves beyond traditional infrastructure upgrades to establish a comprehensive risk management and investment framework focused on safeguarding education into the future.

4.3 Mainstreaming adaptation: examples of how adaptation can be integrated into development planning, climate mitigation, and nature efforts

Embedding adaptation planning within national development, social, and environmental frameworks is essential for achieving truly comprehensive and transformational climate resilience¹⁰⁸. This shift from theory to practice reflects a growing recognition that climate resilience must be integrated at the heart of economic and development planning. Crucially, effective climate action

¹⁰⁸. The global stocktake: an opportunity for ambition. (C2ES, 2021). Retrieved from: [Landscape Analysis of Adaptation Opportunities for Climate Ambition Working Paper](#)

today requires a synergistic approach that links adaptation and mitigation efforts, rather than treating them as separate or secondary concerns.

The Bank's new strategic imperative underscores the reality that the most impactful climate projects are those that embed both adaptation and mitigation directly into core development pathways. By doing so, projects unlock valuable co-benefits. They create positive feedback loops that enhance infrastructure resilience while advancing a low-carbon future. This integrated approach is not only more effective. It is essential for driving transformational change toward sustainable, climate-resilient development.

Such an approach was the driving force behind projects such as the **Barbados Climate Resilient South Coast Water Reclamation Project (BA-L1063)**, which addressed the critical issue of water scarcity. By investing in advanced wastewater treatment and reuse facilities, the project both diversified the nation's water supply (adaptation) and reduced energy demand for desalination (mitigation). Financed through concessional loans blended with national co-funding, it demonstrated how circular water solutions can lower operational costs and deliver dual climate benefits — an important lesson for other small island states. In Brazil, the **Urban Requalification and Resilience Program in Recife (BR-L1609)** demonstrated a focus on building systemic resilience by redesigning urban spaces in socio-environmentally vulnerable areas, a dual-purpose solution that addressed both social and climate risks.

Across the region, infrastructure and ecosystem management projects followed a similarly integrated approach. The **CA-9 North Corridor Development Program (GU-L1189)** in Guatemala was designed with a dual objective: to improve trade connectivity and to increase climate resilience to flooding, ensuring the corridor's functionality in a changing climate. The project combined elevated road sections and improved drainage systems (adaptation) with efficiency upgrades that reduced transport-related emissions (mitigation). Delivered through an investment loan, it offered a key lesson: resilient trade infrastructure safeguards economic activity as well as climate security and functionality in a changing climate.

In Colombia, the **Adding Value to Mangroves Conservation Project (CO-G1029)**, approved in 2021 and still being implemented, applies this lens by valuing mangroves not just as ecological assets, but as critical urban infrastructure for coastal defense. Activities included large-scale mangrove restoration (adaptation) coupled with carbon sequestration benefits (mitigation). Leveraging blended finance with support from the Green Climate Fund, the project illustrated how nature-based solutions can generate resilience dividends while aligning with national climate commitments.

This emphasis has also been a driving force in the energy and agricultural sectors of the region. The **Remote Area Rural Electrification Program (HO-G1247)** in Honduras harnessed innovative, decentralized micro-grid technologies to bring power to remote communities, simultaneously boosting energy access and creating a more resilient energy system less vulnerable to large-scale grid failures. In Uruguay, the **Program to Support Policy Reform in Water Resources and Solid Waste (UR-L1195)** was designed to enhance water security and resilience to extreme events. It also strengthened a circular economy approach for waste management and advanced reforms that promoted water efficiency and waste-to-resource practices (adaptation + mitigation). Structured as a policy-based loan, it underscored how governance reforms can mainstream climate resilience and circular economy principles into national development planning.

