The cost of the double burden of malnutrition

Main **social and economic impacts** in eight Latin American countries

Rodrigo Martínez • Carla Mejía • Ernesto Espíndola

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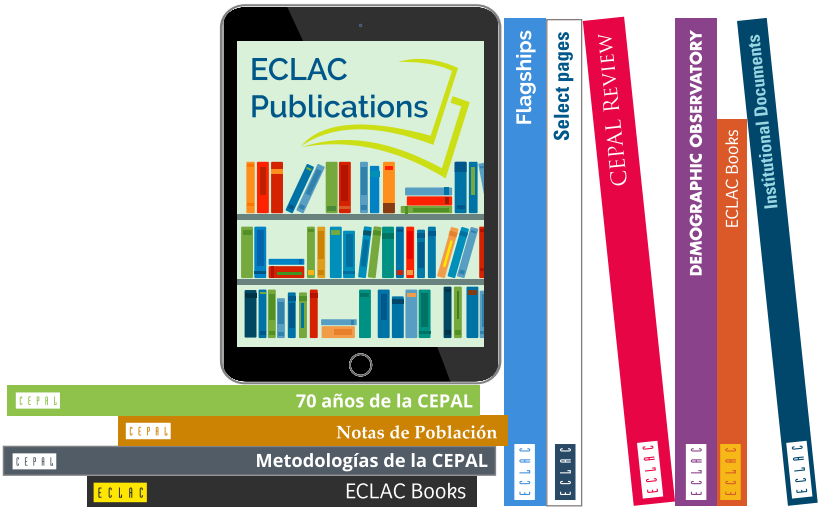

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Main social and economic impacts in eight Latin American countries

Rodrigo Martínez
Carla Mejía
Ernesto Espíndola

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This document was coordinated by Rodrigo Martínez, of the Social Development Division of the Economic Commission for Latin America and the Caribbean (ECLAC), within the framework of activities of the joint project with the World Food Programme (WFP) "The double burden: the combined economic impact of undernutrition and obesity in Latin America and the Caribbean". The document was prepared together with Ernesto Espíndola, of the Social Development Division of ECLAC, and Carla Mejía, of the Regional Office for Latin America and the Caribbean of WFP. Amalia Palma, of the Social Development Division of ECLAC, and Rolando Wilson, of the Regional Office for Latin America and the Caribbean of WFP, also provided input. Tito Pizarro, of the University of Santiago de Chile, and Lorena Rodriguez and Andrea Flores, of the University of Chile, contributed to the section on policy, which also included proposals from representatives of the respective countries.

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Introduction

Latin American countries are in the throes of a demographic, epidemiological and nutritional transition, with increased life expectancy and rates of ageing, rises in chronic illnesses and a marked shift from undernutrition by deficiency to a combination of this and overweight and obesity. This is by no means a uniform process and its development has unique characteristics in each country.

To make effective, efficient and sustainable progress towards addressing these transition processes and thereby ensure the right to food and nutrition security for the entire population, it is important to analyse the particular features of the process in each country. Having evidence-based proposals that make it possible to identify challenges, find public policy opportunities and quantify the desired impacts is therefore essential. Yet beyond the analysis of the costs of implementing potential solutions, it is also crucial to adequately recognize the multidimensional effects of not implementing them. In the words of Ban Ki-moon (2007), hunger is a moral issue, but it is also a critical economic concern. As well as constituting a violation of human rights, it affects the overall well-being of societies and indicates a significant loss of resources for countries.

This document summarizes the main results of studies on the cost of the double burden of malnutrition carried out in Chile, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico and Peru between 2014 and 2019.[1] This information is preceded by a brief overview of the region's current economic and social context and is complemented by some of the major public policy proposals on food and nutrition security to achieve the targets of Sustainable Development Goal (SDG) 2 to end all forms of malnutrition.

The work carried out in each of the countries was focused on estimating the social and economic impacts of undernutrition among children under 5 years of age and the overweight and obesity that affect the population aged 20 years and over. The estimated proportion of the malnourished population of each country and the resulting effects on morbidity and mortality, educational performance, work and productivity are then analysed.

The studies presented here are the result of a joint cooperation project between the Economic Commission for Latin America and the Caribbean (ECLAC) and the World Food Programme. Technical teams from the governments of the respective countries, staff of the Institute of Nutrition of Central America and Panama (INCAP) and national consultants participated actively in the implementation of the project.

[1] A detailed report of each study may be found in: Fernández and Martínez (2017); Prost and Martínez (2019a, 2019b, 2020a and 2020b) and Mejía and Martínez (2022).

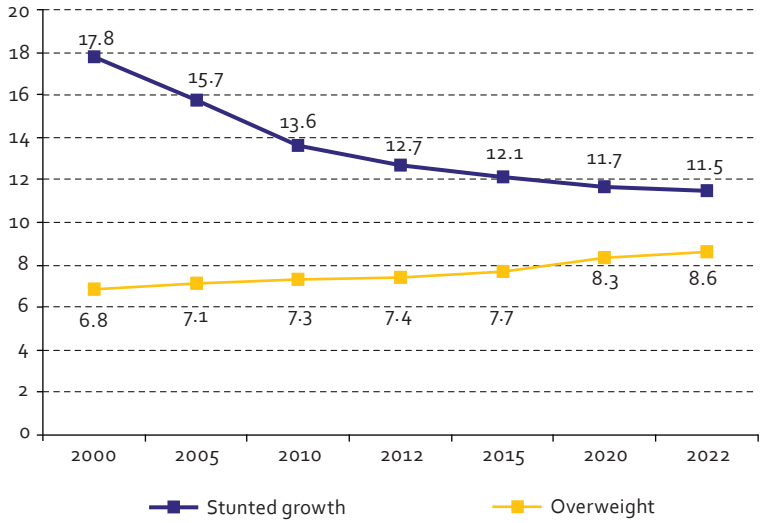
I. Malnutrition in the current economic and social context of Latin America and the Caribbean

Rates of overweight and obesity are increasing alarmingly in Latin America and the Caribbean, threatening the health and well-being of millions of children, adolescents and adults. Overweight affects 4.2 million children under 5 years of age (8.6%) and 49 million children and adolescents aged 5–19 years (30.6%) (UNICEF, 2023), in addition to 106 million adults (24.2%) (FAO and others, 2023). These rates are above the global average for children under 5 years of age (5.6%), almost 11 percentage points above that for children and adolescents (20%) and almost double the global prevalence of obesity in adults (13.1%) (FAO and others, 2023). These figures thus place the region among the most obese areas in the world.

Paradoxically, in Latin America and the Caribbean, the growth of overweight and obesity is occurring alongside increasing hunger and the resulting undernutrition, expressed as stunting, wasting or micronutrient deficiencies. Between 2010 and 2022, the number of people living with hunger rose from around 37 million to more than 43 million (6.5% of the population) and remains at one percentage point above the rate before the onset of the coronavirus disease (COVID-19) pandemic (FAO and others, 2023).

