The impact of climate change on child and youth poverty in Latin America

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Acronyms

CO2: Carbon dioxide

CRU: Climatic Research Unit

ECLAC: Economic Commission for Latin America and the Caribbean

EU: European Union

GDP: Gross Domestic Product

GHG: Greenhouse Gases

IPCC: Intergovernmental Panel on Climate Change

LA: Latin America

LAC: Latin America and the Caribbean

NDCs: Nationally Determined Contributions

NGFS: Network for Greening the Financial System

OLS: Ordinary Least Squares

RCP: Representative Concentration Pathway

SDG: Sustainable Development Goal

SPEI: Standardized Precipitation Evapotranspiration Index

SSP: Shared Socioeconomic Pathways

UNICEF: United Nations Children's Fund

USA: United States of America

WDI: World Development Indicators


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Executive summary

Climate change is transforming the way we live and redefining the future of childhood. In the Latin American and Caribbean region, children and young people[i] face unprecedented risks that threaten their present and future opportunities. Climate change affects them disproportionately, as they are physically and physiologically more vulnerable to withstand and survive extreme weather conditions such as floods, droughts, storms and heat waves. This vulnerability is also due to their high economic dependence, the prevalence of poverty and the lack of access to essential services for their development, such as healthcare, nutrition, education and social protection, which limits the resources available to deal with a changing climate. As these impacts intensify, these trends are expected to worsen, potentially resulting in a lifetime of missed opportunities.

> **This study analyses the potential impact of climate change on the incidence of child and youth poverty in Latin America in 2030.**

This study analyses the potential impact of climate change on the incidence of child and youth poverty in Latin America in 2030. Based on harmonised poverty data for 18 countries in the region, the results show that climate change will cause a considerable increase in child and youth poverty in Latin America. However, the final magnitude of this increase will depend on **(i)** the climate scenario towards which the planet is heading and **(ii)** the public policies that the region implements.

This document quantifies the impacts of climate change under three climate scenarios: **Net Zero 2050**, **Current policies** and **Too little, too late**. These scenarios reflect the different efforts aimed at reducing global greenhouse gas (GHG) emissions. In each scenario, the economic impacts of climate change are considered, including the chronic effects related to the trend increase in temperatures and the acute effects associated with four types of extreme weather events: heat waves, droughts, floods and tropical cyclones. Likewise, it explores how a deepening of economic inequality driven by the effects of climate change - and reflected by an increase in the Gini coefficient of income distribution - could impact the evolution of child and youth poverty (climate change and inequality effect).

In 2030, even in a scenario where ambitious and rapid reductions in GHG emissions are implemented globally (**Net Zero 2050**), it is estimated that climate change could push an additional 5.9 million children and young people into poverty. On the other hand, in a scenario of climate inaction (**Too little, too late**), this number could triple to 17.9 million additional children and young people. By way of comparison, approximately 11 million children and young people were pushed into poverty as a result of the COVID-19 pandemic.

[i] In this study, the terms "children and young people" refer to individuals under 25 years of age.

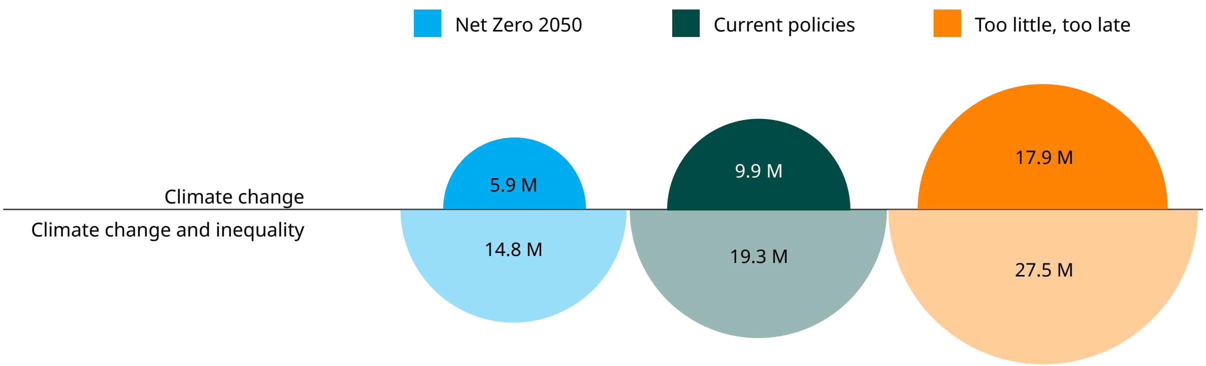
In 2030, even in a scenario where ambitious and rapid reductions in GHG emissions are implemented globally (Net Zero 2050), it is estimated that climate change could push an additional

5.9

million children and young people into poverty.

On the other hand, under the impulse of climate change, pre-existing inequalities could deepen, further exacerbating the aforementioned impacts. If the Gini coefficient of income distribution deteriorates by 1 per cent per year[ii], by 2030, the number of children and young people in poverty due to climate change could approximately double compared to previous estimates.
This emphasizes the importance of promoting a more inclusive development model in which public policy mitigates the pressures of climate change on inequality. See table Summary of the projected evolution of the main variables below.

In the best-case scenario, an additional 5.9 million children, adolescents, and youth will fall into poverty due to climate change in 2030.



Children and young people in poverty due to climate change effects in 2030, Latin America (17 countries)

Source: Own elaboration.

Note: These numbers correspond to the difference from the scenario without climate change in millions of people. The upper semicircles ("Climate change") represent the projection where inequality remains the same, while the lower semicircles ("Climate change and inequality") represent the projection where inequality worsens.

[ii] The Gini coefficient or Gini index is a measure of inequality in income distribution. It takes values between 0 (perfect equality) and 1 (maximum inequality), reflecting how equitably income is distributed within a population.

Given the scale of these impacts, it is essential to address climate change as a key factor in the fight against child and youth poverty. To this end, it is recommended that greater coordination be promoted between climate policies and policies for the protection and defence of children and youth in the region in at least the following priority areas:

(i) **Strengthen the climate resilience of social services and improve critical infrastructure** (health, nutrition, education and early childhood development with a climate focus) by designing programmes that provide combined health, nutrition and early care services with special emphasis on the first 1,000 days of life, designing and building climate-resistant schools and facilitating access to safe drinking water, sanitation and hygiene.

(ii) **Increase climate funding** to develop child- and youth-sensitive programmes that strengthen critical social services to make them more climate-resilient, while ensuring the inclusion of their rights and their participation as relevant actors and agents of change.

(iii) **Promote adaptive social protection policies and emergency responses** that take into account the specific needs of children and youth through the development of disaster-adaptive or responsive social protection systems, improving accessibility to comprehensive health services and adapting emergency response protocols based on the physical and psychological requirements of children and young people.

(iv) **Promote greater awareness, education, and climate empowerment** of children and youth that build life skills in a changing world by fostering their participation at the local, regional, and global levels and by supporting and strengthening climate movements led by children and youth through the inclusion of environmental and climate education in school curricula and programmes.

It is of the utmost importance to incorporate the needs, perspectives and rights of children and young people into climate policies, actions and investments at all levels. The new Nationally Determined Contributions (NDCs) that countries have to prepare by 2025 represent an excellent opportunity to establish commitments and measures for the most vulnerable populations.

To prevent climate change from pushing an increasing number of children and young people into poverty, integrated climate and social policies are also essential. The present and future of children and young people in Latin America and the Caribbean depend on the measures taken today to protect them from the adverse effects of climate change, promote equitable growth and avoid the risk of poverty by giving each of them an equal opportunity to improve their well-being.

	Net Zero		Current policies		Too little, too late	
Temperature increase in Latin America and the Caribbean by the end of the 20th century (relative to the 1961-1990 average)	+1.47 °C		+2.84 °C		+4.60 °C	
Regional GDP impacts in 2030 (difference in % relative to the scenario without climate change)	-5.52 %		-7.91 %		-12.05 %	
Regional population growth between 2022-2030	+4.68 %		+5.54 %		+4.25 %	
Change in the Gini index relative to 2022	No change	+1% annually	No change	+1% annually	No change	+1% annually
Increase in the number of children and young people in poverty (difference relative to the scenario without climate change)	+7.4 %	+18.4 %	+12.2 %	+23.7 %	+22.3 %	+34.3 %
	5.96 million	14.88 million	9.97 million	19.34 million	17.91 million	27.54 million

Summary of the projected evolution of the main variables

Source: Own elaboration.

1

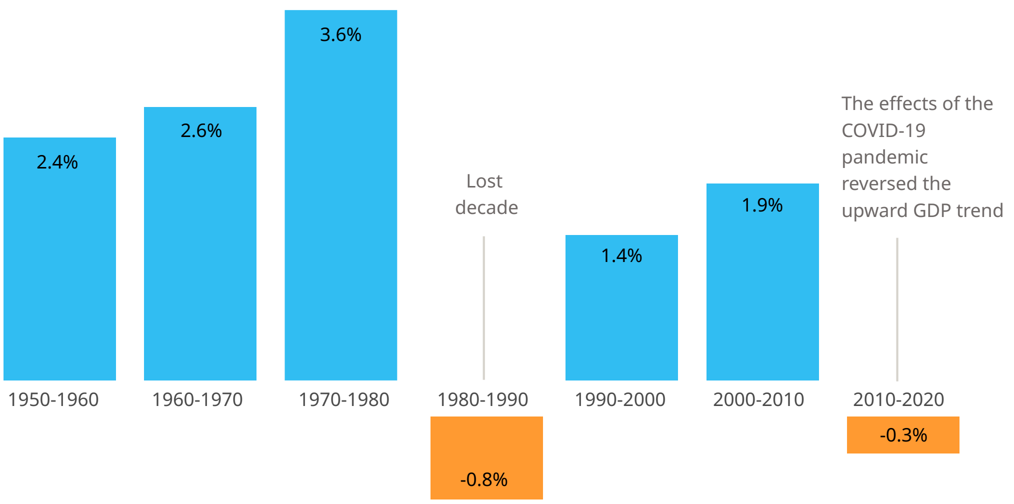
Introduction

1

Introduction

The evolution of child and youth poverty in Latin America (LA) is concerning and could worsen under the effects of climate change. In recent years, the effects of the COVID-19 pandemic have exacerbated this trend, causing the greatest economic setback in decades. This situation contrasts sharply with the evolution observed during the first decade of the 21st century. Between 2000 and 2010, growth driven by the boom in commodity prices allowed the region's GDP per capita to increase by almost 2 per cent per year. In a longer historical perspective, since 1950, the only other period in which GDP per capita decreased was the 1980s, a period known as the "lost decade" due to low growth and constant crises faced by LA.

Recent years have seen the worst economic downturn in decades.



Graph 1. Annual average variation of GDP per capita, Latin America, 1950–2020

Source: Own elaboration based on CEPALSTAT.

In the 2000s, several countries in the region achieved significant progress in poverty reduction.

This new macroeconomic context has had a direct impact on poverty reduction. The economic boom of the 2000s allowed several countries in the region to achieve significant poverty reduction, reflected in a decrease in the regional poverty rate from 44.1 per cent in 2001 to 27.7 per cent in 2014 (*see Graph 2*)[1]. However, the limited GDP per capita growth in recent years has caused stagnation and even a reversal of this trend, and during the health and economic crisis associated with COVID-19, the LA's poverty rate rebounded above 30 per cent. It is estimated that in 2020, the region experienced an increase of 22 million people in poverty. In 2022, it is estimated that 29 per cent of the population is living inpoverty, a level that remains higher than the historical low recorded in 2014.

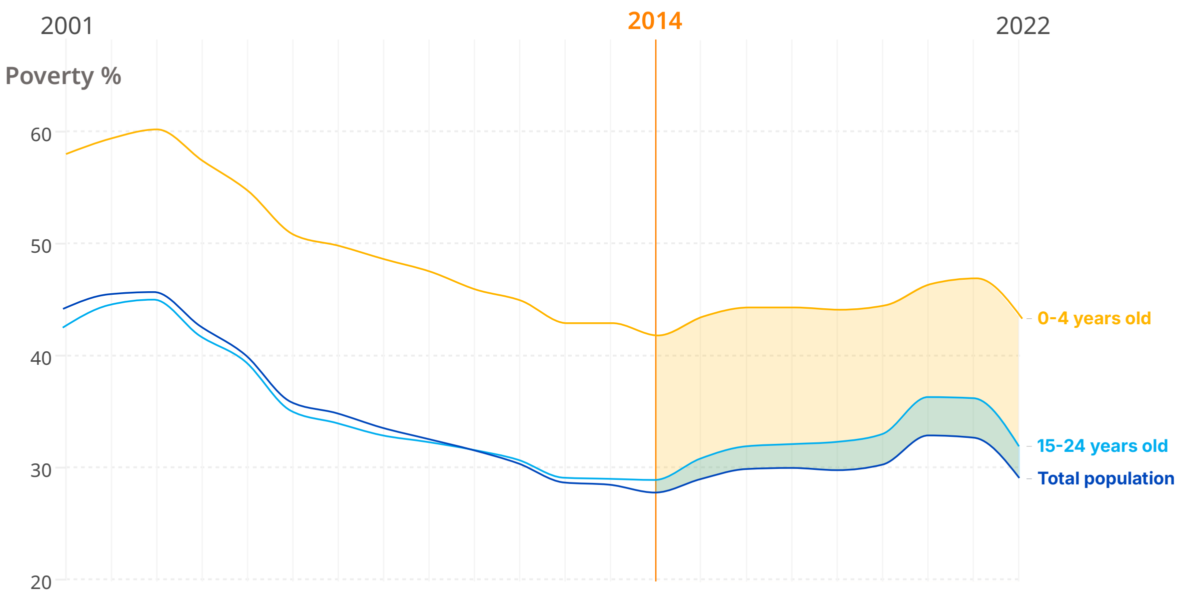
In Latin America, around

94 million

children, adolescents, and young people live in poverty.

These developments are particularly concerning for the LAC's children and young people[2], who are disproportionately affected by poverty. The macroeconomic situation in recent years has hindered the implementation of effective social protection

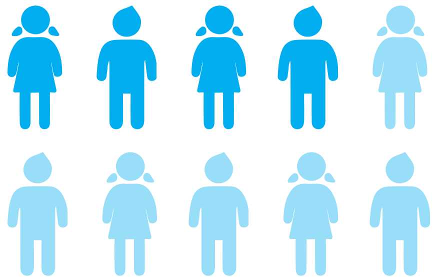
Since 2014, poverty rates for the population under 25 years old have increased more rapidly than the poverty rate of the general population.