An integrated, no-regret strategy is clearly illustrated by projects that reduce non-revenue water (NRW).¹⁰⁹ In urban settings, these initiatives deliver immediate, measurable benefits, improving water efficiency, conserving scarce resources, and strengthening the financial sustainability

¹⁰⁹. Water lost before it reaches the customer

of utilities. By reducing losses from leaks and illegal connections, NRW programs increase urban water-system resilience to drought and rising demand, directly supporting critical climate adaptation objectives. They also open substantial avenues for private-sector participation through performance-based contracts and innovative technologies. For example, IDBG Invest's financing of the **Corsan Project in Brazil** supports a large-scale loss-reduction program that enhances climate resilience while improving the utility's operational and commercial performance, demonstrating a scalable public-private collaboration model.

The private sector, a key partner in this transition, has also embraced this integrated approach. The **Xochi Flower Road (14003-01)** in Guatemala, an IDBG Invest project, was a major infrastructure initiative that embedded climate resilience and gender programs into its core business model. In Jamaica, the **Rio Cobre Water Treatment Plant (14690-01)** modernized a critical public service, thereby embedding climate resilience into essential urban infrastructure.

4.4 Harnessing innovations: Examples of utilizing technology and digital solutions for adaptation

Technology serves as a powerful catalyst for climate adaptation across LAC by moving beyond simple data collection to provide real-time, actionable intelligence to build resilience. Whether using AI to enhance early warning systems by predicting extreme weather events, enabling proactive disaster risk management,¹¹⁰ or facilitating people's ability to transition toward resilient development,¹¹¹ the proliferation of these technologies is fundamentally changing how risk is communicated and managed at the local level.

Innovation is essential to accelerating this technological momentum and achieving climate adaptation at scale. The IDBG is actively fostering a new generation of technological and financial solutions that can help the region to respond to increasingly complex climate risks, ranging from droughts and extreme rainfall to agricultural losses and urban flooding.

This strategic approach was embodied in projects such as the **Program to Finance Sustainable Investments and Improve Productivity in the Dominican Republic's Agriculture Sector (DR-L1157)**, which provided credit for climate-smart technologies in agriculture and helped drive a shift towards more sustainable and resilient farming practices. In Panama, the **Integrated Project for Electromobility and Increased Resilience (PN-L1185)** in its public transportation infrastructure linked decarbonization with the physical resilience of the transport network, using new technologies to electrify bus fleets and reinforce critical infrastructure.

Similarly, in agriculture and food systems, the IDBG Lab backs cutting-edge technologies. These include drought-tolerant seeds, biological inputs, and precision farming that help farmers adapt to changing climate conditions and reduce environmental impact.

A key driver is the strategic use of technology to create more efficient, responsive, and resilient systems. From digital governance to smart infrastructure, technology acts as a force multiplier, enabling projects to achieve scale and impact that would otherwise be impossible.

110. Artificial Intelligence for Climate Action (UNFCCC, UNIDO, 2025). Retrieved from: https://unfccc.int/tclear/misc_/StaticFiles/gnwoerk_static/AI4climateaction/f2922b97c4cf431996c468e622127eb5/112f8be560ea447dab5ff2e53ab3f6e4.pdf

111. World Bank Group. 2024. People in a Changing Climate: From Vulnerability to Action - Insights from World Bank Group Country Climate and Development Reports covering 72 economies. © World Bank. <http://hdl.handle.net/10986/42395>

Recognizing the importance of financial innovation, the IDBG Lab promotes fintech solutions like climate-contingent insurance, digital payments, and tailored credit products that enhance liquidity, risk transfer, and financial inclusion during climate-related events. Additionally, the lab leverages digital technology, earth observation, and sensing tools to improve early warning systems, urban planning, water management, and forest conservation. In doing so, it provides critical data and insights to better prepare communities and ecosystems for climate impacts. Through these integrated efforts, the IDBG Lab is building a more resilient and sustainable future for the region.

Beyond individual cases, lessons from technology-focused projects in LAC suggest that the sweet spots for innovation lie in agriculture, water management, transport, and risk governance. Local innovations, such as regional fintech, insurtech, and agri-tech startups, are increasingly shaping adaptation pathways. Meanwhile, external technologies, including blockchain-based smart contracts, advanced AI applications, and next-generation satellite and sensing systems, can complement domestic efforts. The combination of both creates opportunities for scaling solutions that are context-sensitive, affordable, and replicable across the region.