At the regional level, stunting continues to affect 5.7 million (11.5%) children under 5 years of age (see figure 1) and wasting affects 700,000 (1.4%). Furthermore, anaemia affects 32.9% of children of preschool age and 17.5% of children of school age (Beach and others, 2019), as well as 17.2% of women between 15 and 49 years of age. These figures show that, despite the progress made in combating undernutrition, the pace of reduction has slowed. Between 2000 and 2022, the rate of stunting in the region decreased by 6.3 percentage points; however, between 2012 and 2022, the reduction was only 1.2 percentage points (FAO and others, 2023).

Figure 1
Latin America and the Caribbean: rate of stunting and overweight in children under 5 years of age
(Percentages)



Source: Food and Agricultural Organization of the United Nations (FAO) and others, Latin America and the Caribbean – Regional Overview of Food Security and Nutrition: Statistics and Trends, Santiago, 2023 [online] https://openknowledge.fao.org/server/api/core/bitstreams/f6d5a32f-c6f5-476c-bcc4-c72c74be3b8d/content.

In 2023, over 187 million Latin American and Caribbean people (28.2% of the population) suffered from moderate or severe food insecurity.[2] Women are disproportionately affected in comparison to men (30.3% compared to 25.1%) as are people living in rural areas in comparison to those living in urban areas (32.2% compared to 26.0%). In addition, the prevalence of undernourishment in the Latin American and Caribbean population was 6.2% (FAO, 2024).

The above-mentioned periods of progress, stagnation and setback were accompanied by a decade marked by a series of challenges for Latin American economies. Since 2014, average economic growth has been extremely low, at just 0.8%, less than half the average achieved during the "lost decade" of the 1980s (ECLAC, 2023a and 2023b). This context has created cumulative vicious cycles that have led the region into a double trap of low economic growth and high levels of inequality. Policy strategies for development based on stronger, more sustained, inclusive and sustainable growth will be required to address this situation (Salazar-Xirinachs, 2023).

Prior to 2014, for around a decade, high global demand for commodities drove significant economic growth in the region, allowing most of its governments to increase social expenditure, strengthen social protection systems and reduce poverty (ECLAC, 2014).

The end of the super boom in commodities in 2014 marked the beginning of an economic downturn. The drastic drop in the prices of these raw materials weighed on various economies in the region, decreasing income and increasing economic volatility. Trade policies and economic slowdown in some global economies had additional and significant adverse impacts on trade and investment in Latin America; labour markets fluctuated, with falling participation and increasing unemployment, and labour market indicators slowly but noticeably deteriorated between 2015 and 2019.

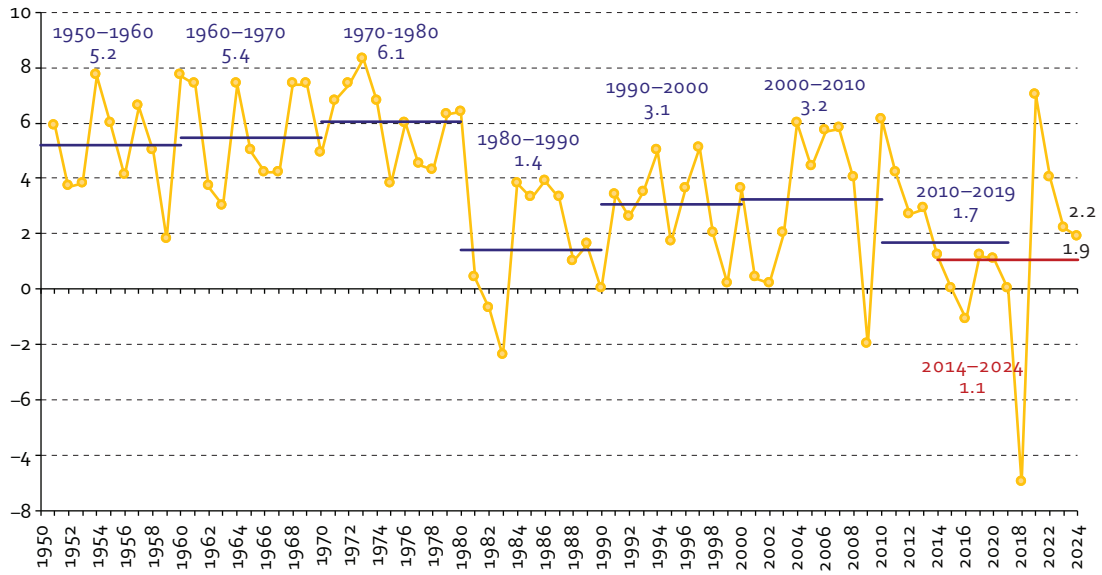
The situation described above was compounded by the coronavirus disease (COVID-19) pandemic. The lockdown and social distancing measures implemented to curb the spread of the virus led to a widespread economic downturn in the region. The service, tourism and manufacturing industries were particularly affected, resulting in unemployment and economic difficulties for many people, exacerbating poverty, inequality and labour informality.

[2] According to the Food Insecurity Experience Scale.

At present, Latin America and the Caribbean continues to face structural challenges amid great uncertainty owing to economic, climate-related, technological and geopolitical shocks and other ongoing transformations. According to ECLAC, "the region is beset by the consequences of cascading crises that have created a protracted social crisis, particularly in health and education, ..., food and energy insecurity, and a rise in the cost of living" (ECLAC, 2023b). This creates even more obstacles to the already challenging path towards achieving the SDGs. The indicators reflect no progress towards 32% of the SDGs and a trend in the right direction but with insufficient progress for 46%, with only 22% of the SDGs having been achieved or trending sufficiently towards attainment (ECLAC, 2024).

With an annual rate of variation in gross domestic product (GDP) estimated at 2.2% in 2023, the region appears to have returned to the path of low growth in economic activity already recorded in the previous decade. For 2024, the GDP growth rate is expected to be 1.9% on average, maintaining this low growth (see figure 2).

Figure 2
Latin America and the Caribbean: growth in GDP, 1951–2024[a]
(Percentages on the basis of constant dollars at 2018 prices)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Preliminary Overview of the Economies of Latin America and the Caribbean, 2023 (LC/PUB.2023/22-P), Santiago, 2023.
[a] The variations for periods are the average annual rates of variation. The figures for 2023 and 2024 are estimates and projections, respectively.

The region's countries have limited fiscal and monetary policy space, and little stimulus from international factors. Specifically, the slower pace of economic growth resulted in countries tightening their monetary policy, and fiscal stimulus measures were withdrawn to address the high inflation of recent years. However, low growth is not merely a short-term problem; it reflects the decline in the trend growth rate of regional GDP (ECLAC, 2023a).

From May 2020 to June 2022, the annual rate of inflation rose steadily in the region, from 1.2% to 9.2%. The pandemic triggered a series of circumstances and dynamics which in turn stimulated global inflation. These include scarce supply owing to disruptions in production, supply chain crises linked to difficulties in distributing goods and changes in demand due to lockdowns and restrictions on movement, all of which pushed up global costs and resulted in an uneven economic impact, as emerging economies and more vulnerable groups were disproportionately affected. Moreover, in some cases, the government measures intended to revitalize economic activity following large-scale lockdowns included

widespread monetary policies that pushed prices higher, even though they also increased liquidity and rekindled demand.