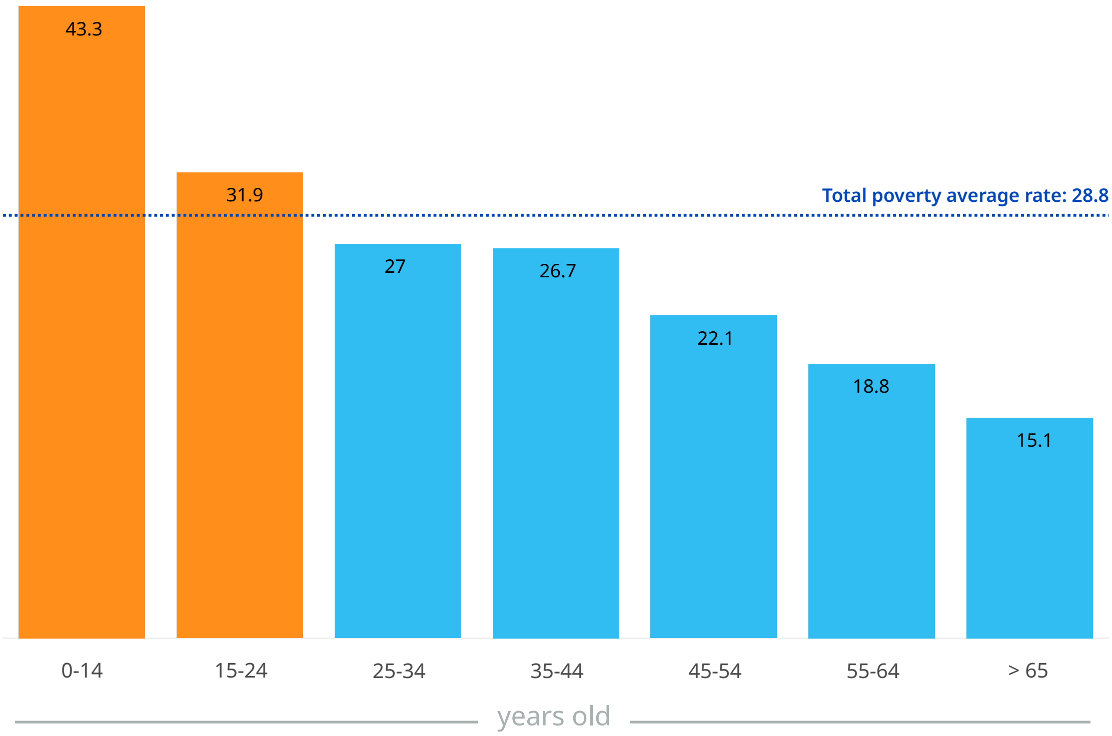
Graph 2. Poverty rate, Latin America (18 countries), 2001–2022 (%)
Source: Own elaboration based on CEPALSTAT.

policies, especially affecting the region's children and young people. As a result, since 2014, poverty rates for the population under 25 have increased more rapidly than the general population's poverty rate (red and blue lines vs. grey line in Graph 2), putting a generation of children and young people at risk. In 2022, it is estimated that more than half of Latin America's poor are under 25, although they only make up 39 per cent of the total population. This means that in the region, about 94 million children and young people are poor (i.e., 52 per cent of the total poor). The incidence of poverty is particularly concerning for young children, (i.e., 43 per cent), while the poverty rate for the population aged 25 and over is 23.1 per cent (*see Graph 3*).

4 out of 10 children under 15 years of age are living in poverty



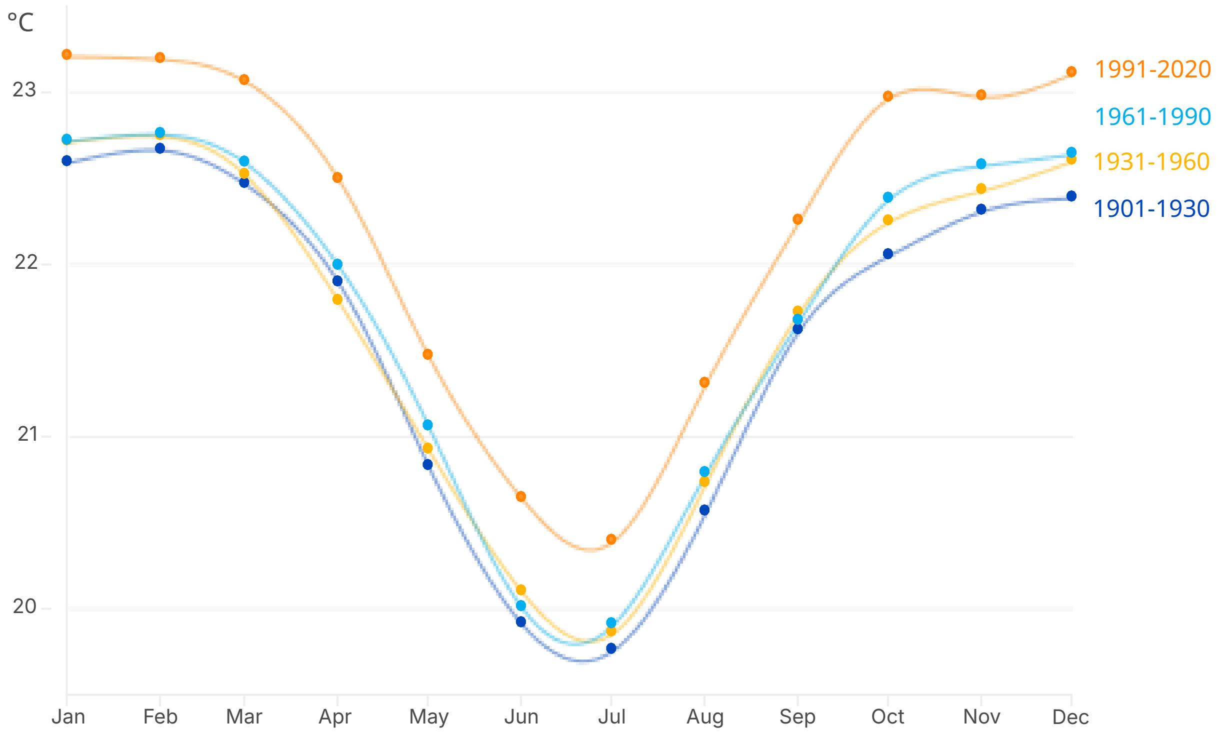
Children and adolescents are the most affected by poverty, with a rate that far exceeds the average of the total population.



Graph 3. Poverty rate by age groups, Latin America (18 countries), 2022 (%)
Source: Own elaboration based on CEPALSTAT.

The region is also experiencing the effects of climate change. In the last 30 years, the average monthly temperature in Latin America and the Caribbean (LAC) has shown a significant increase, contrasting with the relative stability observed throughout the 20th century (*see Graph 4*). In some Caribbean countries, monthly temperature increases already exceed 1.5°C compared to the average recorded at the beginning of the 20th century. Meanwhile, in countries like Argentina or Chile, these increases do not exceed 1°C (*see Graph 5*). This gradual increase in temperatures intensifies the hydrological cycle and is accompanied by more erratic precipitation patterns, with increasingly frequent and/or intense torrential rain episodes, although total precipitation levels are decreasing in some countries[3]. This warming trend is also accelerating polar ice melt, inducing a progressive rise in sea levels that risks permanently flooding small islands, low-lying coastal areas, and deltas.

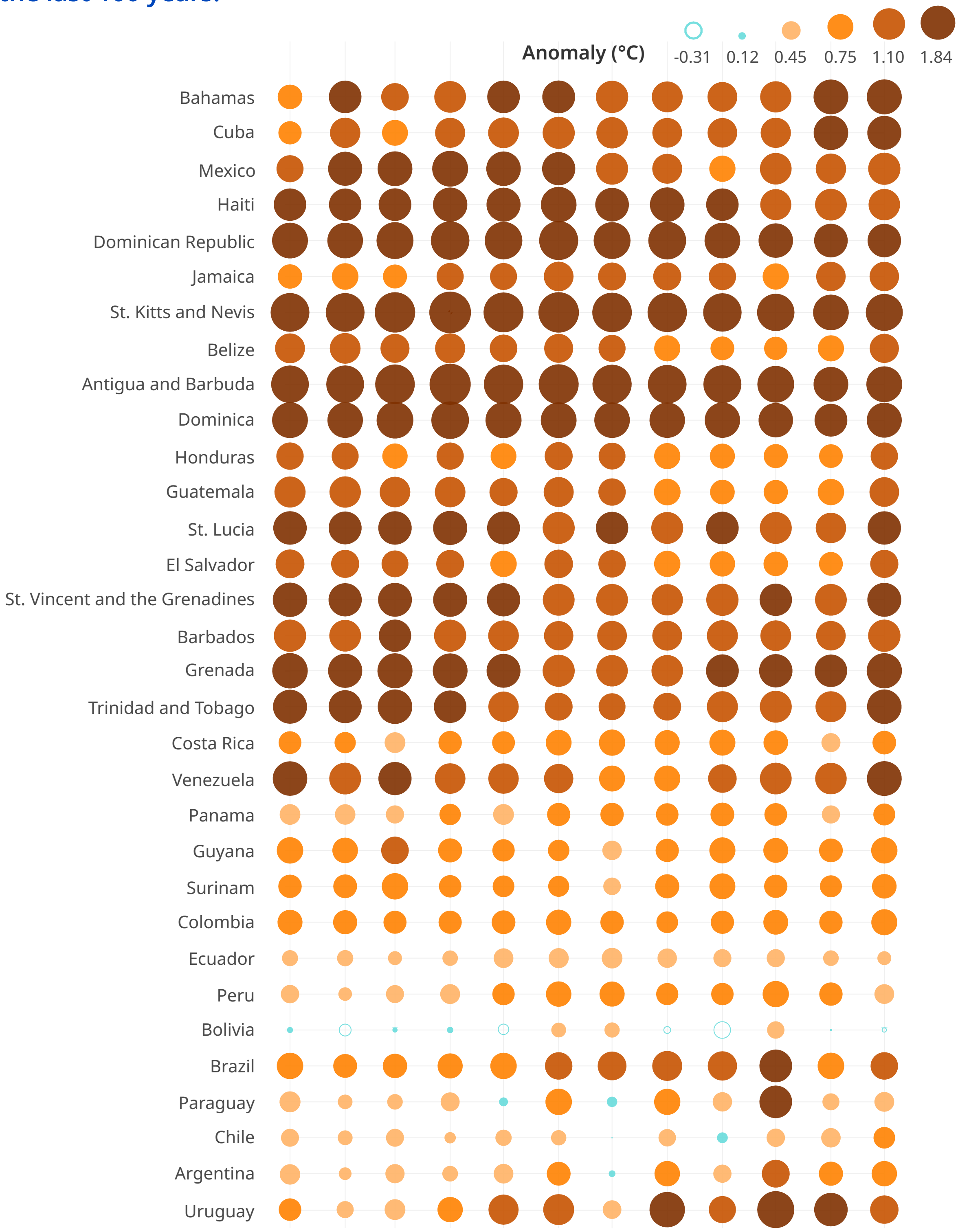
In the last 30 years, average monthly temperatures have increased significantly in Latin America compared to the 20th century.



Graph 4. Evolution of average monthly temperature in LAC, 1901–2020 (°C)

Source: Own elaboration based on CRU.

The Caribbean has presented the greatest increases in average temperature in the last 100 years.



Graph 5. Monthly temperature anomalies by country (average 1991-2020 vs. 1901-1930)

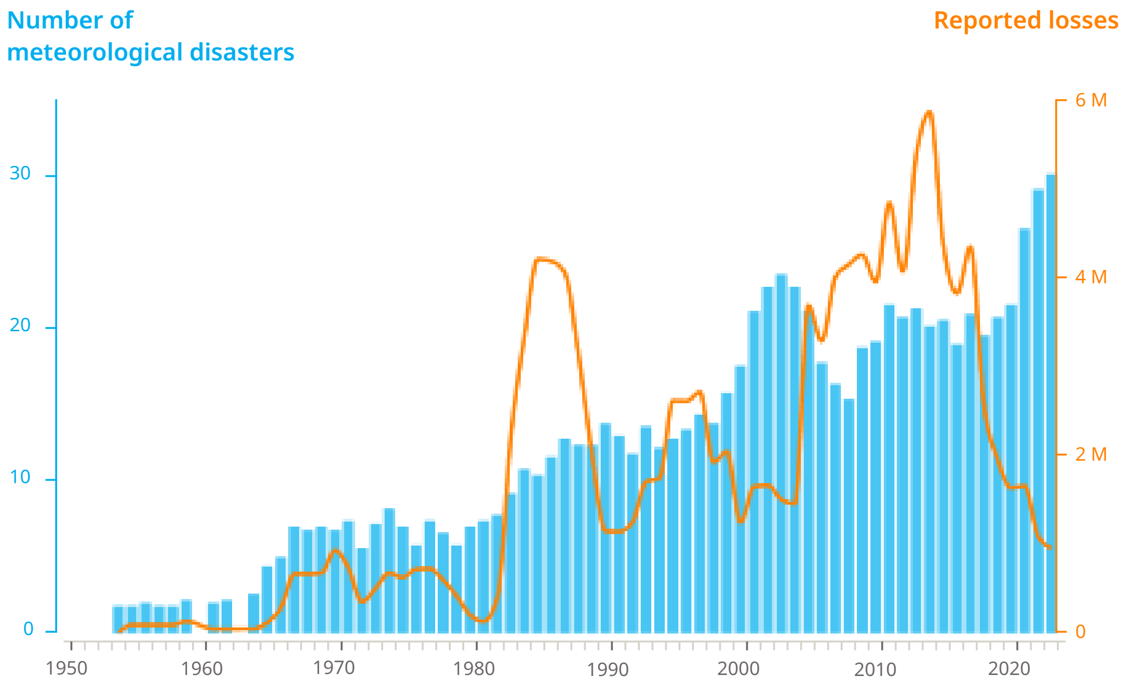
Note: Countries are sorted by latitude, from north to south.

Source: Own elaboration based on CRU.