4.5 Financing adaptation: Examples of financial innovations that drive adaptation

Delivering climate adaptation at scale in LAC requires financial architecture tailored to national realities—levels of debt, fiscal space, and cost of capital—while unlocking systemic transformation. The IDBG has been a regional pioneer, testing and refining instruments that align adaptation goals with macro-fiscal conditions, institutional capacity, and sustainability. Such an alignment can happen, for example, by expanding the variety of financial instruments and tools—such as green and resilience bonds, contingent credit facilities, or climate resilient debt clauses (CRDCs)—or by concentrating resources into a smaller number of larger projects that maximize systemic impact. Another important cornerstone of the new adaptation strategy is building financial resilience by moving away from a reliance on post-disaster aid to proactive risk management. Such a focus revolves around designing and deploying financial incentives and instruments that can scale up both public and private investment in adaptation and resilience. Climate and disaster risk finance and insurance (CDRFI) provide rapid, predictable payouts. But equally important is their role in embedding resilience within fiscal policy, governance systems, and long-term planning.¹¹²

The IDBG has set explicit targets for increasing adaptation finance and tracking results. Under its Impact Framework 2024–2030, the Bank aims to mobilize at least \$25 billion in adaptation-related finance (indicator 3.8) and increase the share of projects that build climate resilience to 30% in the public sector. It also seeks to set measurable goals for IDBG Invest and the IDB Lab (indicator 3.9).¹¹³ By aligning financial innovation with country ownership, institutional reform, and private sector engagement, the Bank can ensure that every dollar invested generates scalable, inclusive, and lasting resilience across LAC.

In keeping with this ambition, the IDBG offers a diverse set of financial instruments for adaptation and disaster risk management, ranging from policy-based and investment loans to

¹¹² CDRFI in National Adaptation Plans and Nationally Determined Contributions (UNDP-IRFF, 2025) Retrieved from: [CDRFI in NAPs and NDCs_26 June.pdf](#)

¹¹³ Inter-American Development Bank Group (2023). Impact Framework 2024–2030: Performance Targets. Indicators 3.8 and 3.9.

innovative mechanisms such as climate resilient debt clauses and disaster protection options, as summarized below.

TABLE 3
IDB FINANCIAL INSTRUMENTS FOR ADAPTATION AND DRM

Public Sector Instrument (Direct investments, knowledge)	Details
Conditional Credit Line for Investment Projects (CCLIP)	Provides a credit line to finance investment loans as well as issuing guarantees that support investment projects
Policy-Based Loans (PBL)	Provides flexible resources to support policy reforms or institutional changes in a sector or sub-sector
Multiple Works Loans (GOM)	Finance groups of similar works (a sample of which are fully defined) with specific characteristics
Specific Investment Loans (ESP)	Finances one or more specific projects or subprojects that are wholly defined at the time the IDB's loan is approved
Loan Based on Results (LBR)	Finance the achievement of results of new or existing Government programs. The LBR disburses once results have been achieved
Contingent Credit Facility for Natural-Disaster and Public-Health Emergencies (CCF)	Provides resources for immediate response after a natural disaster or a public health event of severe catastrophic proportions
Immediate Response Facility for Emergencies caused by disasters (IRF)	Provides rapid financial support for addressing the effects of disasters
Reimbursable Technical Cooperation (TCR)	Transfers technical know-how to strengthen the capacity of entities in developing countries and requires repayment like a regular investment loan
Flexible Financing Facility (FFF) – Climate Resilient Debt Clause (CRDC)	In relation to Disaster Risk Management, allows postponement of payments up to two years after the occurrence of a disaster
Disaster protection option	Provides rapid cash payments after the occurrence of a disaster
Investment Grant (IG)	Finances specific investments and activities that promote knowledge generation
Innovative financial instruments	IDB-CLIMA, Debt-for-nature swap, bonds, among others

Source: IDBG (2025). [Financing offerings](#)

Policy-based loans (PBLs) have been particularly effective for systemic reforms. In Peru, the **Program to Strengthen the State's Capacity for Climate Resilience (PE-L1086; PE-L1104)** mainstreamed climate and disaster risk into planning, budgeting, and infrastructure standards. Investment loans have enabled climate-resilient infrastructure in **Uruguay (UR-L1195)**, **Guatemala (GU-L1189)**, and the **Dominican Republic (DR-L1166)**, while also building technical capacity in climate data integration.