Added to this are the conflict in Ukraine and trade sanctions that increased the volatility of oil and other energy prices. Greater restrictions on access to fertilizers have also caused food prices to skyrocket, affecting the most vulnerable populations.

According to ECLAC (2023a): "Although inflation has now eased, it remains high and above the target set in many countries of the region, so monetary policy remains contractionary, and fiscal policy offers less room for manoeuvre. This is compounded by a weakened external environment, as global economic activity has slackened and commodity prices have fallen in recent months. The slowdown in regional economic activity reflects faltering domestic demand and a smaller external contribution."

This context —of low economic growth, limited macroeconomic policy space and a sluggish external sector— is also reflected in weaker capacity for job creation, which has indiscriminately affected all sectors of activity in the region. From 2014 to 2023, employment grew by just 1.3%, less than half the 3.2% recorded in the lost decade of the 1980s (ECLAC, 2023b). The COVID-19 pandemic not only reinforced this trend, but also triggered the biggest crisis in Latin American and Caribbean labour markets since 1950. In 2020, job creation fell for the first time in 70 years. There were improvements in the two following years, but, according to the estimates of employment surveys in 12 of the region's countries in late 2022, 49% of workers were in informal employment and, according to information from household and employment surveys in 14 countries in the region, 36.8% of those in employment received wages below the national minimum wage. In 2023, the slow pace of job creation was accompanied by an increase in the number of inactive people (1.8%) compared to the levels recorded the previous year. This reversed the downward trend in 2021 and 2022, when the number of inactive people fell by 5.9% and 1.5%, respectively, owing to the recovery of economic activity following the COVID-19 crisis. However, the recent increase in inactivity in the labour market (11.8 million more people than in 2019) resulted in a further reduction in the regional unemployment rate, which was estimated at 6.5% in 2023 (ECLAC, 2023a).

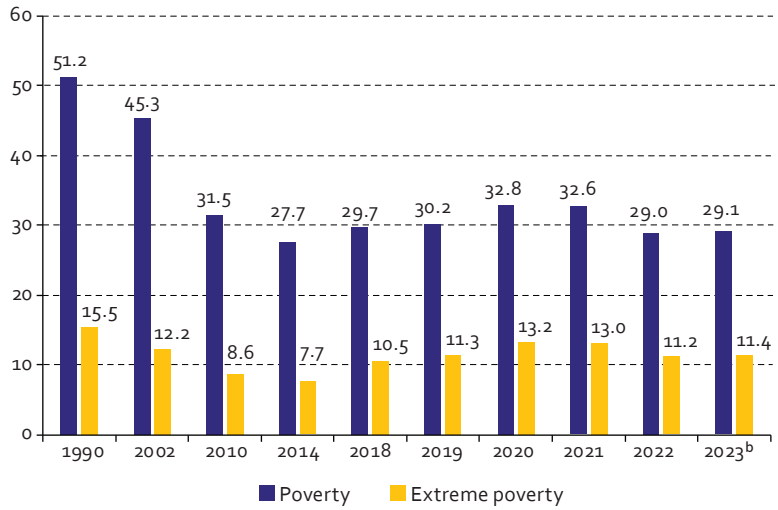
As a result of the above-mentioned factors, 29.1% of the Latin American population were living in poverty and 11.4% in extreme poverty in 2023. This is a significant improvement compared to the figures recorded during the pandemic (in 2020, the poverty rate was 32.8% and the extreme poverty rate was 13.2%), but these figures show no progress towards the target of Goal 1 of ending poverty in all its forms by 2030 (ECLAC, 2024).

As regards income inequality in the region, in 9 of the 12 Latin American countries analysed, the Gini coefficient in 2022 was lower than before the pandemic, reflecting an annual decrease of 1.1%, on average. In this period, the highest decile received an income 21 times higher than the lowest decile and had an increasing concentration of wealth: in 2021, the wealth of the 105 billionaires in the region accounted for 4% of the wealth of the entire population, a higher percentage than in 2019 and 2020 (ECLAC, 2023b). In the previous decade, data from studies that combined sources of information from household surveys and data from tax records indicated that the share of the richest 1% of the population, with a minimum of around 13% for Argentina in 2001 and a maximum of 29% for Brazil in 2011, showed a slight upward trend (ECLAC, 2019).

While the most recent figures on poverty in the region are more favourable than those for 2019, the year before the onset of the COVID-19 pandemic (see figure 3), in 2022, more than 180 million people in the region did not have enough income to cover their basic needs, and 70 million of these did not have enough income to buy a basic food basket (ECLAC, 2023b). Current poverty levels are similar to those recorded at the start of the previous decade and extreme poverty levels are even higher, which reveals, at the very least, the region's stalled progress towards ending poverty (ECLAC, 2024). In a context of

low economic growth and in the absence of further effective public policy action, it is to be hoped that poverty and extreme poverty rates in the region remain more or less stable.

Figure 3
Latin American (18 countries):[a] poverty and extreme poverty rates, weighted averages, 1990–2022 and projections for 2023
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Social Panorama of Latin America, 2023 (LC/PUB.2023/18-P/Rev.1), Santiago, 2023.
[a] Argentina, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay.
[b] Projections.

Food insecurity is one of the most serious manifestations of poverty and, in particular, extreme poverty, which implies lack of reliable access to a sufficient quantity of safe and nutritious food for normal growth and development and a healthy and active life. Although this may be caused by problems in food systems, such as a lack of availability of food, inadequate distribution or even misuse of food within the home, the most common factor in the region is insufficient income.

In the above-mentioned economic context and given that food systems are themselves major contributors to climate change and the degradation of ecosystems, it is likely that food insecurity will continue and that the Latin American and Caribbean population will continue to be seriously affected. This population must also contend with what has recently become known as the "global syndemic", which indicates the co-occurrence in time and place of three crises, namely: obesity, undernutrition and climate change, with common drivers that interact with each other to produce complex sequelae (Swinburn and others, 2019; Burgaz and others, 2023). Malnutrition in all its forms, including stunting among children, micronutrient deficiencies, overweight and obesity, will continue to be a major challenge for the region's economic and social development, and will be exacerbated by increasing habitat degradation and the intensification of the greenhouse gas effect, if no effective global policy measures are taken in the field of food security.

II. Impacts of the double burden of malnutrition

This section includes a summary of the main results of the eight country studies on the cost of the double burden of malnutrition that have been carried out in the region, preceded by a brief description of the conceptual basis and estimation methodology.[3]

A. Conceptual framework

The world in general, and Latin American and the Caribbean in particular, is experiencing a change in era, with profound transformations in various areas of social and cultural life, production and the economy, and the environment and surroundings. In terms of hunger and malnutrition, as mentioned in section I, recent decades have been marked by significant demographic, epidemiological and nutritional transformations, which together have given rise to what has been called the double burden of malnutrition (FAO, 2006; Freire and others, 2014; Sarmiento and others, 2014; Kroker-Lobos and others, 2014). This phenomenon is characterized by the gradual ageing of populations, migration, the co-existence of communicable and non-communicable diseases and malnutrition in all its forms (deficiency and excess) at both the population and household levels. In that regard, the concept of malnutrition covers, on the one hand, undernourishment, including low birthweight, underweight, stunting, wasting and micronutrient deficiency (iron, zinc, vitamin A and others), and, on the other hand, overweight and obesity.