The effects of climate change are also manifested by more frequent extreme weather events. In the last 50 years, both the frequency and impact of extreme weather events have shown an upward trend in Latin America. While an average of 5 events per year were reported in the 1960s, this number skyrocketed to more than 20 per year during the 2010s and even reached 30 per year in the early 2020s (*see Graph 6* – bars). Likewise, economic losses from meteorological events have multiplied nearly tenfold, reaching an average of US$3.913 billion annually during the 2010s (adjusted to dollars in 2022, *see Graph 6* – line).[4] These increasing impacts divert resources towards damage repair and adaptation instead of investing in infrastructure, education, or innovation. This creates an opportunity cost by limiting potential growth and perpetuates development gaps, hindering the reduction of inequalities in Latin America.

The impacts of climate change exacerbate these trends and pose a significant threat to efforts to reduce child and youth poverty. According to the *Child Climate Risk Index*, developed by the United Nations Children's Fund (UNICEF), in Latin America and the Caribbean, it is estimated that 55 million children are exposed to water scarcity; 60 million children are exposed to cyclones, and 45 million children are exposed to heatwaves. Under the effects of climate change, the likelihood of facing extreme weather events will increase as global temperatures rise, with potentially devastating effects on children and young people.[5] Droughts, for example, are

Weather phenomena have shown an upward trend in Latin America in the last 50 years, increasing economic losses.



Graph 6. Number of meteorological disasters (bars) and reported losses (line) in million US dollars adjusted to 2022, in Latin America and the Caribbean, 1960-2023 (5-year moving average)

Source: Own elaboration based on EM-DAT, CRED 2015.

Note: Includes floods, storms, and landslides.

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Peru, 2023

already intensifying in areas such as the Central American dry corridor, northeastern Brazil, and parts of the Southern Cone, causing adverse impacts on agricultural production that for many poor children mean periods of nutritional deprivation that can have lifelong impacts. This could worsen by 2030, and globally it is estimated that between 570,000 and over 1 million children under 5 could suffer from stunted growth due to climate change.[6] On the other hand, more frequent torrential rains cause floods and landslides that damage critical infrastructure for children and young people, such as schools and healthcare services. Floods can also compromise water and sanitation facilities, contaminating water sources and increasing the incidence of diarrheal diseases that particularly affect young children. Finally, the trend of rising temperatures and changes in rainfall patterns spread vector-borne diseases, such as malaria, zika, and dengue, to new territories, creating a substantial risk for the development of children and young people.

Children and young people are highly vulnerable to these climatic changes, directly threatening their ability to survive, grow, and thrive in a changing climate.

By 2030, it is estimated that **between 570,000 and more than 1 million children** under the age of 5 could suffer from stunted growth due to climate change.

The marked vulnerability of children and young people is mainly due to three types of factors:

(i) they are physically more sensitive and less able to withstand and survive extreme weather conditions such as floods, droughts, storms, and heatwaves

(ii) the high incidence of poverty and lack of access to essential services, such as healthcare, nutrition, education, and social protection, limits their available resources to cope with climate change

(iii) they have their whole lives ahead of them, meaning that any deprivation resulting from a changing climate can result in a lifetime of lost opportunities. This is especially important for young children. Early childhood spans from gestation to eight years, although neuroscience has emphasized the importance of the first 1,000 days as a "critical period" because it is when the brain's neural connections occur at a speed that will not be repeated in life.[7]

If during early childhood children do not receive the necessary care and protection or are exposed to stressful or emergency situations, their overall and cognitive development is at risk, affecting their future opportunities in terms of educational trajectory, long-term health, and well-being. This high climate vulnerability contributes to the significant migrations observed in recent years in the region, and empirical analyses have shown that young people from Central America and the Caribbean are more likely to migrate in response to droughts or heatwaves than other age groups.[8]

Despite being particularly vulnerable to the impacts of the climate crisis, child-sensitive climate financing in LAC only represents 3.4 per cent of the total multilateral climate financing received by the region.[9] This represents about US$743 million. Additionally, the sectoral and geographical distribution of these funds does not cover the investment needs in basic sectors for children: child-sensitive climate funds only reach children in six LAC countries (Brazil, Cuba, Guatemala, Haiti, Trinidad and Tobago, and Uruguay), and their sectoral distribution is also concentrated towards education projects. As a result, despite the expectation that climate change will drastically increase the burden of morbidity on children under 5, no funds are allocated to improve the resilience of health services in a way that responds to children's needs.

Despite being particularly vulnerable to the impacts of the climate crisis, child-sensitive **climate financing in LAC only represents**

3.4%

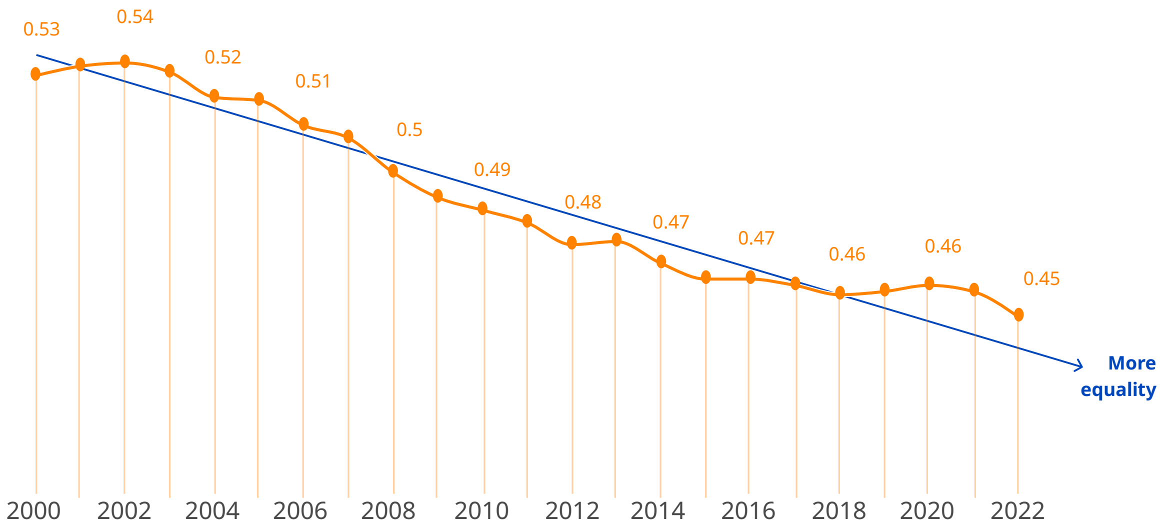
of the total multilateral climate financing received by the region.

> **Funding is scarce to improve the resilience of health services that respond to children's needs.**

Climate change could also intensify the marked income and gender inequalities that prevail in the region. Although Latin America has experienced a slight improvement in income distribution, the Gini coefficient income concentration remains at 0.45 in 2022 (*see Graph 7*), making it the most unequal region in the world. This figure exceeds that of regions such as Europe (where the Gini is around 0.30) or East Asia (around 0.35), highlighting the persistence of inequality in LA.[10] Wealth distribution is even more unequal than income distribution: in 2021, the richest 1 per cent concentrated 33 per cent of the wealth and 19 per cent of the income in LA. Additionally, the set of taxes and monetary transfers shows limited capacity to reduce inequality. Currently, the effectiveness of redistributive policies is constrained by the fiscal structure, which is primarily focused on indirect taxes.

In view of that, climate change will exacerbate policy challenges in addressing new pressures on income inequality. As climate events become more frequent and intense, the livelihoods of the most disadvantaged families will weaken more rapidly than those of the more advantaged, further hindering their recovery and adaptation to new climatic conditions and increasing income level divergence.[11] Climate shocks tend to drive inequality and social tensions.[12] Similarly, the effects of climate change are not gender-neutral. Women and girls are disproportionately affected by extreme weather events in aspects such as unemployment, labor reintegration, relative asset loss, or school dropout.[13] These effects require a gender-sensitive approach to climate change response to prevent existing inequalities from deepening as the worst effects of climate change materialise.[14]

Despite a constant decreasing trend, Latin America remains the most unequal region in the world.



Graph 7. Gini index, Latin America (18 countries), 2000-2022
Source: Own elaboration based on CEPALSTAT.

Objective and scope of the study

Given this situation, it is crucial to better understand the relationships between climate change and child and youth poverty. Available empirical evidence shows that both extreme weather events and the trend of rising temperatures generate significant economic losses and increases in poverty levels.[15] Prospective modeling exercises also suggest that, globally, between 32 and 132 million people could fall into poverty by 2030 due to climate change.[16] However, despite the marked climate vulnerability of children and young people, there are no projections calibrated based on empirical data that inform about the potential impact of climate change on child and youth poverty. This study seeks to fill this gap and is aimed primarily at public policy makers with the purpose of informing climate and public policies aimed at children and young people.

The objective of this study is to estimate the potential impact of climate change on the incidence of child and youth poverty in Latin America by 2030.

The objective of this study is to estimate the potential impact of climate change on the incidence of child and youth poverty in Latin America by 2030. To this end, a methodology was developed that combines estimates of the impact of climate change on GDP growth with statistical associations on the growth-poverty relationship. More specifically, the impacts of climate change were first quantified as the difference between GDP per capita in a scenario without climate change and the estimated GDP per capita under three climate scenarios: **Net Zero 2050**, **Current policies**, and **Too little, too late**. These three climate scenarios have been designed to reflect different efforts to reduce greenhouse gas (GHG) emissions globally. In each scenario, the economic impacts of climate change consider the chronic effects related to the trend of rising temperatures, as well as the acute effects associated with four types of extreme weather events: heatwaves, droughts, floods, and tropical cyclones. These projected GDP per capita trajectories up to 2030 are then used to infer poverty rate variations for each country. Finally, these poverty rate variations are imputed to the latest available data for each country, allowing poverty rates to be derived for 2030. Additionally, this study explores how a deepening of economic inequality driven by the effects of climate change –reflected by an increase in the Gini coefficient of income distribution– could impact the evolution of child and youth poverty.

It is important to note that the scenarios developed in this study do not seek to obtain an exact forecast of the incidence of child and youth poverty in 2030. Instead, this study analyses a range of possible climate futures that reflect varying degrees of international climate efforts and explores their implications for child and youth poverty in Latin America and the Caribbean. Additionally, the analysis quantifies the influence that various public policies could have on these potential developments through their impacts on the Gini coefficient. It is also worth mentioning that, due to a lack of data, the projections presented here do not include several effects associated with climate change (e.g., sea level rise or the materialization of tipping points in the Earth system that could cause abrupt changes in the climate system) nor the financial risks traditionally associated with a transition to low-carbon economies. Therefore, the projections presented here should be interpreted as an assessment of the quantifiable impacts based on the current available information. These aspects may possibly be improved in future analyses, and it is expected that as more effects and transmission channels are incorporated, the resulting climate impacts will grow.

The results of this study are relevant for informing the design of climate policies and public policies for child protection. On the one hand, this study shows how the lack of ambitious GHG emission reduction policies significantly increases the risk that millions of Latin American children will live in poverty by 2030. On the other hand, these results highlight the importance of developing climate adaptation policies with a priority focus on children.

This study is structured as follows. Section 2 presents the conceptual framework and methodology developed to estimate the effects of climate change on the incidence of child and youth poverty. Section 3 first presents the estimates of the effect of climate change on Latin America's GDP per capita and then details its implications in terms of the incidence of child and youth poverty in 2030. Finally, section 4 concludes and presents the policy implications of these analyses.

Colombia, 2023

2

Conceptual framework and methodology

2.

Conceptual framework and methodology

A methodology consisting of two main stages was developed to quantify the range of impacts that climate change could generate on child and youth poverty. First, statistical associations are used to infer the evolution of child poverty based on the evolution of GDP per capita growth. Then, the impacts of climate change on economic growth are estimated by contrasting a hypothetical scenario without climate change with three scenarios reflecting various trajectories of global GHG emissions. With these two elements, poverty rate projections are derived under each scenario, and the impact of climate change on the incidence of child and youth poverty in 2030 is quantified.

This section first presents the theoretical and empirical foundations regarding the relationship between growth and child and youth poverty and then details the approach used to estimate the impact of climate change on the region's economic growth.

Colombia, 2023

2.1. The relationship between growth and child and youth poverty

2.1.1. Theoretical and empirical foundations

Poverty statistics usually come from household consumption and/or income surveys. However, the availability of these surveys vary within countries. To overcome this deficiency, it is common practice to project poverty statistics using micro and macroeconomic indicators that are considered highly correlated with poverty trends. Specifically, GDP per capita growth is used to update poverty rates or household surveys. This approach has been used by the World Bank, UNICEF, among others.[17]

The use of GDP per capita growth to project poverty rates is based on a long-standing empirical regularity: there is a negative association between GDP per capita growth and changes in poverty.[18] The transmission mechanisms that explain this strong statistical association have been widely investigated: economic growth creates new jobs and generates additional income, which allows the population occupying these jobs and/or capturing this income to escape poverty. Similarly, higher economic growth means more public resources for public investment, social spending, and public services, which also influences poverty reduction. The magnitude of this statistical association varies according to the structural characteristics of each country and/or region Therefore, authors like Ravallion (1997, 2004) or more recently Lakner et al. (2020), have highlighted the importance of including a measure of inequality to determine poverty trends in the medium term. In contexts where inequality is very pronounced, the additional income associated with economic growth will be concentrated among a few wealthy individuals, and consequently, the impact of economic growth on poverty will be less than in contexts where income is more equitably distributed among the entire population. In short, greater inequality erodes the power of economic growth to reduce poverty.

In short, greater inequality erodes the power of economic growth to reduce poverty

Following the approach established by this literature, this study seeks to estimate the relationship between poverty reduction and economic growth, that is, the growth elasticity of poverty.

This elasticity is denoted as η and is defined as the percentage change in the poverty headcount index for each percentage point change in per capita income. It is expressed as:

$$\eta = (\Delta P/P)/(\Delta Y/Y)$$

where (P) represents the poverty headcount index and (Y) the income or consumption per capita; (\Delta) is the difference operator (e.g., $\Delta Xt = Xt - X_{t-1}$). This elasticity η for Latin American countries is obtained from a standard model, which includes, in addition to changes in income or consumption, changes in income distribution, represented by the Gini index. Formally, the model is expressed as:

$$\Delta p_{it}=\eta\Delta y_{it}+\gamma\Delta gini_{it}+ v_{it} \qquad (1)$$

where Δp_{it} is the annual growth rate of the poverty headcount index of country (i) in year (t); Δy_{it} symbolizes the growth rate of GDP per capita, or the average income or consumption per person of country (i) in year (t); $\Delta gini_{it}$ is the variation of the Gini index by country. Finally, v_{it} is the stochastic error term.