Blended finance has proven key to scale and affordability. For example, the **Program to Support Environmental and Economic Development in Barbados (BA-U0001)**, provided an innovative solution through the use of an **IDBG Policy-Based Guarantee (PBG)**. This leveraged resources in an international financial debt market operation directed at promoting conservation outcomes. The project also supported the development of new debt strategies and instruments for environmental sustainability.

This strategic approach was embodied in projects such as the **Program to Finance Sustainable Investments and Improve Productivity in the Dominican Republic (DR-L1157)**, which

provided credit for climate-smart technologies in agriculture, driving in the process a shift towards more sustainable and resilient farming practices.

Additional innovations that could be scaled up include:

- **IDBG Invest's Scaling4Impact securitized \$1 billion portfolio.** This enhanced lending capacity for new climate adaptation-oriented projects, leveraging strong government ties and public-private synergies to open a new asset class in LAC.

- **Use of unfunded credit protection,** which has expanded IDBG Invest's lending capacity in agro-industrial, energy, infrastructure, and financial sectors focused on long-term climate resilience.

Another example focused on practically addressing barriers to access foreign investment is the **Eco Invest Brazil program.** This has proven to be an innovative and successful initiative, arising from the combination between innovative economic-financial instruments and Brazil's commitment to sustainability and ecological transition. Designed to address barriers for accessing foreign investment — namely, the high cost of capital, FX volatility, and limited longterm FX hedges — Eco Invest Brazil is a governmentled program, which is also supported by the IDB, the UK Embassy in Brazil and Oliver Wyman. It mobilizes public catalytic capital to improve project bankability and attract foreign direct investment for environmental initiatives in Brazil. The first auction of the program successfully tested the model: Brazil's Treasury committed around R\$7 billion and banks targeted around R\$38 billion, implying an approximately R\$45 billion potential investment (leverage around 6.5x). The second auction scaled up demand (R\$17.3 billion in catalytic requests) and the potential investment (around R\$31.4 billion), supporting plans to restore about 1.4 million hectares between 2025–2027, at a leverage of around 1.8x. As of September 2025, a third auction is in the works and soon to be launched. As the program moves ahead with momentum, there may be opportunities to apply it to adaptation challenges.

Finally, a new generation of instruments is emerging to unlock private sector capital for adaptation. One example is **Reinvest+.** This seeks to overcome one of the most persistent barriers in climate finance: the mismatch between institutional investors' preference for rated, foreign-currency securities and the local-currency, unrated nature of most emerging market projects.

The mechanism operates by purchasing existing, high-quality performing loans from local financial institutions, diversifying them, and enhancing the portfolio with political risk and FX insurance. Once rated, these securities can be sold to global institutional investors. The proceeds are then reinvested in local banks on the condition that they extend new loans to projects aligned with national adaptation and resilience priorities.

This creates a closed loop where institutional investors access investable securities, local banks expand lending capacity, and national climate plans receive financing. The model is inclusively focused on projects that spread resilience and mitigation benefits. It is scalable as it requires no direct subsidies. Moreover, incentive-compatible local banks gain access to cheaper capital by lending more to climate-aligned projects. Starting with a pilot in Latin America, Reinvest+ can be potentially replicated across emerging markets, positioning the IDBG at the forefront of financial innovation for adaptation.

Finally, risk finance and insurance can be harnessed for climate resilience. Risk layering is emerging as a holistic approach, combining in one coherent strategy risk reduction and adaptation measures, governance reforms, and risk finance. Mexico's disaster risk financing framework illustrates how multiple layers —budget reallocations, contingent credit, and insurance—can be combined to strengthen resilience and reduce fiscal shocks. In the Caribbean, CCRIF has gone further by embedding adaptation and resilience benefits into its sovereign risk-transfer model, providing governments with both financial protection and incentives for proactive risk management.