While the focus at the regional level has been on malnutrition by deficiency (undernutrition), malnutrition by excess weight (overweight and obesity) is a growing problem, with figures indicating high prevalence among both adults and children. The causes include populations with more sedentary lifestyles, high levels of consumption of ultraprocessed foods (high in saturated fats, sugars and salt) and an unbalanced diet with an insufficient intake of micronutrients (hidden hunger). Added to these factors is the high cost of a healthy and varied diet in Latin America and the Caribbean; in the region, the daily cost of a nutritious diet is US$ 4.08 per person, higher than the global average cost of US$ 3.66 per day (FAO and others, 2023).

[3] For more information, see Martínez and Fernández (2006) and Fernández and Martínez (2017).

Analysis of malnutrition thus requires a broad consideration of the concept of food and nutrition security, which involves analysing both undernourishment (daily intake under the minimum required to satisfy energy needs), undernutrition in all its forms and overweight and obesity. In that regard, new interactions must be taken into account, driven by environmental, technological, socioeconomic and cultural changes that have transformed the levels of vulnerability and risk in relation to food and nutrition security across the region.

1. Conceptual basis

The studies described in this document are based on three conceptual dimensions that guide the analysis of results: food security and vulnerability; demographic, epidemiological and nutritional transitions; and life cycles.

i) On the basis of the World Food Summit (1996), food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (WFP, 2002). In other words, it is dependent on the availability, access and proper biological use of foods.

The operational expression of food and nutrition insecurity, a reflection of hunger, is the indicator of malnutrition or undernourishment, as food vulnerability refers to "the likelihood of a sharp decline in access to, or consumption of, food relative to a critical value that defines minimum levels of human well-being" (WFP, 2002). Vulnerability may therefore be defined as a vector of two contrasting components: the risk (environmental, health and nutritional, or market) of not having food and nutrition security and the response capacity (family and community, and social and institutional) (Martínez and Fernández, 2006).

Food and nutrition insecurity, as well as the poverty or extreme poverty experienced by most of the vulnerable population, not only results in undernutrition, but also has significant impacts on the risk of overweight and obesity. This is due to both the quality of food accessible to this segment of the population owing to its cost, and the more limited time to prepare food along with fewer adequate spaces to do sport and physical activity (lack of a healthy diet and lifestyle).

ii) A key element of the epidemiological and nutritional situation in the region is the change in lifestyles, especially in relation to diet, physical activity, consumption of tobacco, alcohol and drugs, stress and mental health issues, linked to increasing urbanization. This phenomenon is related to an increase in risk factors for non-communicable diseases. As a result, as countries' economic situations improve, rates of infectious diseases and undernutrition decline and maternal and child health improves, with various countries in the region in the "post-transition" stage. However, the co-existence of prevalent infectious diseases, maternal and child health issues and undernutrition, together with an increase in obesity and non-communicable diseases, is what characterizes the stages of epidemiological and nutritional security that most countries in the region are experiencing. Furthermore, the crisis caused by COVID-19 provided a wake-up call as to the extent of the effect that communicable diseases can have on modern society, causing pandemics that have not only health impacts, but also nutritional, social, economic and environmental ones.

iii) Many countries in Latin America and the Caribbean have experienced a nutritional transition towards largely unhealthy diets, which are characterized by high consumption of products rich in energy and low in nutrients, high consumption of sugary drinks, excessively large portions of food and a poor-quality diet (low intake of fruits, vegetables, whole grains, pulses, fibre and polyunsaturated fats, as well as high intake of trans and saturated fats). It should be highlighted that this diet is also linked to changes in the offer of food products. This stage of the nutritional transition has thus been dubbed the "degenerative disease stage".

Malnutrition and its effects may be seen in different ways throughout the life cycle. Furthermore, the impact of malnutrition has intergenerational consequences that must be understood to

fully comprehend the complexity of the problem. The cycle begins in the antenatal stage, when undernutrition is linked to an inadequate maternal diet, low weight gain during pregnancy and poor antenatal care. Children may experience impaired development after birth (expressed as low birth weight, low weight for their age and/or short height for their age); prevalence of this usually increases up to the second year of life as a result of food environments characterized by poor socioeconomic surroundings, a lack of promotion of breastfeeding, deficiencies in the health system and poor feeding and care practices.

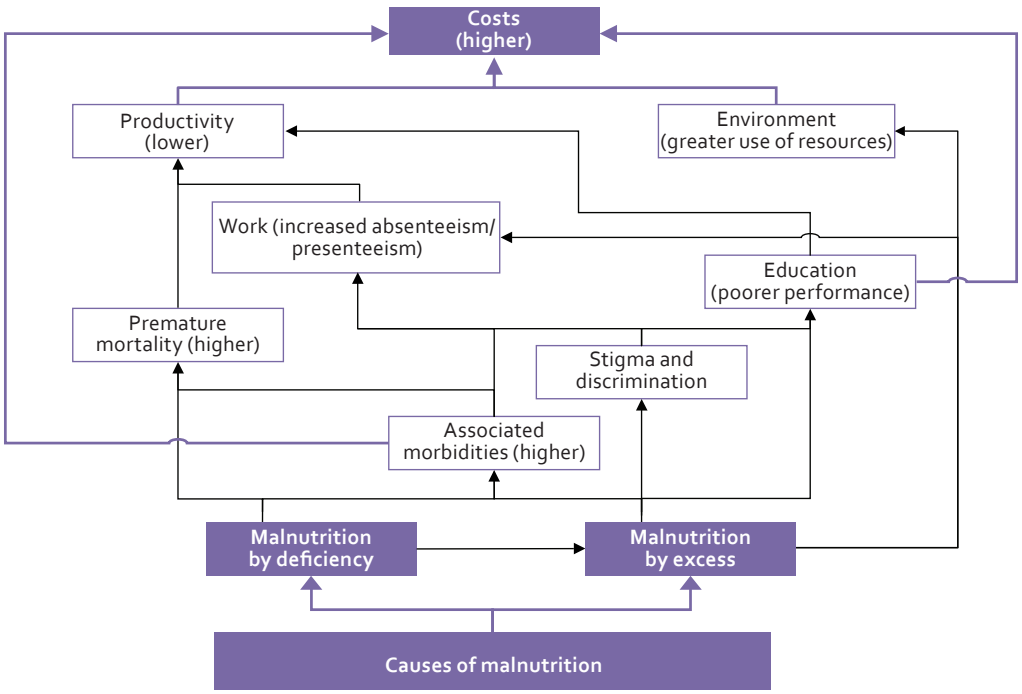
The effects of stunting are unlikely to be reversed after 5 years of age and will be felt for life. The evidence gathered in the 2013 and 2021 series of *The Lancet* reaffirms the importance of the first 1,000 days of life and the need for public policies to be focused on this period, in which there is a window of opportunity for this process to be changed or mitigated. To that end, actions focused on adequate nutrition are critical to ensuring healthy development whose benefits will last throughout the life cycle.