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2.1.2. Growth-poverty elasticity and the evolution of child and youth poverty in Latin America

To estimate the growth-poverty relationship in LA, information on poverty data, GDP per capita, and the Gini index was compiled using the Economic Commission for Latin America and the Caribbean (ECLAC), CEPALSTAT[19] statistical database. The final database contains 267 observations for 18 countries during 2000-2022. As detailed in Annex 6.1, these poverty rates are calculated considering the specific conditions of each country and harmonized according to ECLAC's methodology.[20] These poverty rates differ from those obtained with international poverty lines based on a dollar threshold (e.g., US$2.15 per day, see Annex for more information). The results of estimating equation (1) with this database are presented in Table 1. Column 1 reports the results of an estimation grouping all data, while column 2 includes fixed effects by country and year to control for the unobserved heterogeneity of each country (e.g., culture or institutions) and common changes affecting all countries (e.g., an increase in interest rates in the United States). In both columns, the coefficient associated with GDP per capita growth is negative and highly significant, confirming the strong negative association between GDP per capita growth and poverty rate reduction in the region. On the other hand, the coefficient associated with the Gini index is positive and significant, indicating that when income distribution improves (i.e., the Gini decreases), the poverty rate decreases, ceteris paribus.[21] Several robustness tests were conducted for this relationship, the results of which are presented in the annex and increase our confidence in the model presented here.

Based on these estimates, changes in poverty rates are inferred for different levels of GDP per capita growth. More specifically, the percentage variation in poverty rates forecasted using GDP per capita projections and equation (1) is imputed to the latest available poverty rate for each country. This methodology contrasts with techniques that seek to directly predict poverty rate growth, which could predict extreme and undefined values over a relatively long time horizon or with poverty rates close to 0 percent. Although more sophisticated methods exist to predict poverty rates, including methods that apply statistical learning (i.e., machine learning) to massive data (i.e., Big Data), Mahler et al. (2021) have shown that a simple approach that scales the last observation using real GDP per capita growth data –a method similar to that proposed in this research– predicts poverty rates almost as well as more sophisticated models calibrated with over 1,000 variables. This leads us to prefer the approach proposed here, as it would have been unrealistic to project more than 1,000 variables until 2030.

	Dependent variable	
	Poverty rate variation	
	OLS	linear panel
	(1)	(2)
GDP/capita growth	-1.41*** (0.30)	-1.58*** (0.30)
Gini variation	1.22*** (0.25)	1.13*** (0.33)
Constant	1.28 (1.22)	
Observations	267	267
R^2	0.32	0.25
Adjusted R^2	0.32	0.12
Standard residual error	10.96 (df = 264)	
F-statistic	62.62*** (df = 2; 264)	37.08*** (df = 2; 227)

Nota: *p<0.1; **p<0.5; ***p<0.01

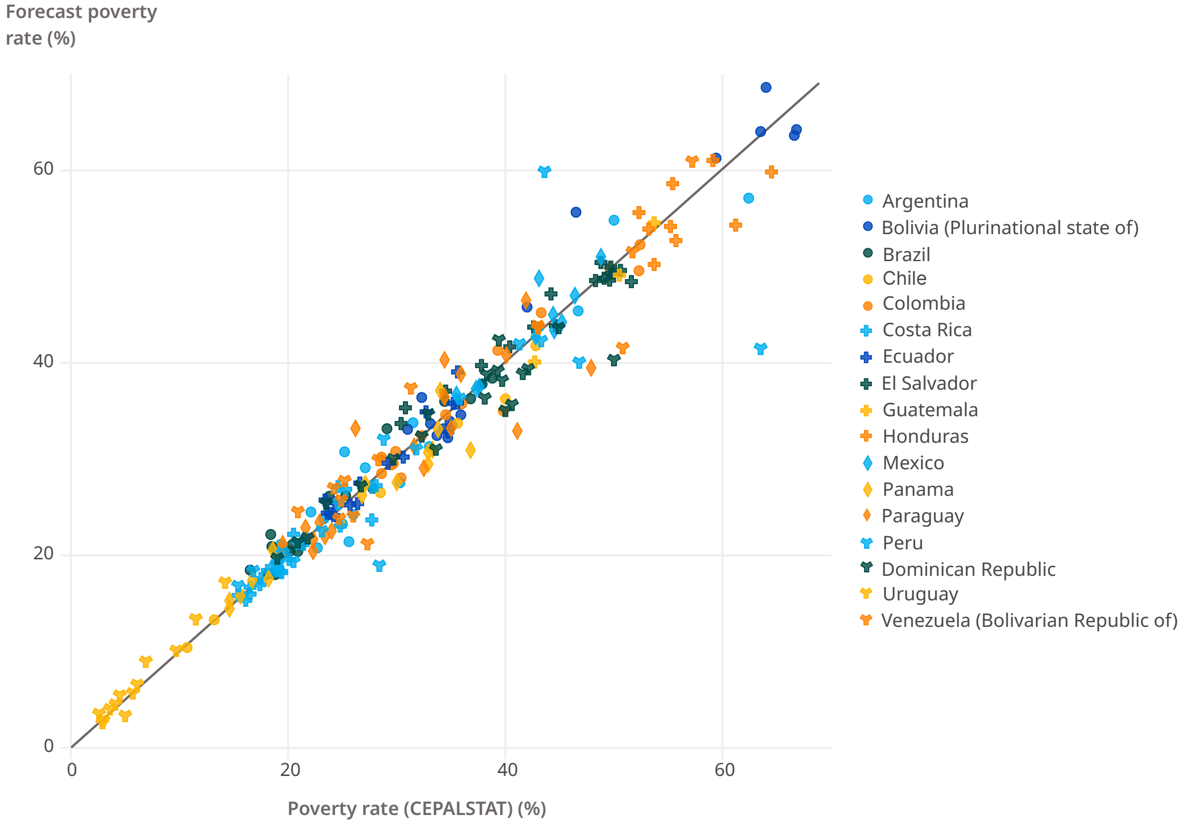
Table 1. Relationship between GDP per capita growth and the evolution of the poverty rate for Latin America, 2000-2020

Source: Own elaboration.

Before projecting poverty rates, we used historical GDP per capita growth data between 2000 and 2022 and the relationship estimated using equation (1) to forecast poverty rates during this historical period. To evaluate the accuracy of these forecasts, we compared the official poverty rates reported in CEPALSTAT with these "poverty forecasts." The results are shown in Graph 8, where the dashed grey line is the 45-degree line. The results indicate that 50 per cent of the poverty rate forecasts are within +/- 1 percentage point (p.p.) of the poverty rate measured by surveys; 90 per cent of the forecasts are between -3.8 and 5.3 p.p.below/above the poverty rate measured by household surveys.[22]

It is worth noting that the proportion of poor children and young people in the total number of poor is very stable over time and among the countries in the region. Grouping all available poverty measurements for the region between 2000 and 2022, we find that in 90 per cent of cases, children and young people represent between 53 per cent and 63 per cent of the total poor (*see Graph 9*). The distribution of the proportion of children and young people in the total number of poor is highly concentrated around the mean (i.e., 58 per cent) and shows limited variability. Considering this notable statistical regularity, it can be reasonably assumed that this

50 per cent of poverty rate forecasts are within +/- 1% of the poverty rate measured through surveys.



Graph 8. Forecasted poverty rate vs. measured poverty rate, Latin America (17 countries), 2000-2022

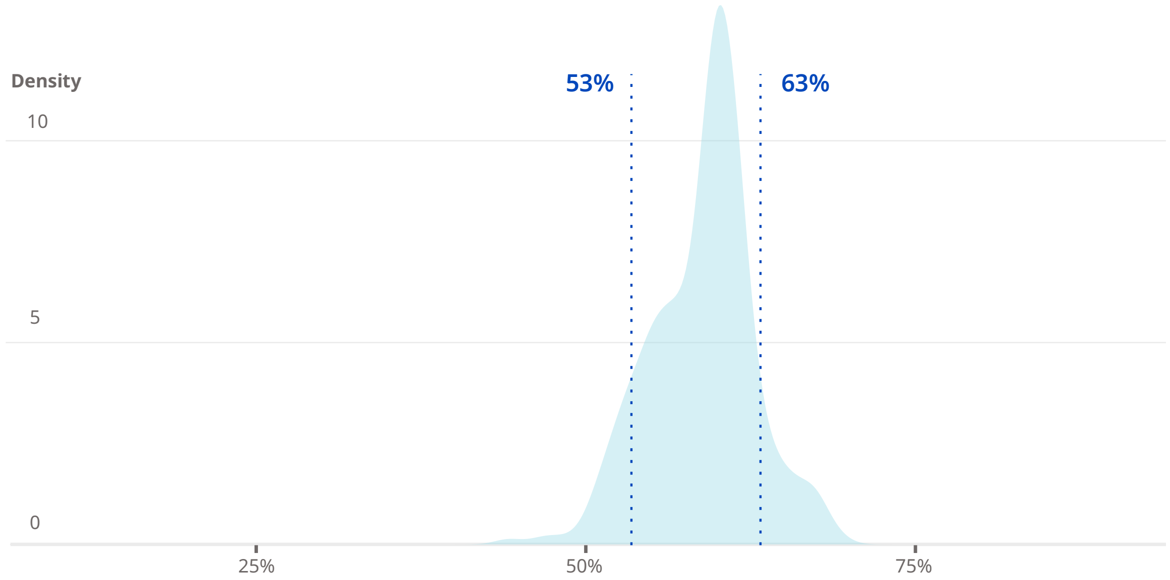
Source: Own elaboration based on CEPALSTAT data.

distribution will not substantially change in the years leading up to 2030. This leads us to use the characteristics of this distribution to infer the number of poor children and young people as a percentage of the total projected poor under each scenario.

The evolution of the Gini coefficient is complex to forecast, but the proposed specification allows us to contrast two scenarios of inequality evolution. The first scenario assumes that by 2030, inequality within each country remains at current levels; the second scenario projects that climate change exacerbates inequality.

The first scenario assumes that the Gini coefficient will not significantly change.[23] Implicitly, this scenario requires that public and redistributive policies implemented in the coming years can counteract the pressures of climate change on inequality to maintain the Gini coefficient at its current level. This scenario describes, therefore, a world in which public policies play an important role in levelling the climate impacts among the population with higher and lower resources.

In Latin America, 1 out of every 2 people living in poverty is a child, adolescent, or young person.



Graph 9. Distribution of the proportion of children and young people in the total number of poor in each country between 2000 and 2020, Latin America (18 countries)

Source: Own elaboration based on CEPALSTAT data.
Note: The blue dashed lines represent the 10th and 90th percentiles of the distribution.

It is important to mention that the transition to low-carbon economies can also have negative effects on inequality. The net effect on employment, productive reconfiguration, or impacts on food and energy prices must be considered in the development of public policies for a just transition.

In the second scenario, the effects of climate change are only partially compensated by social and redistributive policies, and inequality levels are amplified. This translates into a gradual increase in the Gini coefficient. Based on the review of Gini changes in more than 8,000 growth episodes conducted by Lakner et al. (2020), we calibrate the annual increase in the Gini index to 1 per cent until 2030.[24] This increase is around the 5th percentile of the more than 8,000 changes analysed and is, therefore, infrequent but plausible from a historical perspective. This 1 per cent increase in the Gini is used for each of the climate scenarios presented in section 3.1 of this document.

It is important to emphasize that these scenarios do not seek to obtain an optimal estimate or an exact forecast of the incidence of child and youth poverty in 2030. Instead, this study analyses a range of possible climate futures that reflect varying degrees of international climate efforts and explores their implications for child and youth poverty, highlighting the influence of various factors and policies that could limit and/or exacerbate these impacts.

Public policies play an important role in levelling the climate impacts among the population with higher and lower resources.

2.2. The impact of climate change on economic growth

In the medium to long term, economic growth is the main driver of poverty reduction.[25] This implies that any repercussions of climate change on economic growth have direct implications for employment opportunities, income, and consequently, poverty. In recent years, there has been growing interest in scientific literature in estimating the economic impact of climate change. Although there remains considerable uncertainty, numerous empirical evidence allow for the calibration of some potential effects of climate change on economic activity.[26] The methodology proposed here is based on this literature to approximate the economic impact of climate change in Latin America.

Physical risks generated by climate change for economic activity are usually quantified by distinguishing two types of impacts: **(i)** chronic impacts associated with gradual increases in temperatures, precipitation, or other climatic indicators, and **(ii)** acute impacts associated with more frequent extreme weather events such as droughts, heatwaves, or floods.[27] This study considers both types of impacts, and the following briefly presents how these impacts were quantified. Annex 5.3 offers more detailed information on these quantifications.

Chronic risks are estimated using an aggregated damage function that is empirically calibrated. This estimation quantifies the causal impact of temperature deviations on GDP growth through econometric regressions. These relationships are then used to project GDP per capita trajectories under various temperature increase scenarios. Two types of econometric equations are used. In the **Net Zero 2050** and **Current policies** scenarios (*see Chapter 3* for a description of these scenarios), the equation comes from the specification proposed by Kalkuhl and Wenz (2020). To reflect the inherent uncertainty in modeling the macroeconomic effects of temperature increases, the 95th percentile of temperature projections is used to project damages. For the **Too little, too late** scenario, the temperature impact estimation comes from the non-linear specification proposed by Burke, Hsiang, and Miguel (2015).

Acute risks are estimated using natural hazard models. Four types of extreme weather events have been considered in this study: droughts, heatwaves, floods, and tropical cyclones. These events have been modeled using natural hazard indicators under current climatic conditions and, using available climate projections, which have been modeled under future climatic conditions. Following traditional natural hazard modeling methods (i.e., Nat Cat Models), the exposure and vulnerability conditions of each country were estimated. Probable losses associated with different types of events were then simulated using a probabilistic approach. Finally, using empirically identified and accepted transmission channels in the literature, these physical losses were translated into macroeconomic shocks that impact GDP projections.[28]

The impacts of climate change are quantified as the difference between GDP in a hypothetical scenario without climate change and the estimated GDP under each climate change scenario. The GDP projection in the scenario without climate change takes into account the latest available GDP projections and is calculated as the average of the three projections obtained using the macroeconomic models used in phase IV of the NGFS.[29] GDP projections under each climate scenario are computed by applying the percentage deviations resulting from the chronic and acute impacts mentioned above to the GDP without climate change. These percentage deviations correspond to the linear sum of the chronic and acute losses estimated in each climate scenario.[30]

The estimation of the economic impacts of climate change proposed here has limitations. First, due to a lack of data, several effects associated with climate change have not been incorporated. For example, the effects of sea level rise or the exacerbated spread of vector-borne diseases have not been included.