Insurance, as part of this layered approach, can play out at different levels from sovereign to sectoral to local, illustrating how it becomes one piece of a broader puzzle when aiming for a well-adapted LAC. At the micro level, Mexico's Parametric Insurance for Smallholder Farmers of Maize was implemented to strengthen rural resilience to extreme weather. It did so by providing payouts for drought and excess-rain events of up to the equivalent of \$100 per hectare (paid in Mexican pesos) to farmers with less than five hectares of cultivated land.¹¹⁴ At the meso-level, cooperative- or sector-based schemes are being explored for SMEs. At the macro level, sovereign risk-transfer instruments, such as CCRIF, help governments reduce fiscal shocks. Together, these examples show that insurance can play a role at every level —household, sectoral, and sovereign — as one piece of the adaptation puzzle.

Emerging opportunities also include:

- **Credit insurance for climate adaptation portfolios**, designed to bring private capital support, improve risk management efficiency, and empower lending to private sector borrowers leading adaptation implementation.

- **Credit insurance for local currency** lending, helping eliminate exchange-rate risks for borrowers and expand domestic lending capacity in LAC.

Emerging opportunities include insurtech solutions, bancassurance models, and resilience bonds that can expand access and affordability. Rapid smartphone adoption and the growing middle class in LAC create new demands for protection, while partnerships with local financial institutions can improve distribution and uptake.

These lessons highlight that embedding institutional capacity — technical, legal, and regulatory — is essential for financial effectiveness. Policy-based loans are most effective for systemic reforms; investment loans for asset-level resilience; and blended finance for scale and affordability. Financial layering enhances fiscal viability and sustainability.



114. Parametric Insurance for Smallholder Farmers in Mexico (2022). Guy Carpenter, - available at <https://www.marshmcienan.com/insights/publications/2023/april/extending-the-application-of-parametric-solutions-addressing-nature-loss-and-finding-solutions-for-vulnerable-communities.html>

5. Moving towards a well-adapted LAC' in the face of new geopolitical realities, a changing climate, and tighter budgets

The overarching message is one of urgency. Climate impacts are accelerating, fiscal and geopolitical pressures are tightening, and adaptation can no longer be treated as optional or secondary. Embedding adaptation into the core of national development strategies is essential for safeguarding growth, stability, and social welfare. By aligning policy, finance, technology, and community engagement, LAC can build systemic resilience, safeguard development gains, and thrive amid a changing climate.

5.1 Adaptation progress requires an iterative dynamic risk management approach

Advancing on adaptation demands a continuous, iterative risk management strategy that responds dynamically to emerging challenges. For this to occur, a thorough understanding of current and future risks and their causes is key.

While current impacts are visible, the scale of future risks posed by climate change are characterized by significant uncertainty, making flexible and dynamic approaches essential. Such approaches permit the incorporation of new information and technologies as they emerge, enhancing robustness and adaptability.

Countries must define their own ambitions, as there is no universal understanding of what we are adapting to. National governments have a responsibility to define adaptation pathways, with international funders supporting—but not replacing—these sovereign decisions. Development of robust governance systems paired with clear, actionable goals and objectives is fundamental to effective adaptation implementation.

For those reasons, building a resilient LAC requires more than increased investment. Resilience must be deeply integrated with development goals, climate mitigation, and environmental conservation, while actively leveraging both technological and financial innovations. Critical components enabling successful adaptation include strengthening capacity, enhancing governance structures, and expanding risk awareness and knowledge. Economic considerations should



guide every phase of the adaptation process, employing data-driven prioritization and cost-benefit analyses of adaptation options, while ensuring that expenditures align with long-term trends.