During childhood, schooling, adulthood and old age, malnutrition has specific characteristics and consequences, with the presence of non-communicable diseases progressively increasing. Moreover, the earlier overweight and obesity occur, the higher the incidence of such diseases, with both common and differentiating features among men and women.

2. Effects of malnutrition

Malnutrition, in its various forms, has significant consequences for: health, with a direct impact on morbidity and mortality; skills development and educational outcomes; social and labour inclusion; and the environment. All these consequences generate their own operational costs and productivity losses (see diagram 1).

Diagram 1
Effects of malnutrition



Source: A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017.

The economic cost linked to malnutrition is defined in relation to the valuation of the consequences of undernutrition and of overweight and obesity.

i) **Undernutrition**[4] has negative impacts on various dimensions of people's lives, including effects on health, education and the economy (public and private costs and expenditure, and productivity), which lead to problems of social inclusion and an increase or deepening of the scourge of poverty and destitution among the population, recreating the vicious cycle by simultaneously increasing vulnerability and undernutrition (Hoddinott and others, 2008 and 2013).

The most serious effect of undernutrition in children under 5 years of age is the increase in the risk of death with the greatest impact occurring during intrauterine life and in the first years of life. The risk of neonatal death of children with a birth weight between 2,000 and 2,499 grams is four times higher than that of children who weigh 2,500–2,999 grams and 10 to 14 times higher than that of children who weigh 3,000–3,499 grams (Martínez and Fernández, 2006, p. 36). In many cases, the expectant mother is too young to understand the consequences of her own undernutrition, which poses a significant risk of perpetuating malnutrition in the next generation.

A meta-analysis of 10 longitudinal studies carried out among children under 5 years of age indicates that 35% of deaths are attributable (directly or indirectly) to underweight (WHO, 2002). The deficit of micronutrients also has significant impacts. The risk of dying of diarrhoea, malaria or measles rises by 20% to 24% among children with a vitamin A deficiency; a zinc deficiency, for the same diseases, causes an increased risk to life of between 13% and 21%. The burden of disease attributable to low weight is 61% for diarrhoea, 57% for malaria, 53% for pneumonia and 45% for measles. Iron deficiency, meanwhile, has a direct impact on maternal, child and school-age anaemia; a vitamin A deficiency affects eyesight and an iodine deficiency causes goitre and cretinism.

These linkages go in both directions. As well as undernutrition being an important factor in the appearance and lethality of these pathologies, they, in turn, also contribute to undernutrition, creating a vicious cycle.

At the educational level, undernutrition affects school performance as a result of deficiencies that cause diseases and owing to limitations in learning ability related to poor cognitive development. This leads to greater likelihoods of lateness, grade repetition, dropout and low educational attainment.

A deficiency of micronutrients, particularly iron, zinc, iodine and vitamin A, is linked to a cognitive impairment that leads to poor learning. For example, using data from the Institute of Nutrition of Central America and Panama on Guatemalans living in rural areas, Maluccio and others (2003) showed that receiving nutritional supplements between the ages of 6 and 24 months significantly boosted school performance (Alderman, Behrman and Hoddinott, 2004, p. 374).

The impacts of undernutrition on both health and education have repercussions on the population's productive capacity. Firstly, by affecting the size of the working-age population owing to the greater likelihood of death, and secondly, because of the gap in educational level between persons affected by undernutrition and the rest of the population.

ii) **Overweight and obesity**[5] mainly affect health (morbidity and mortality) and the economy (restrictions on work and productivity). There are also environmental impacts linked to the increased use of resources (consumption of energy and food).

[4] Child undernutrition refers to children under 5 years of having height-for-age (stunting), weight-for-age (underweight) or weight-for-height (wasting) below -2 standard deviations of the World Health Organization (WHO) child growth standards median.

[5] People with a body mass index between 25 and 29.99 are considered overweight and those with an index equal to or greater than 30 are considered obese.

Chronic diseases associated with malnutrition by excess are the main cause of adult mortality and morbidity worldwide. In Latin America and the Caribbean, these account for a high proportion of the burden of morbidity and mortality, representing 49% of the years of life lost. While such chronic diseases have a cross-cutting impact on the population, there are significant differences in terms of gender, socioeconomic level and geographical area. For example, while more women report having chronic diseases linked to malnutrition by excess, mortality rates are higher among men, with some variations among diseases (Bonilla, 2014). In turn, cardiovascular diseases are the leading cause of death in the region,[6] with notable variations between countries and a strong linkage with household income: 30% of premature deaths resulting from cardiovascular disease occur in the poorest quintile, while only 13% occur in the highest income quintile (WHO, 2011).

Malnutrition by excess also has an intergenerational impact. Overweight and obesity among parents is linked to the obesity of their children. Fetal growth is related to the nutritional state of the mother, including prior to pregnancy.

The effects of obesity on mental health have also been documented, particularly the link with low self-esteem and negative body image, which are themselves influenced by discrimination in different social contexts, such as school and work (Frone, 2007).

Evidence on the effects of malnutrition by excess on education, compared with those of malnutrition by deficit, is less conclusive.

In the workplace, overweight employees have more days of absence caused by illness, irrespective of their occupation, a risk that increases with their level of obesity. In turn, there is also a positive correlation between obesity and presenteeism7 (Janssens and others, 2012; Lehnert and others, 2013). Moreover, the absence from school of obese children and adolescents is linked to the workplace absence of their parents, owing to childcare requirements (Hammond and Levine, 2010; Kaestner, Grossman and Yarnoff, 2009).

In addition to the effects indicated, a person's overweight has environmental impacts caused by a greater use of infrastructure, fuel and food resources, as well as larger amounts of emissions caused by productive industries (Dannenberg, Burton and Jackson, 2004; Michaelowa and Dransfield, 2008).

3. Malnutrition and its costs

The above-mentioned social and labour impacts generate economic costs and losses that affect not only people with malnutrition, but also their families and the whole of society. In the case of child undernutrition, the economic cost (CT^U) is defined as the total of public and private healthcare costs (CSU) owing to the need for more treatment in the healthcare system; in education (CE^U), the impacts arise from school repetition; and in productivity (CP^U), they are equivalent to the loss of human capital owing to the related mortality that results in malnourished people being less likely to be part of the economically active population and to the gaps in the level of education that affect those who have suffered from undernutrition.

Therefore:

$$CT^U = f(CS^U, CE^U, CP^U)$$

In the case of overweight and obesity, the total costs of malnutrition by excess (CT^O) are the product of greater healthcare costs (CS^O), especially for chronic diseases linked to this form of malnutrition, the environmental impacts (CA^O) arising from greater consumption of energy during the production and

[6] Percentage of mortality by disease, adjusted for age.

[7] Workplace absenteeism is defined as absence from work owing to illness. Presenteeism or reduced productivity is defined as the inability to work at maximum capacity when workers are present when ill.

transportation of food and during storage, and productivity losses (CP^O) caused by the higher risk of death and the effects on work (presenteeism and absenteeism).