Second, the characterization of extreme weather events used here could be refined with climate projections of greater spatiotemporal granularity, and the evaluation of their macroeconomic impacts could be improved through a broader identification of macroeconomic transmission channels. Additionally, the projections used do not consider the materialization of some tipping points in the Earth system (such as accelerated Arctic ice melt, weakening of the Atlantic Meridional Overturning Circulation known as AMOC, or prolonged drought in the Amazon) that could cause abrupt changes in the climate system. The probability of reaching these climate tipping points increases as GHG concentrations in the atmosphere rise.[31] The materialization of these tipping points would substantially alter critical processes for the stability of the Earth system as a whole, endangering its ability to remain in the state it has maintained for the last 11,000 years of the Holocene.[32]

Therefore, the estimates presented here should be interpreted as an assessment of the quantifiable impacts based on the current state of scientific knowledge. These aspects may possibly be improved in future analyses, and it is expected that as more effects and transmission channels are incorporated, the resulting climate impacts will grow.

3

Results

3.

Results

3.1. The economic impact of climate change under different scenarios

To evaluate the range of impacts that climate change can cause, three global GHG emission trajectories were considered. The impacts of climate change depend on future GHG emissions, which will determine the severity of temperature increases and the magnitude of the increase in the frequency of extreme weather events. The three global emission scenarios calibrated in this study cover a wide range of global GHG emission trajectories associated with various climate action scenarios. Each scenario is described below:

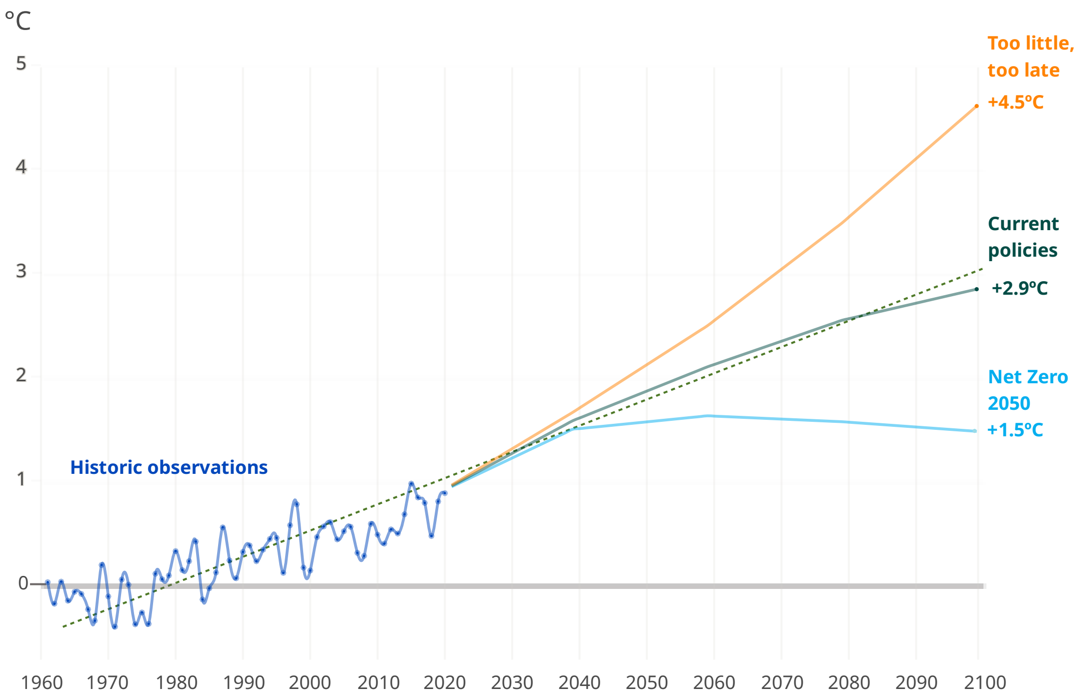
(i) **Net Zero 2050**: This scenario describes a future where more ambitious and stringent GHG emission reduction policies are implemented than those currently in force. This scenario implies achieving net-zero global CO2 emissions around 2050 and a reduction of approximately 50 per cent of 2010 emission levels shortly after 2030. In this scenario, it is assumed that some jurisdictions, such as the United States, the European Union, the United Kingdom, Canada, Australia, and Japan, achieve net-zero for all GHGs by 2050. These collective efforts allow limiting global warming to 1,4°C by the end of the century (with a limited overshoot to 1,6°C).

(ii) **Current policies**: This scenario projects a global emission trajectory aligned with the policies currently applied by each country under their NDCs and/or long-term emission reduction strategies. This scenario leads to global warming of approximately 2,9°C by the end of the century and is characterized by higher physical risks than the **Net Zero 2050** scenario. This scenario does not consider emission reduction commitments announced in the NDCs when effective implementation of measures and/or policies consistent with these announcements cannot be verified.

(iii) **Too little, too late**: This scenario describes a world where very few of the actions contemplated in the NDCs are implemented – or are implemented after 2050. This scenario is consistent with the level of global warming corresponding to the RCP 8.5 scenario (Representative Concentration Pathway 8.5) and would lead to an increase in the average global temperature of more than 4ºC by 2100 compared to pre-industrial levels. Although this scenario can be considered extreme, it serves to illustrate very severe climate impacts that could occur if, for example, there are significant setbacks in climate action by some major emitters in the coming years.

Graph 10 shows the temperature increase that each of these climate scenarios would imply for Latin America. By the end of the century, this increase ranges from 1,5ºC (**Net Zero 2050** scenario) to more than 4,5ºC (**Too little, too late** scenario) above the 1961-1999 average. Finally, for each climate scenario, GDP per capita is obtained by dividing the projected GDP as indicated in the previous section by the projected population under each Shared Socioeconomic Pathway (SSP). In our case, SSP1, 2, and 5 were selected for the **Net Zero 2050**, **Current policies**, and **Too little, too late** scenarios, respectively.[33]

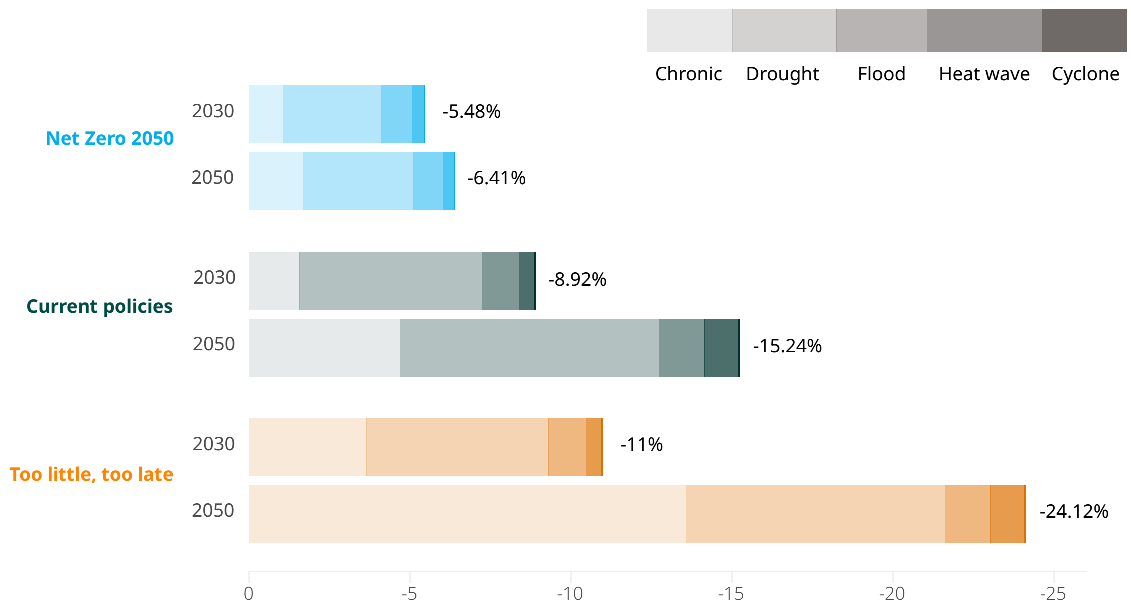
The level of ambition in reducing greenhouse gas emissions will lead to temperature increases between 1.5 and 4.5°C, with their consequent impacts.



Graph 10. Projected temperature increase in Latin America under three climate scenarios vs. 1961-1990 average (°C)
Source: Own elaboration based on CRU-TS.

In 2030, depending on the climate scenario considered, the region's GDP per capita could be between 5 per cent and 12 per cent below the scenario without climate change. The relative importance of each transmission channel is illustrated in Graph 11, and Annex 5.3 provides more technical details on these estimates. Chronic impacts associated with temperature increases, along with droughts, have the greatest weight in the projected losses for 2030. By 2050, the only scenario in which losses do not worsen considerably is the **Net Zero 2050**. In contrast, in both the **Current policies** and **Too little, too late** scenarios, losses due to trend increases in temperatures increase significantly, resulting in a situation where the region's GDP per capita could be between 15 per cent and 24 per cent below its level in the scenario without climate change. These GDP per capita projections are used to infer the child and youth poverty trajectories presented in the next section.

GDP per capita could be between 15 per cent and 24 per cent below its level in a scenario without climate change. Chronic impacts associated with temperature increases along with droughts have the greatest weight in losses.



Graph 11. Deviation of GDP per capita in Latin America in a changing climate vs. a scenario without climate change, 2030 and 2050 (%)

Source: Own elaboration based on NGFS (2023a).

3.2. The impact of climate change on child and youth poverty

Using GDP per capita projections under each climate scenario, we infer the incidence of child and youth poverty in Latin America in 2030. The results are presented in terms of "additional children and young people in poverty due to climate change" and correspond to the difference between the number of children and young people projected to be in poverty under each climate scenario and the number projected in the scenario without climate change. More technical details on this inference are provided in the annex. It is important to note that the different climate scenarios depend on future global emission trajectories and that, currently, Latin America and the Caribbean's share of global emissions is less than 10 per cent of the total.[34] Therefore, the realization of one or another climate scenario does not depend solely on the measures implemented by the countries in the region but mainly on global emission reduction efforts, particularly in the countries and regions with the highest emission levels.

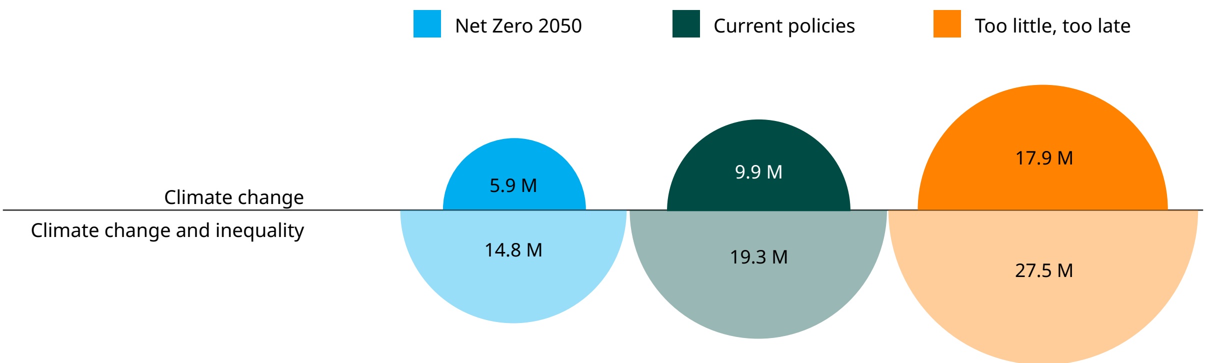
For each climate scenario, the incidence of child and youth poverty is analysed by contrasting a world where inequality remains at current levels until 2030 with another where climate change acts as an amplifier of inequality. Unlike climate scenarios, the evolution of inequality will be directly influenced by internal factors and public policies that each government proposes in response to climate change. The implementation of social and redistributive policies that level the climate impacts between the population with higher and lower resources will be fundamental to mitigate the pressures of climate change on inequality and ensure that the Gini coefficient remains at current levels—or even improves. Thus, Graph 12 should be interpreted as follows: global actions and emission reductions in high-emission countries will determine the scenario in which the region is located in 2030, while national public policies of each country will determine whether the region moves towards the upper or the lower semicircle.

In the **Net Zero 2050** scenario, it is estimated that approximately 5.9 million additional children and young people could be in poverty due to climate change in 2030. This projection assumes that the impacts of climate change have not worsened inequality and represents a 7.3 per cent increase in the total number of children and young people in poverty compared to a scenario without climate change. However, if inequality intensifies and the Gini coefficient worsens by 1 per cent annually, the number of children and young people in poverty due to climate change could rise to 14.8 million in 2030, representing an 18.4 per cent increase compared to a scenario without climate change.

Under the **Current policies** scenario, if countries do not implement policies that limit the pressures of climate change on inequality, 19.9 million more children and young people could be in poverty in 2030. However, this figure could be reduced by approximately half (i.e., about 9.97 million) if governments implement measures to maintain the Gini coefficient at current levels. The 9.97 million additional children and young people in poverty projected in the **Current policies** scenario without worsening the Gini coefficient represent an increase of a magnitude comparable to what COVID-19 caused (approximately 11 million children and young people in poverty). However, there is a fundamental difference between COVID-19 and climate change: while the effects of the pandemic on monetary poverty have been reversed by the economic recovery experienced in subsequent years, in the case of climate change, an intensification of impacts is expected in the years following 2030, suggesting a permanence and even worsening of the projected effects, with potentially devastating effects on childhood in Latin America.

In the worst-case **Too little, too late** scenario, more than 27 million additional children and young people could be in poverty due to climate change. This result corresponds to the scenario where inequality is amplified towards 2030 and would represent an increase of nearly 35 per cent in the number of children and young people in poverty compared to a scenario without climate change. In this quadrant, the role of public policy in preventing a worsening of inequality remains relevant, but even if the Gini remains at current levels, 17.9 million additional children and young people in poverty are projected in

In the best-case scenario, an additional 5.9 million children, adolescents, and youth will fall into poverty due to climate change in 2030.