5.2 Bridging existing adaptation gaps requires effective public-private engagement

Adaptation can be seen as a public good. The public sector should play a key role in the planning and implementation of adaptation actions. However, adaptation cannot rely solely on the public sector, particularly in times of tighter budgets and changing geopolitical realities. For that reason, it is ever more important to harness the significant potential for greater participation by domestic and international private sector partners in developing and implementing innovative adaptation solutions. This includes adaptation at the asset-level. Businesses across LAC, for example, can take measures to protect their sites, employees, or resources. As highlighted in recent surveys,¹¹⁵ however, there is a growing awareness of adaptation gaps at a system level, where businesses rely on infrastructure, supply chains, and government policy to create greater climate resilience. There is a need for effective engagement and collaboration across sectors. By combining the unique capabilities of both the public and private sectors, adaptation costs can be effectively reduced. Public-private partnerships play a crucial role in maximizing investment impact and facilitating knowledge exchange, thus strengthening resilience for the future. Organizations such as the IDBG can play a key role by acting as a bridge, connecting governments and investors, the public and private sectors, and individuals and communities. However, these processes require time, trust, and transparency to result in long-lasting climate resilience.

¹¹⁵ Marsh (2025): <https://www.marsh.com/en/risks/climate-change-sustainability/insights/climate-adaptation-report.html>

There are no silver bullets. National governments and their partners need to implement comprehensive, multilayered adaptation strategies that utilize diverse tools and mechanisms. Not everything needs to be done everywhere at once. Building on an iterative framework, adaptation interventions can be categorized according to costs, benefits, lead-times, and their applicability to a local context, and can be dependent, among others, on data or technological availability. Nonetheless, across the wide spectrum of adaptation interventions some strategies stand out in terms of their potential for quick and sustainable results, such as:

- **Embedding adaptation** across planning and policies and into broader economic and development strategies, including health, infrastructure, and agriculture.

- **Supporting projects that reduce emissions and increase resilience**, especially those that foster nature-based solutions and strengthen natural capital.

- **Harnessing** innovative financing approaches to give countries fiscal breathing room and reduce the cost of borrowing for adaptation.

- **Strengthening domestic markets** to deliver adaptation and generate a strong supply side, particularly in the context of building technologies, insurance solutions, and agricultural innovations. Patience is needed, as markets take time to develop. But urgency requires combining external support with internal capacity-building.

Significantly, a key advantage of adaptation lies in its capacity to generate co-benefits. These additional outcomes extend beyond simple climate resilience to include reductions in emissions, the restoration of ecosystems, and advancements in social equity.¹¹⁶

5.3 Adaptation needs to be context specific; different pathways to effective solutions exist

Across LAC, context-specific strategies are required that prioritize mainstreaming, leverage innovative financing, and strengthen domestic markets for adaptation technologies and services. The way to identify the most effective solutions depends on each country's stage of capacity and institutional readiness.

Adaptation pathways can provide a roadmap, helping countries prioritize measures and adjust them as risk drivers and needs¹¹⁷ evolve. For example, some countries may need to advance systemic reforms to lay the groundwork for integrating risk into planning, while considering financing options such as blended finance or public-private partnerships. At the same time, financial protection through prearranged financing (contingent credit, insurance, and others), or reserve funds remains essential to safeguard economies and livelihoods and ensure an effective response.

Countries should advance across multiple, complementary tracks. Urgent, well-coordinated, and adequately funded adaptation actions are imperative to safeguard LAC's development gains, reduce vulnerabilities, and promote sustainable growth amid a changing climate. Adaptation is no longer optional. It is a necessity requiring an all-of-society approach that leverages innovation, finance, and governance to build systemic resilience for the region's future.

116. Heubaum, H., C. Brandon, T. Tanner, S. Surminski, and V. Roezer. 2022. "The Triple Dividend of Building Climate Resilience: Taking Stock, Moving Forward." Working Paper. Washington, DC: World Resources Institute. Available online at <https://doi.org/10.46830/wri-wp.21.00154>.

117. Adaptation pathways are approaches for planning adaptation under conditions of uncertainty, by sequencing measures over time in response to how climate risk and societal conditions evolve. (IPCC AR6 WGII, Chapter 17, Glossary)