Therefore:

$$CT^O = f(CS^O, CA^O, CP^O)$$

In sum, the total costs of malnutrition are the product of the combined total costs of undernutrition (CT^D) and the total costs of overweight and obesity (CT^O):

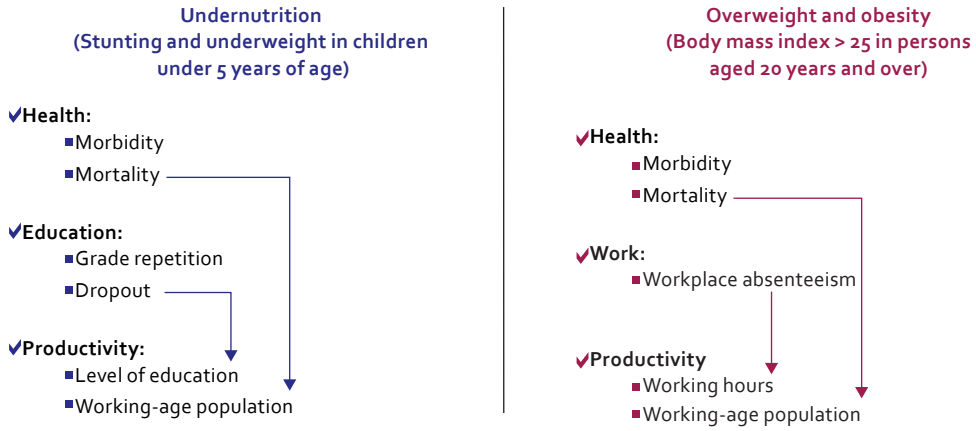
$$CT^M = f(CT^U, CT^O)$$

$$CT^M = f(CS^U, CE^U, CP^U, CS^O, CA^O, CP^O)$$

B. The analysis model

Using the analytical framework and the available data for countries in the region, variables related to health, education and productivity, as summarized in diagram 2,[8] were taken into account for the study on the social and economic impacts of the double burden of malnutrition. While the environmental impacts are also important, they are not included in these cases owing to the difficulty of finding reliable and comparable data for all countries.

Diagram 2
Impacts of the double burden of malnutrition using the analysis model



Source: Prepared by the authors.

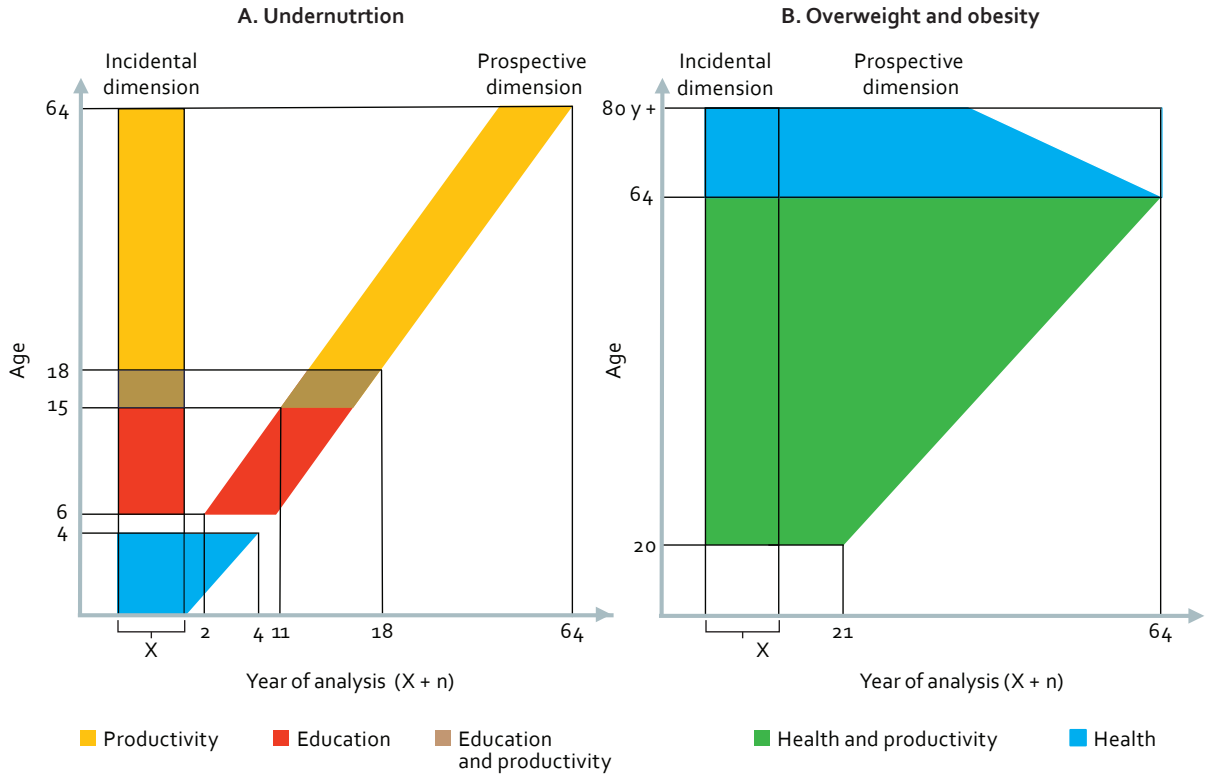
The social and economic impacts observed in a given year are the result of the nutritional profile of each country in previous years. The estimates for the situation of a year of analysis —as case and cost differentials during the period resulting from malnutrition that affects or has affected each country's population— therefore refer to the retrospective incidental dimension. For undernutrition, the health-related costs and impacts for children under 5 years of age who were undernourished in the year of analysis are estimated. For education, the effects of undernutrition experienced during the first five years of life by those currently of school age (6–8 years of age) are estimated, in addition to productivity losses among people of working age (15–64 years of age) who were exposed to undernutrition before their fifth birthday. For overweight and obesity, the consequences experienced in the year of analysis are estimated on the basis of the prevalence among adults aged 20 years and older who have a history of malnutrition.

[8] The studies are based on information available in each country and an inductive approach, i.e. with estimates based on national data, and estimations of differential relative risks based on the literature available worldwide and adapted to the epidemiological, nutritional and socioeconomic realities of each country.

The studies also include projections of the future impact (prospective dimension), which reflect what is estimated to happen to the current population in the coming years if there are no exogenous changes to the trends. This can be used as a basis for estimating the potential savings if the actions needed to achieve nutrition objectives, such as those under the SDGs, are implemented.

Diagram 3 provides a summary of the relationship between the dimensions of analysis and the age of the population among which the various social and economic impacts are measured.

Diagram 3
Age and year when the impacts of malnutrition occur, according to the dimensions of analysis



Source: A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017.