Graph 12. Children and young people in poverty due to climate change effects in 2030, Latin America (17 countries) (in millions)

Source: Own elaboration.

Note: These numbers correspond to the difference from the scenario without climate change in millions of people. The upper semicircles ("Climate change") represent the projection where inequality remains the same, while the lower semicircles ("Climate change and inequality") represent the projection where inequality worsens.

2030. This means that even if inequality does not worsen, inthis climate scenario, the number of children and young people in poverty would reach nearly 100 million in 2030 and would be 22.3 per cent above what is projected in a world without climate change.

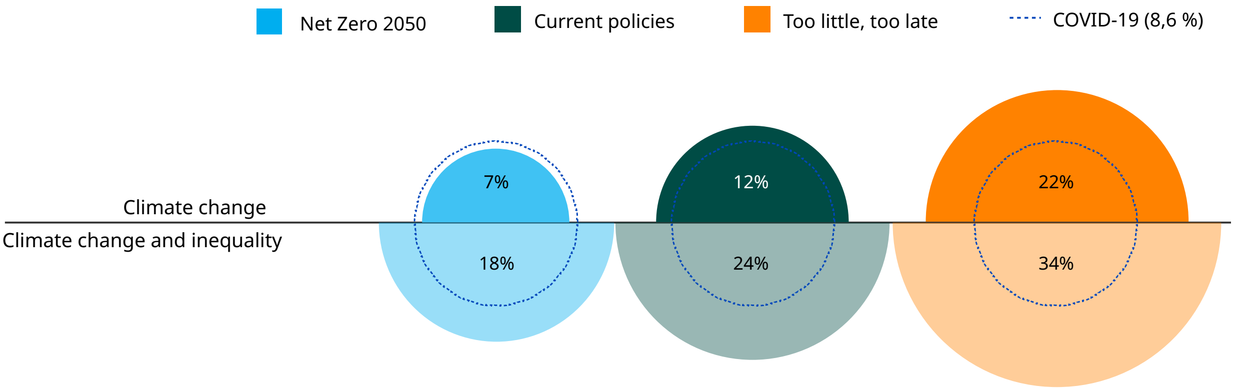
In all scenarios and countries, it is estimated that more than 60 per cent of children and adolescents in poverty due to climate change will be under 15 years old. This result highlights the high vulnerability of the region's children to climate change effects and underscores the urgent need to implement public policies that ensure their ability to grow and thrive in a changing climate. These policies will be especially important for children in their first 1,000 days, as deprivations experienced during this "critical period" can jeopardize their overall and cognitive development and affect their future opportunities in terms of educational trajectory, long-term health, and well-being.

Most of climate change impacts considered in this study are related to temperature increases, droughts, and heatwaves. This implies that no country in the region is immune to the impacts described here, although the magnitude of these impacts will vary between countries. In general, countries with historically higher temperatures will suffer more from temperature increases and heatwaves, while countries with significant agricultural sectors will experience more severe impacts from droughts. Additionally, the impacts of climate change on child and youth poverty are amplified in countries with higher current poverty levels. This suggests, once again, that poorer countries are more vulnerable to the effects of climate change and could suffer the worst impacts due to a lack of resources to adapt and recover from extreme events.

Depending on the level of ambition in climate action, by 2030, climate change could cause an increase of 7 per cent in the best-case scenario or up to 34 per cent in the number of children and young people in poverty compared to a scenario without climate change.

In summary, it is important to emphasize that the projected increases in child and youth poverty constitute a significant threat to the future of the region's children. Depending on the level of ambition in climate action, by 2030, climate change could cause an increase of 7 per cent in the best-case scenario or up to 34 per cent in the number of children and young people in poverty compared to a scenario without climate change (*see Table 2*). Additionally, in 5 of the 6 scenarios analyzed, the total number of Latin American children and young people in poverty in 2030 exceeds the number of children and young people in poverty recorded in the region in 2022.[35] In the most extreme scenario, the increase in children and young people in poverty due to climate change could be more than three times what the COVID-19 crisis caused. In other words, by 2030, the region could have to address an additional number of children and young people in poverty of a magnitude comparable to or much greater than what was experienced during COVID-19, with no short-term improvement prospects. It is difficult to imagine that impacts of this magnitude can be addressed with marginal reforms or without generating strong social pressures and possible conflicts.

In the most extreme scenario, the increase in children, adolescents, and youth living in poverty could be more than triple what was caused by the COVID-19 crisis.



Graph 13. Projected increases in the number of children and young people in poverty in 2030, Latin America (18 countries) (%)

Source: Own elaboration.

Note: The increase corresponds to the percentage difference from the number of children and young people in poverty in a scenario without climate change. The COVID-19 circle corresponds to the increase in poverty recorded between 2019 and 2020.

Fortunately, global climate action has a direct impact on the magnitude of the projected impacts and could significantly limit the increase in child and youth poverty. By 2030, in a scenario where rapid and decisive actions have been implemented to limit global GHG emissions, it is estimated that 5.9 million additional children and young people could be in poverty. In contrast, in a scenario without climate action, this figure could reach 17.9 million. In other words, ambitious and rapid global GHG emission reductions could reduce the number of children and young people in poverty due to climate change in 2030 by a factor of 3.

On the other hand, public policies that maintain the Gini coefficient at current levels (or even improve it) can also contain the rise in child and youth poverty. Preventing the Gini from worsening by 1 per cent per year (i.e., maintaining it at current levels) allows for reducing the number of children and young people in poverty due to climate change by a factor of 2.4 in the **Net Zero 2050** scenario, 1.9 in the **Current policies** scenario, and 1.53 in the **Too little, too late** scenario.[36] However, as climate change intensifies, there is a possibility that economic growth will face increasing limitations in combating poverty and that the effectiveness of response measures will diminish, emphasizing the need for simultaneous actions on both the mitigation and adaptation fronts.

Finally, depending on the scenario, the economic cost of excess poverty in childhood and adolescence is between 0.09 per cent and 0.44 per cent of GDP by 2030. One way to assign an economic cost to the increase in poverty derived from the climate change impacts considered in this document is to assume that the State willprevent this excess from materializing by transferring resources equivalent to a poverty line to the affected population.

4

Conclusions and public policy recommendations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Conclusions and public policy recommendations

This study combines estimates of the impact of climate change on GDP with statistical associations to infer the incidence of child and youth poverty in Latin America in 2030 under various climate scenarios. Using poverty data harmonised at the regional level by ECLAC, the results indicate that, in 2030, in a scenario where rapid and decisive actions have been implemented to limit global GHG emissions, 5.9 million additional children and young people could be in poverty compared to a scenario without climate change. Conversely, if climate policies remain in their current state, this figure could reach 9.97 million, a number comparable to the increase in child and youth poverty caused by COVID-19. In the worst-case scenario analysed, this figure could even spike to 17.9 million. This implies that ambitious and rapid global GHG emission reductions could reduce the number of children and young people in poverty due to climate change in 2030 by a factor of 3.

The study also analyses how the deepening inequality that could result from climate change will impact child and youth poverty. The results reveal that with a Gini coefficient worsening by 1 per cent annually between 2023 and 2030, the number of additional children and young people in poverty mentioned above would approximately double in each climate scenario (i.e., multiplied by 2.4 in the **Net Zero 2050** scenario, 1.9 in the **Current policies** scenario, and 1.5 in the **Too little, too late** scenario). This implies that if public policies cannot counteract the pressures of climate change on inequality, there could be between 14.8 million (**Net Zero 2050**) and more than 27 million (**Too little, too late**) additional children and young people in poverty in 2030.

Given the magnitude of these impacts, it is essential to address climate change as a key factor in the fight against child and youth poverty. It is crucial that the needs, perspectives, and rights of children are considered in climate policies, actions, and investments at all levels. This could start with child-sensitive NDCs, which strengthen critical social services for children and young people to make them more resilient to climate and disasters and ensure the inclusion of their rights and their participation as relevant actors and drivers of change. Climate policies directed at children also position them to be more aware, educated, empowered, and resilient. In concrete terms, four major policy areas can be identified to mitigate the effects of climate change on child and youth poverty:

1

Increasing the climate resilience of social services and critical infrastructure to better protect children and young people, with a special focus on the first 1,000 days of life.

To provide comprehensive protection in early childhood, it is a priority to design special programmes that provide combined health, nutrition, and early care services with a climate focus. These programmes will consider, for example, the impact of thermal stress and food insecurity on child development and seek to provide appropriate responses according to the context. Additionally, strengthening school infrastructure by ensuring the design and construction of climate-resilient schools represents a key policy to reduce educational disruptions in case of disasters. Prioritizing the resilience of drinking water and sanitation infrastructure is also crucial to limit the disruptions that extreme weather events can cause and mitigate their potential health impacts on children.

2

Increasing child-sensitive climate financing.

This study highlights the urgent need to significantly increase climate financing that addresses the needs of children, with special attention to those in situation of economic vulnerability and at greater risk. It is important for governments to close the adaptation gap and ensure new and additional resources to address loss and damage, avoiding future financial obligations that could compromise their development.

Furthermore, climate finance actors are urged to review and update their institutional policies and strategies to incorporate specific child-centered objectives and indicators. This includes implementing mechanisms to assess the impact of projects with a child rights approach, based on disaggregated data by age and gender, and ensuring the participation of child rights and gender experts in the design and implementation of adaptation projects.

Finally, we emphasize the need to strengthen technical capacities and coordination to ensure child-centered climate action among the private sector, multilateral organizations and funds, financial institutions, and key actors such as ministries of economy, fiscal authorities, health, and education, among others.

3

Fostering social protection policies and emergency responses that take into account the specific needs of children.

This involves, for example, developing adaptive or disaster-responsive social protection systems, incorporating climate vulnerability criteria into existing programmes to ensure basic income for poor families affected by extreme weather events. Such a system can be leveraged with the creation of an emergency fund for families with infants to limit the possible periods of deprivation experienced by disadvantaged children following extreme weather events. Expanding access to comprehensive health services to protect children from diseases exacerbated by disasters, such as diarrhoea or vector-borne diseases, is another priority. Finally, adapting emergency response protocols could provide a good opportunity to consider the specific physical and psychological needs of children during emergency responses.

4

Promoting greater awareness, education, and empowerment of children and young people.

While children and young people are particularly vulnerable to the effects of climate change, they also have innovative ideas and initiatives that contribute to increasing the resilience of their families, communities, and countries. At the local, regional, and global levels, children and young people are leading climate movements that demand urgent action from governments for a safer and more resilient future. It is important to support and strengthen these movements by incorporating environmental and climate education into school curricula and educational programmes.

Ultimately, these proposals aim to promote greater articulation between climate policies and child protection and advocacy policies in the region. The implementation of these proposals will need to be adapted to the local context in which they are intended to be applied, integrating into national or regional development strategies. In all cases, they should aim to **(i)** protect children and young people from disproportionately suffering the impacts of climate change and **(ii)** empower them to help find new ideas that can solve the climate crisis.

Finally, we conclude this research by noting that it is complex to project the types of reactions that could arise in societies where an increasingly significant proportion of children and young people are in poverty and experiencing severe deprivations. In light of the findings of this study, the issue of intergenerational equity in climate change is more critical than ever.

Climate inaction not only poses risks to the planet's future but also makes future generations face a higher risk of being in poverty during their childhood and seeing their future compromised by actions in which they did not participate or choose. In short, the climate crisis is not only changing the planet, it is also changing and will increasingly change the way children and young people around the world live.

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5

Annex

5.

Annex

5.1. Poverty data

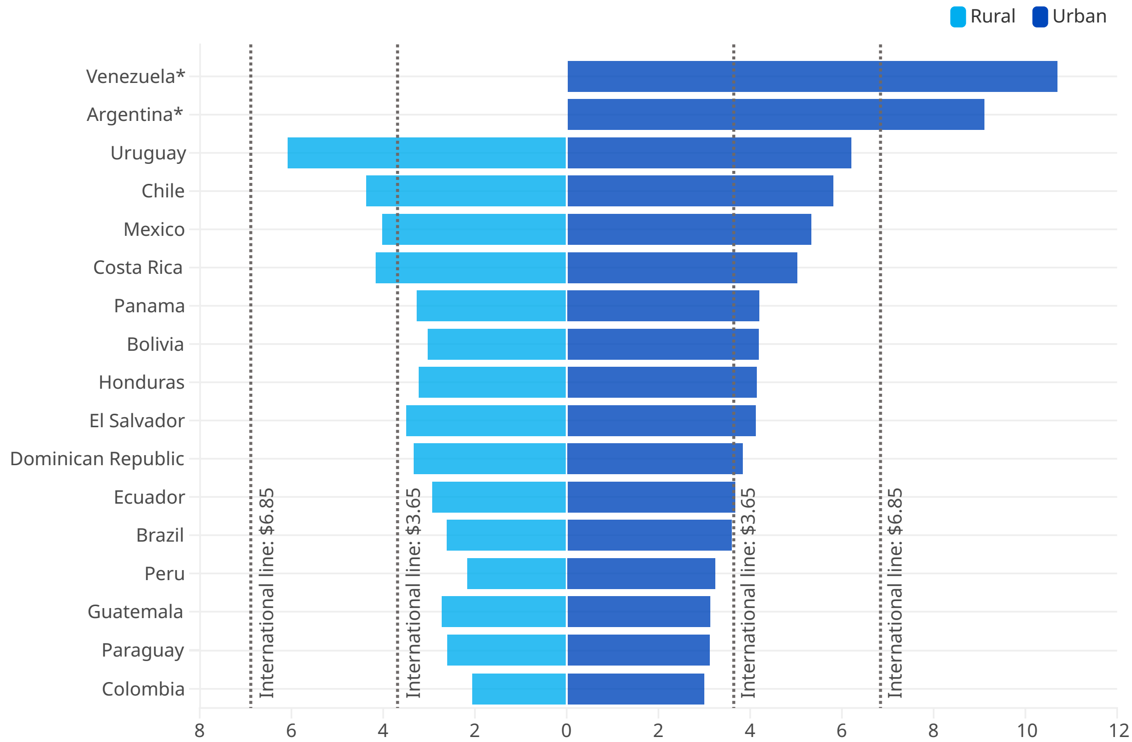
The 18 countries for which ECLAC estimates regionally harmonized poverty figures are: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay, and Venezuela (Bolivarian Republic of). For Argentina, poverty measurements are used for the urban area, while for the rest of the countries, the poverty indicator is national. These countries represent approximately 95 per cent of the population of the 33 Member States of ECLAC that make up the Latin America and the Caribbean region. When the main text refers to the average for Latin America, this corresponds to a population-weighted average. For its calculation, the total survey population is adjusted to the most recent population projections. The data for each country used in the regional average may not correspond to the observed value but to poverty projections made using a model, either to complete missing data or to splice non-comparable series.

ECLAC's estimated poverty figures are calculated to achieve the highest possible degree of comparability at the regional level. Poverty and extreme poverty are calculated according to the cost of a basic food basket (for extreme poverty) and an expanded basket that includes non-food items (for general poverty). These lines reflect differences in the level of development, consumption patterns, and living conditions in each Latin American country and are differentiated in rural and urban areas. ECLAC's estimates aim to harmonize poverty data, but their objectives and uses are different from national figures, and in no case do they seek to replace them to describe poverty levels and trends in each country.

ECLAC's poverty estimates also differ from poverty estimates that use international poverty lines based on a threshold set in purchasing power parity dollars (e.g., US$2.15, US$3.65, or US$6.85 per day). Due to their uniformity, these lines are used for global comparisons and to monitor international commitments to eradicate poverty (SDG 1). However, they do not consider specific differences between national contexts but are based on thresholds corresponding to different levels of extreme and moderate poverty depending on the country's economic development. By not reflecting the cost of living or the particularities of each country, these international lines often lead to marked discrepancies with national figures in Latin American countries. These methodological differences also explain why a country may have a higher poverty rate according to ECLAC and a lower one according to international lines, or vice versa.

In the context of this regional study, ECLAC's figures have been considered more relevant. To illustrate this, Graph 15 compares two relevant international lines for the region ($3.65 and $6.85, vertical black lines) with the lines used by ECLAC in urban and rural areas for each country (horizontal bars). The discrepancies between the two measures are clear, and although the $3.65 line is above the line used in rural areas of many countries, it is below the measurement used in urban areas of most countries, which would lead to some inconsistencies when using these international lines for Latin American countries.

ECLAC poverty lines take into account the context of each country for comparative purposes, unlike international poverty lines.



Graph 14. Discrepancies between international poverty lines of $3.65 and $6.85 per day (PPP) vs. poverty lines used by ECLAC for rural and urban areas of the region's countries

Source: Own elaboration based on CEPALSTAT.

* Note: There is no data for Venezuela or Argentina in rural areas.

5.2. Relationship between poverty and economic growth

To evaluate the sensitivity of our results to different sources of economic activity data, equation (1) from the main text was estimated using GDP per capita data in constant 2010 dollars from the *World Development Indicators* (WDI) of the World Bank. The results of this estimation are presented in column 2 (OLS model with pooled data) and column 4 (fixed effects model by country and year) of Table 4 below. The results from the main text using GDP per capita data in constant 2018 dollars from CEPALSTAT are presented in columns 1 and 3 for comparison.

In all cases, the coefficients of interest are highly significant and of similar magnitude. With an R^2 greater than 0.32, the model in column 1 is considered adequate for forecasting poverty rate trends. Although the model proposed in column 2 offers a higher R^2, it is not used because it employs a different base year than the one used to project GDP to 2030. It is also worth mentioning that we introduced an interaction term with the Gini at the beginning of the study period or the average Gini, following Ravallion (2004). However, this specification caused a significant reduction in R^2 and was not selected for these simulations.

	Dependent variable: Poverty rate variation			
	OLS		linear panel	
	(1)	(2)	(3)	(4)
GDP/capita growth (US2018)	-1.41*** (0.30)		-1.58*** (0.30)	-1.58*** (0.30)
Crecim. PIB/cap (US2010)		-1.76*** (0.32)		-1.84*** (0.23)
Variación Gini	1.22*** (0.25)	1.00*** (0.23)	1.13*** (0.33)	0.97*** (0.30)
Constante	1.28 (1.22)	1.43 (1.21)		
Observaciones	267	244	267	244
R^2	0.32	0.36	0.25	0.25
R^2 ajustado	0.32	0.35	0.12	0.11
Error residual estándar	10.96 (df = 264)	10.40 (df = 241)		
Estadística F	62.62*** (df =2; 264)	67.33*** (df =2; 241)	37.08*** (df =2; 227)	33.92*** (df =2; 206)

Nota: *p<0.1; **p<0.5; ***p<0.01

Table 2. The GDP-Poverty relationship using various data sources

Source: Own elaboration.

5.3. Modelling the impacts of climate change on the GDP

To estimate the economic impacts of climate change, the potential impacts of chronic and acute risks on GDP growth were modelled separately.

To estimate the impact associated with chronic risks, an aggregated damage function assuming a non-linear relationship between temperature and economic output was used. Its generic form can be expressed by the following equation:

$$\Delta ly_{it} = \beta_1 T_{it} + \beta_2 T^2_{it} + \gamma_1 P_{it} + \gamma_2 P^2_{it} + p\Delta ly_{it-1} + \alpha_i + \alpha_{rt} + \varepsilon_{irt}$$

For a more detailed description of the variables used in each damage function, the reader can refer to Kalkuhl and Wenz (2020) and Burke, Hsiang, and Miguel (2015). In both cases, precipitation is used to calibrate the impact of temperatures but does not generate statistically significant impacts. Future improvements to this damage function could more comprehensively reflect chronic physical risk by including other climatic factors (e.g., precipitation or extreme precipitation as in Kotz, Levermann, and Wenz 2024) and better capturing long-term climatic effects (in addition to short-term GDP losses). This is expected to result in higher damage estimates.

To estimate the economic impact of acute risks linked to extreme weather events, another approach based on natural hazard modelling was proposed. This modelling was carried out by Climate Analytics as part of phase IV of the NGFS (NGFS, 2023b), and this study is based on these results. The main transmission channels used to translate these acute risks into macroeconomic shocks are briefly detailed below. For each natural hazard, the estimated losses were incorporated into the NiGEM macroeconomic model to simulate a GDP per capita projection that reflects the impact of these natural hazards.

(i) **Drought** risk is based on the SPEI indicator. Its evolution has been projected under different climate scenarios to account for the increased frequency and/or intensity of drought episodes as temperatures rise. The economic losses from these droughts have been estimated in national crop yields (combining harvested area data with the aforementioned SPEI indicator and yield-drought vulnerability functions). The drought losses thus estimated affect the macroeconomy and GDP growth through productivity, export, and price shocks. This process is illustrated in Diagram 1.

(ii) **Heatwave** risk has been calculated similarly, first estimating the population exposed to dangerous levels of thermal stress. This level of exposure to heatwaves has then been converted into productivity shocks using empirically calibrated damage functions between labor productivity and heatwaves. These productivity shocks are included in the NiGEM macroeconomic model and translate into a new GDP growth trajectory.

(iii) **Flood** risk is estimated from the results of global hydrological models, combined with flood protection data, capital stock estimates, and depth-damage vulnerability functions. Based on these estimates, impacts on GDP are derived through capital stock damage affecting investment premiums. Unlike other hazards where projections are based on stochastic simulation, floods are estimated as a single shock based on estimated annual average losses (AAL).

(iv) **Tropical cyclone** risk generates a probabilistic set of cyclones under current and future climatic conditions using the CLIMADA model. These hazard data are then combined with exposure and vulnerability estimates calibrated with EM-DAT to estimate capital stock damage. These capital stock damages affect the economy through investment premium shocks.

Significant challenges remain in improving the estimation of acute risks, which can be classified into two main groups: **(i)** data and validation: climate, exposure vulnerability, and **(ii)** modeling approaches for transmission channels. Additionally, for Latin America, the results have been produced at a disaggregated level only for four countries (Mexico, Brazil, Chile, Argentina) and as an aggregated regional block for the other countries. In this study, it is estimated that for the 14 countries without a national-level disaggregated assessment, the percentage deviation in GDP caused by acute risks will be equivalent to the percentage deviation estimated for the regional aggregate. This represents a significant methodological limitation that could be improved in future iterations if estimates with a higher level of geographical disaggregation are available.

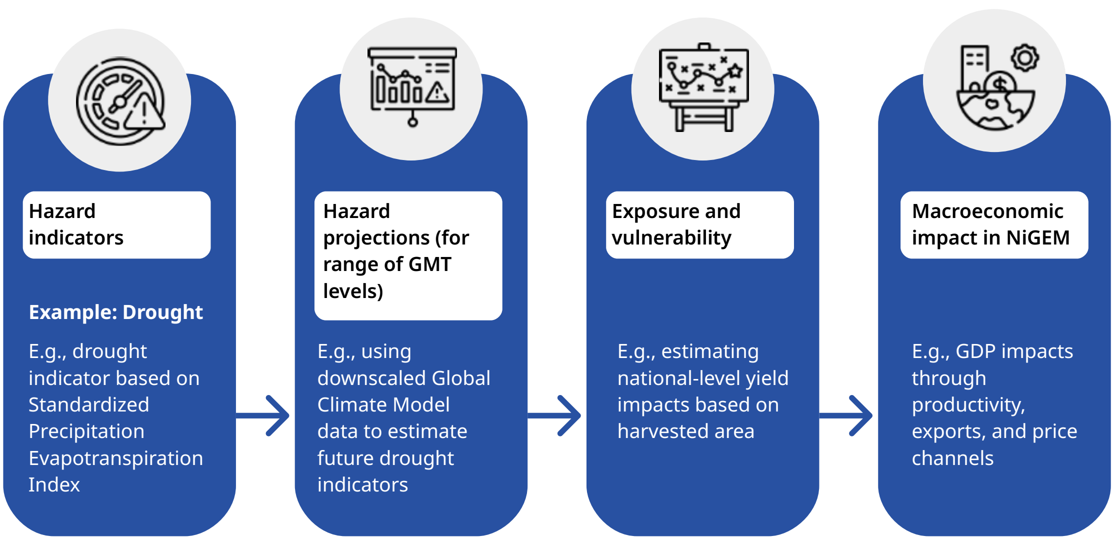
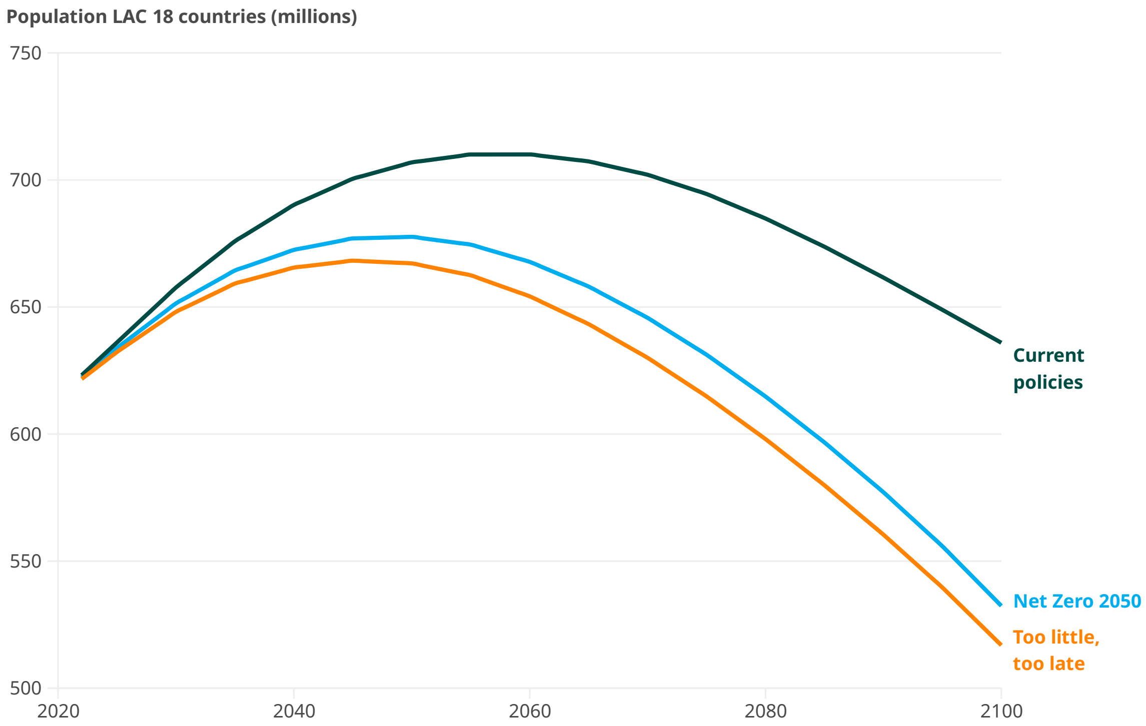


Diagram 1. Incorporation of drought risk into a macroeconomic projection

Source: Adapted from NGFS (2023b) based on *Climate Analytics*.