III. Study results

In this section, the main outcomes from the eight country studies carried out in the region on the cost of the double burden of malnutrition are presented. The countries examined are Chile (2014), the Dominican Republic (2017), Ecuador (2014), El Salvador (2017), Guatemala (2018), Honduras (2017), Mexico (2014) and Peru (2019). The first part contains the impacts of child undernutrition; the impacts of overweight and obesity among adults, which are then consolidated and presented by country, are detailed in the second part.[9]

A. Impacts and costs of child undernutrition[10]

As mentioned, the effects of undernutrition among children under 5 years of age are felt throughout the life cycle in three dimensions: health, education and productivity. In the case of health, together with the increase in mortality risks, the most well-recognized impacts on morbidity are the greater likelihood of acute diarrhoeal disease (ADD) and acute respiratory infection (ARI), as well as treatment for undernutrition (low birth weight owing to intrauterine growth retardation, wasting or low weight relative to height).

The burden of mortality among children under 5 years of age from causes linked to undernutrition is estimated to have reached almost 100,000 cases in recent years among the seven countries studied; had these children not suffered from this scourge, they could have been part of the group aged 0–5 years in the respective year of analysis.

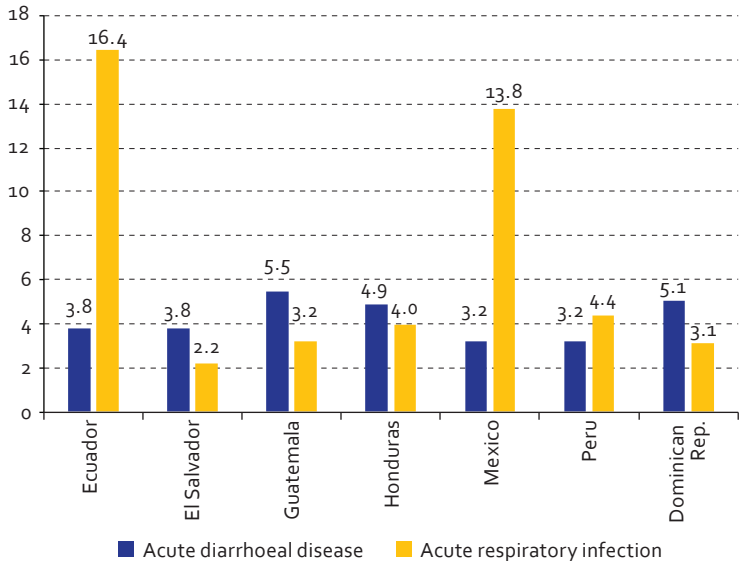
The burden of disease linked to child undernutrition in the year of analysis for each country accounted for a total of almost 80,000 additional cases of ARI and almost 37,500 additional cases of ADD. In view of the different nutritional and epidemiological profiles of countries, these data represent a difference in prevalence among the population that has suffered from undernutrition and the population with a "normal" nutritional status that increases from 3.2% to 5.5% in the case of ADD and from 2.2% to 16.4% for ARI (see figure 4).

[9] Even when all countries are presented together in this report, they are not strictly comparable either in terms of differences in nutritional and epidemiological profiles or social and economic circumstances, because these refer to different study years. For more details of each national study, see Fernández and Martínez (2017); Prost and Martínez (2019a, 2019b, 2020a and 2020b); Mejía and Martínez (2022).

[10] Chile is excluded from this section owing to its low rate of undernutrition (under 2.5%).

Figure 4
Additional prevalence of acute diarrhoeal disease and acute respiratory infection among malnourished population relative to non-malnourished population in year of study, 2014, 2017, 2018 or 2019[a]

(Percentage points)



Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

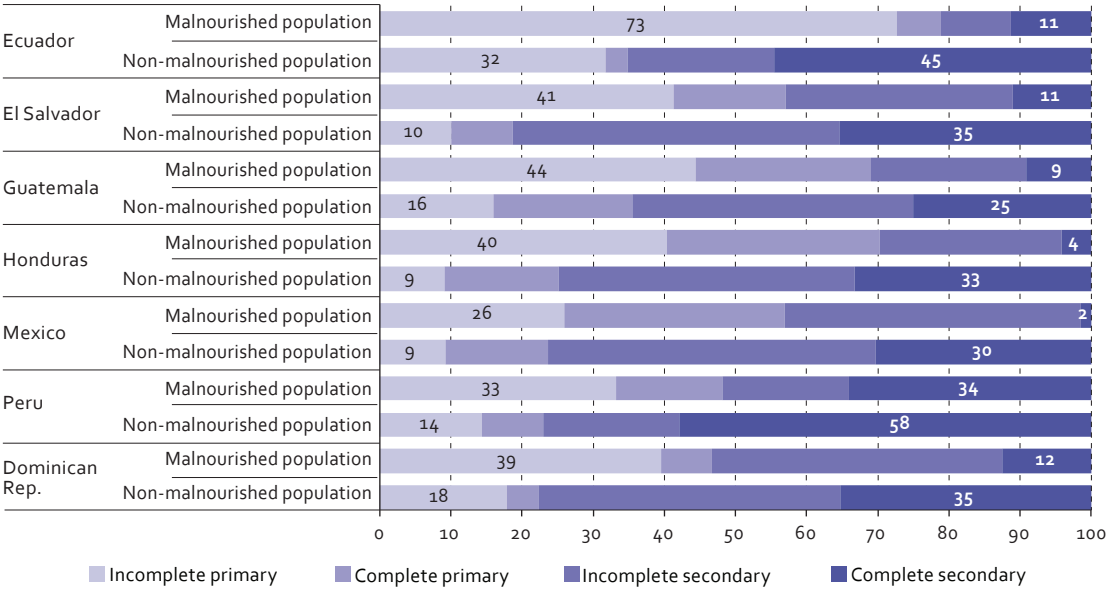
[a] The data and estimates for Ecuador and Mexico refer to 2014, those for El Salvador, Honduras and the Dominican Republic to 2017, those for Guatemala to 2018 and those for Peru to 2019.

In addition to the values indicated, there is the burden of low birth weight owing to intrauterine growth retardation and wasting, which adds almost 83,700 cases and around 74,800 cases, respectively, among the five countries for which data are available.

With regard to the impact of child undernutrition on education, it is estimated that the schooling gap affecting the population suffering from undernutrition accounts for two years of study on average. This average is relatively stable between countries and results in a significantly higher rate of incomplete primary education and a lower level of completed secondary education among those who suffered from undernutrition (see figure 5). The impact differs between countries owing to the specificities of the distribution of the level of schooling in each country.

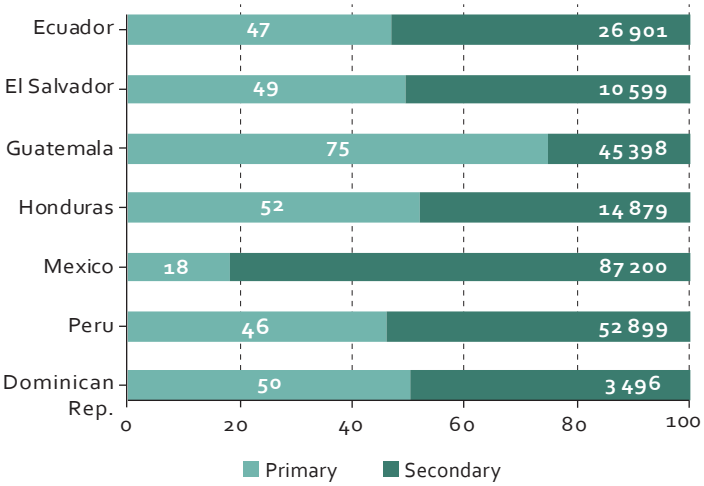
A loss of 241,373 years of study resulting from grade repetition during the year of analysis can be added to the above. As shown in figure 6, in most of the countries studied, the distribution of grade repetition is relatively similar across educational levels, with the exceptions of Guatemala and Mexico; in Guatemala, there is a higher proportion of cases in primary education and in Mexico, there is a higher proportion in secondary education.