5.4. Inferring the child and youth poverty rate in 2030

Poverty rate projections start in 2023 and are inferred using each country's GDP per capita projections. Specifically, the latest available poverty rate for each country was taken and the variations derived from GDP per capita projections under the scenario without climate change until 2030 were first applied. The regional poverty rate is then obtained by summing the estimated number of poor in each country and dividing it by the projected regional population under the corresponding SSP. The regional population projections under each scenario are presented in Graph 15. Poverty rates in a changing climate were then computed by inputing the percentage deviations in each country's poverty rates inferred from national GDP per capita projections under each scenario. Since the GDP per capita projections used by Burke et al. (2015) are less recent than those used in NGFS (2024a), the percentage deviation in the poverty rate resulting from the GDP per capita deviation estimated by Burke et al. (2015) was applied to the poverty rates of the scenario

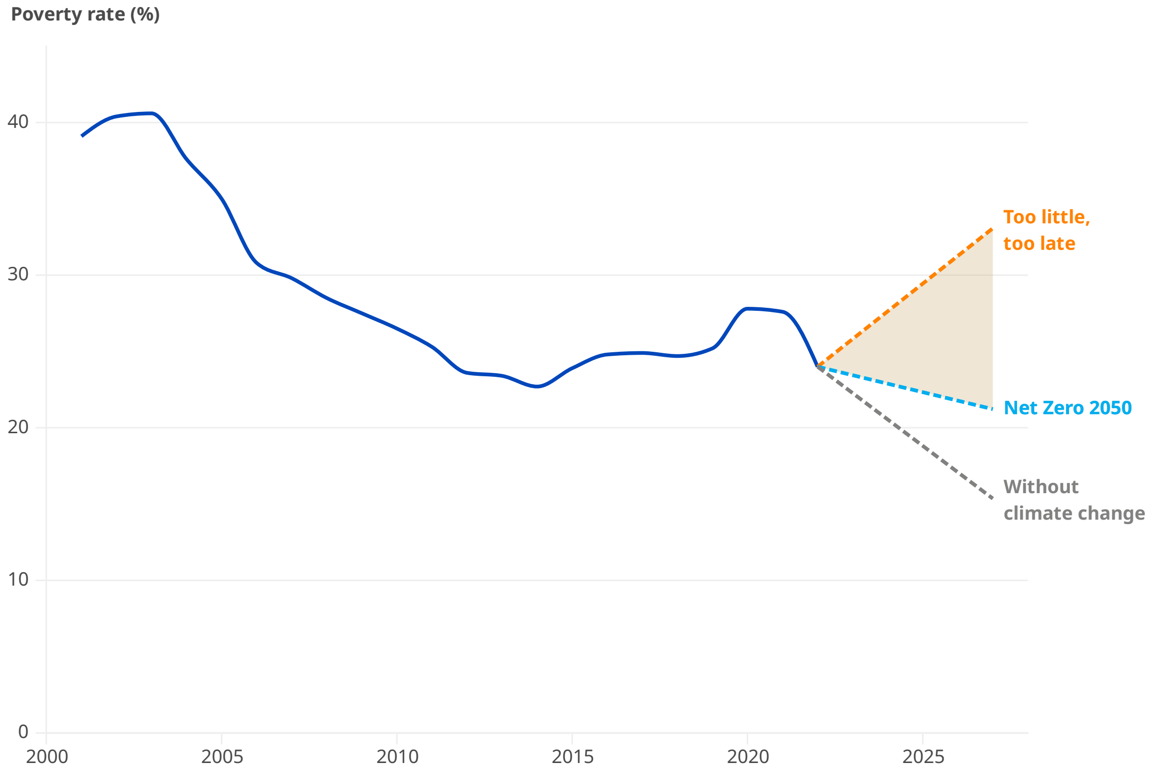


Graph 15. Population projections for Latin America (18 countries) under each scenario

Source: Own elaboration based on SSP v3.0.

Note: Population projections under the Net Zero, Current policies, and Too little, too late scenarios correspond to SSP 1, 2, and 5, respectively.

without climate change. This ensures consistency between the projections used across different scenarios. The process is illustrated in Graph 16, where the grey line represents the poverty rate trend in a scenario without climate change, and the orange area represents the range of poverty rates that would result from various climate change scenarios and inequality trends.

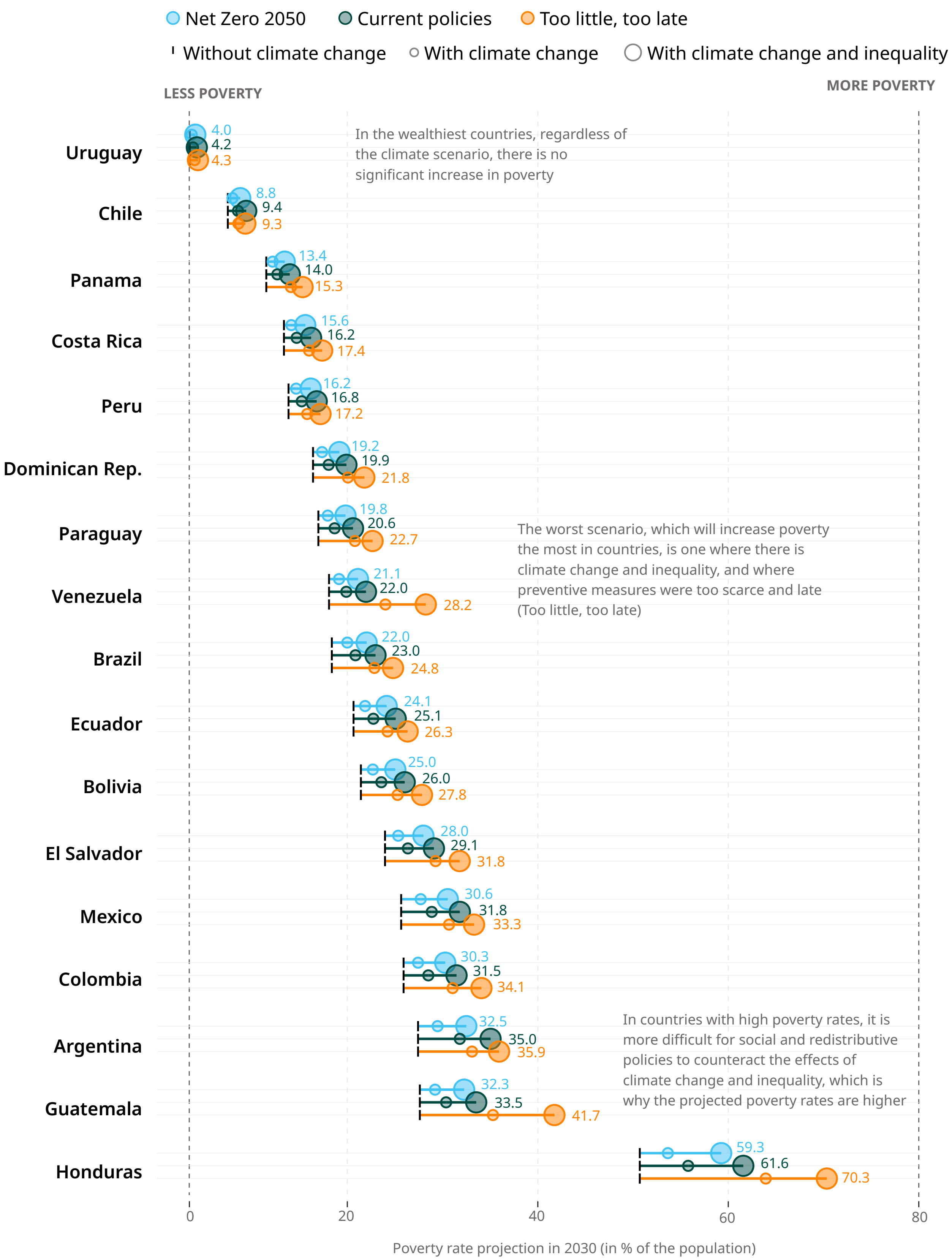


Graph 16. Illustration of the poverty rate projection process under various scenarios

Source: Own elaboration.

In the scenario without climate change, sustained economic growth projected until 2030 is expected to reduce the regional poverty rate gradually. Specifically, between 2022 and 2030, the regional GDP is projected to grow by an average of 2.4 per cent annually, which would translate into a reduction in the regional poverty rate from an estimated 24.4 per cent in 2022 to 21.4 per cent in 2030.[38]

However, the effects of climate change could weaken or even reverse this trend. In scenarios where social and redistributive policies cannot counteract the effects of climate change on inequality, regional poverty rates could be between 25.3 per cent (**Net Zero 2050** scenario) and 28.7 per cent (**Too little, too late** scenario) in 2030. If social and redistributive policies are implemented to



Graph 17. Projected poverty rate by country under various climate scenarios and inequality trajectories, 2030

Note: The small grey circle ("With climate change") represents the projected poverty rate without altering the Gini coefficient; the large grey circle ("With climate change and inequality") represents the projection that accounts for a 1 per cent annual increase in the Gini.

Source: Own elaboration.

counteract the effects of climate change on inequality, the impacts of climate change on poverty could be limited, and the regional poverty rate in 2030 could be between 23 per cent (**Net Zero 2050** scenario) and 26.1 per cent (**Too little, too late** scenario). Graph 18 provides the results of these projections at the country level, where the smallest point represents the scenario without climate change, the medium point represents the climate impact without changes to the Gini, and the largest point combines climate impacts and Gini degradation. The number of people in poverty is obtained by multiplying the poverty rates by the projected population for the SSP corresponding to each scenario. Finally, the number of children and young people in poverty is inferred using, for each country, the historical average proportion of each age group relative to the total number of poor. The final results and the main assumptions associated with each scenario are presented in the summary table below.

	Net Zero		Current policies		Too little, too late	
Temperature increase in Latin America and the Caribbean by the end of the 20th century (relative to the 1961-1990 average)	+1.47 °C		+2.84 °C		+4.60 °C	
Regional GDP impacts in 2030 (difference in % relative to the scenario without climate change)	-5.52 %		-7.91 %		-12.05 %	
Regional population growth between 2022-2030	+4.68 %		+5.54 %		+4.25 %	
Change in the Gini index relative to 2022	No change	+1% annually	No change	+1% annually	No change	+1% annually
Increase in the number of children and young people in poverty (difference relative to the scenario without climate change)	+7.4 %	+18.4 %	+12.2 %	+23.7 %	+22.3 %	+34.3 %
	5.96 million	14.88 million	9.97 million	19.34 million	17.91 million	27.54 million

Table 3. Summary of the projected evolution of the main variables

Source: Own elaboration.

Endnotes

1 Estimation based on 18 countries, these correspond to the Latin American region and are as follows: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela (Bolivarian Republic of), representing 95 per cent of the population of Latin America and the Caribbean. To ensure the greatest possible comparability and consistency between countries, the poverty rates used in this study have been calculated using the ECLAC methodology (2018). The Annex provides further methodological information.

2 In this study, when referring to children and young people it considers those under 25 years old.

3 This evolution is explained by the Clausius-Clapeyron relation, which suggests that for every 1°C increase in air temperature, the water-holding capacity of the atmosphere increases by approximately 7 per cent. Therefore, there is more moisture available in a warmer atmosphere than in a cooler one, leading to more intense precipitation when rain forms. Consequently, a warmer climate is likely to increase the occurrence of extreme precipitation events, even if aggregate precipitation levels decrease. This could reinforce the pattern of 'when it rains, it pours' already observed in some dry regions (Tabari 2020).

4 This trend is partly due to the improved capacity for collecting data on the impact of disasters over the years.

5 IPCC, 2018; IPCC, 2023. The projected changes in the intensity and frequency of climate extremes are very heterogeneous across regions, but generally increase with global warming. The IPCC's Sixth Assessment Report, for example, reports that an extreme rainfall event that occurs once every 100 years could be 2.3 times more frequent (i.e., occurring every 43 years) with 2°C of global warming and 4.1 times more frequent (i.e., occurring every 24 years) with 4°C of global warming. Droughts could follow a similar trend: a meteorological drought that currently occurs once every 10 years could be twice as frequent (i.e., occurring every 5 years) with 4°C of global warming. These projections are made at a global level and are associated with high uncertainties. However, they provide a reference to assess the orders of magnitude in future climate changes.

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21 *Ceteris paribus*, that is, it is assumed that all other variables remain constant.

22 The forecasts in this graph only use variations in GDP per capita since we do not have Gini coefficient variations for many of the years/countries, which would have resulted in a more limited number of forecasts.

23 This assumption implies that growth produces a uniform change in income distribution proportional to the growth of GDP per capita without altering the shape or variance of income distribution.

24 Lakner and others (2020) have shown that changes in the Gini coefficient tend to be smaller the longer the period considered, suggesting that large changes in the Gini coefficient are difficult to sustain over long periods. For example, annualized increases of 2 per cent in the Gini have not been observed over a period longer than 10 years. An annual increase of 1 per cent implies that a Gini of 0.45 in 2022 will settle at nearly 0.49 in 2030.

25 Dollar, David, and Aart Kraay, ‘Growth is Good for the Poor’, *Journal of Economic Growth*, vol. 7, no. 3, 2002, pp. 195-225; Ravallion, *Pro-poor growth: A primer*; Bourguignon, *The growth elasticity of poverty reduction*.

26 For a literature review see Dell, Jones, Olken, *What do we learn from the weather?*.

27 The transition risks towards low-carbon economies represent another type of risk associated with climate change, but, due to methodological issues and lack of data, they have not been considered in this study.

28 For more information, consult the Annex and the following publication: Network for Greening the Financial System, *NGFS Scenarios Technical Documentation*, NGFS, Paris, France, 2023.

29 The three macroeconomic models used for these projections are REMIND-MAgPIE 3.2-4.6; MESSAGEix-GLOBIOM 1.1-M-R12, and GCAM 6.0 NGFS.

30 The chronic damage function only considers the impacts of temperature deviations, which limits the risk of double counting when adding chronic and acute impacts.

31 For an analysis of some of these turning points see Lenton, Timothy M., et al., 'Climate Tipping Points — Too Risky to Bet Against', *Nature*, vol. 575, no. 7784, 2019, pp. 592–595.

32 Richardson, Katherine, et al., 'Earth beyond six of nine planetary boundaries', *Science Advances*, vol. 9, no. 37, 2023, <https://doi.org/10.1126/sciadv.adh2458>, accessed 3 April 2024.

33 The SSPs describe alternative pathways of economic, social, and demographic development that influence societies' ability to mitigate or adapt to climate change. Version 3.0 of the SSPs has been used. It is available online at the following link: <https://data.ece.iiasa.ac.at/ssp/#/workspaces>. Graph 14 in the Annex shows the population projections corresponding to each SSP.

34 Samaniego, et al., *Panorama de las actualizaciones de las contribuciones determinadas a nivel nacional*.

35 The only scenario in which the projected poverty incidence for 2030 is below the estimated level in 2022 is the Net Zero 2050 without inequality amplification. See the Annex for more details.

36 This factor corresponds to the relationship between the number of poor children and young people without changes in the Gini and with changes in the Gini in each climate scenario. Although the elasticities are the same for each simulation, the relatively lower strength of this factor in higher warming scenarios is due to the absolute number of poor being higher in these scenarios.

37 'Climate Finance for Children in Latin America and the Caribbean'.

38 The regional poverty incidence used for the poverty projections is based on the latest available observation for each country and does not correspond with the incidence presented in Graph 2 (i.e., 29 per cent in 2022). This is because the regional projection in Graph 2 is obtained by projecting national series using a model, either to complete missing data or to splice non-comparable series. An update exercise of poverty rates in the 6 countries that do not have harmonized regional poverty data in 2022 (Bolivia, Colombia, Guatemala, Honduras, Nicaragua, and Venezuela) suggests that approximately 75 per cent of the discrepancy between the two estimates could be explained by the discrepancies observed in the case of Venezuela. The latest available harmonized poverty data for this country is from 2014, and we do not have official data to project it.

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