Figure 5
Level of schooling of population aged 20–64 in year of study, 2014, 2017, 2018 or 2019[a]
(Percentages)



Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.
[a] The data and estimates for Ecuador and Mexico refer to 2014, those for El Salvador, Honduras and the Dominican Republic to 2017, those for Guatemala to 2018 and those for Peru to 2019.

Figure 6
Distribution of burden of grade repetition linked to stunting by level of education in year of study, 2014, 2017, 2018 or 2019[a]
(Percentages and total number of cases)



Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.
[a] The data and estimates for Ecuador and Mexico refer to 2014, those for El Salvador, Honduras and the Dominican Republic to 2017, those for Guatemala to 2018 and those for Peru to 2019.

The economic costs and losses arising from the above-mentioned social consequences of child undernutrition are estimated to total between US$ 500 million and almost US$ 22 billion in the year of analysis for the seven countries studied. On average, these costs account for 5% of the respective annual GDP of each country, a value that ranges from 0.7% of GDP for the Dominican Republic in 2017 to 11.1% of GDP for Guatemala in 2018 (see table 1).

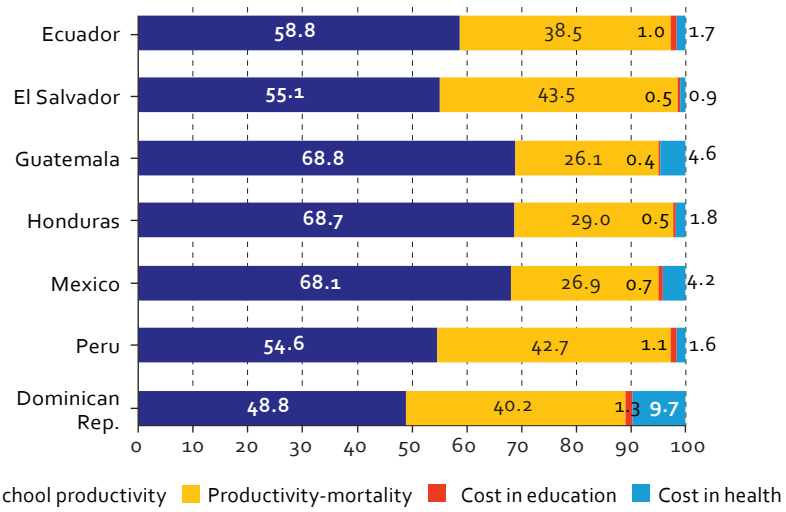
Table 1
Costs of undernutrition in year of study, 2014, 2017, 2018 or 2019
(Millions of dollars at current prices and percentages of GDP)

	Ecuador 2014	El Salvador 2017	Guatemala 2018	Honduras 2017	Mexico 2014	Peru 2019	Dominican Republic 2017
Health cost	44	16	381	36	907	103	48
Educational cost	27	9	32	10	151	75	6
Loss of productivity	2 529	1 680	7,808	1,959	20 458	6 385	445
Mortality	1 001	742	2 148	581	5 796	2 801	201
Schooling	1 528	939	5 659	1,378	14 662	3 584	244
Total cost	**2 599**	**1 705**	**8 220**	**2 005**	**21 516**	**6 562**	**500**
Percentage of GDP	**2.6**	**6.9**	**11.1**	**8.8**	**1.7**	**2.9**	**0.7**

Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

Analysis of the distribution of costs associated with undernutrition reveals that the vast majority concern productivity losses. An average of 64.9% of costs therefore arise from the lower potential productivity created by educational gaps and 30.8% stem from the mortality rate. Meanwhile, the average cost is 3.6% for the health system and 0.7% for the education system (see figure 7).

Figure 7
Distribution of costs of undernutrition, in year of study, 2014, 2017, 2018 or 2019[a]
(Percentages)



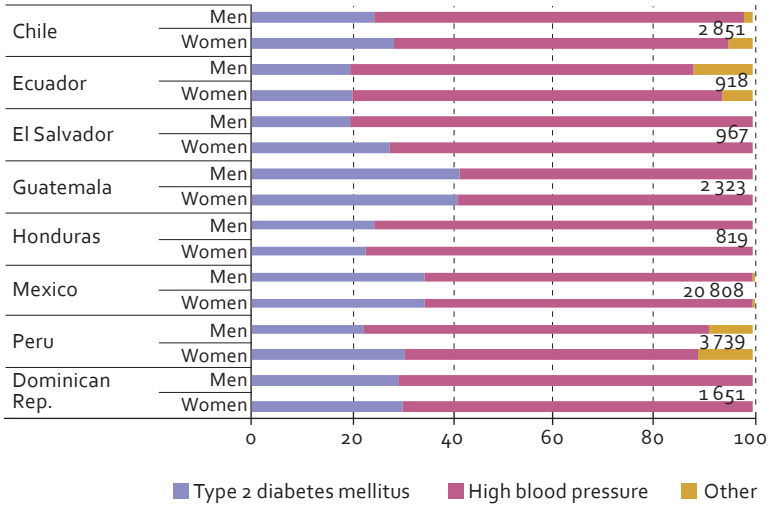
Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.
[a] The data and estimates for Ecuador and Mexico refer to 2014, those for El Salvador, Honduras and the Dominican Republic to 2017, those for Guatemala to 2018 and those for Peru to 2019.

B. Impacts and costs of overweight and obesity among adults

In line with the above-described model of analysis, this section provides estimates of the social impacts of overweight and obesity among people aged 20 years and over in eight Latin American countries, in particular in relation to health and productivity.

With regard to health impacts, the information gathered shows that the burden of disease arising from causes related to overweight and obesity are mainly expressed through the presence of 10.9 million additional cases of type 2 diabetes mellitus and 22.5 million additional cases of high blood pressure, as well as an extra burden of 601,000 cases of certain types of cancer and other pathologies.[11] As shown in figure 8, on average, the proportion of these additional cases among men and women is similar, but there is some heterogeneity between countries, notably a relatively higher burden of type 2 diabetes mellitus among women in Chile, El Salvador, Guatemala and Peru compared to high blood pressure, which remains the greatest burden of associated morbidity in all countries.

Figure 8
Distribution of burden of disease, by sex, in year of study, 2014, 2017, 2018 or 2019[a]
(Percentages and total number of cases in thousands)



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[a] The data and estimates for Chile, Ecuador and Mexico refer to 2014, those for El Salvador, Honduras and the Dominican Republic to 2017, those for Guatemala to 2018 and those for Peru to 2019.

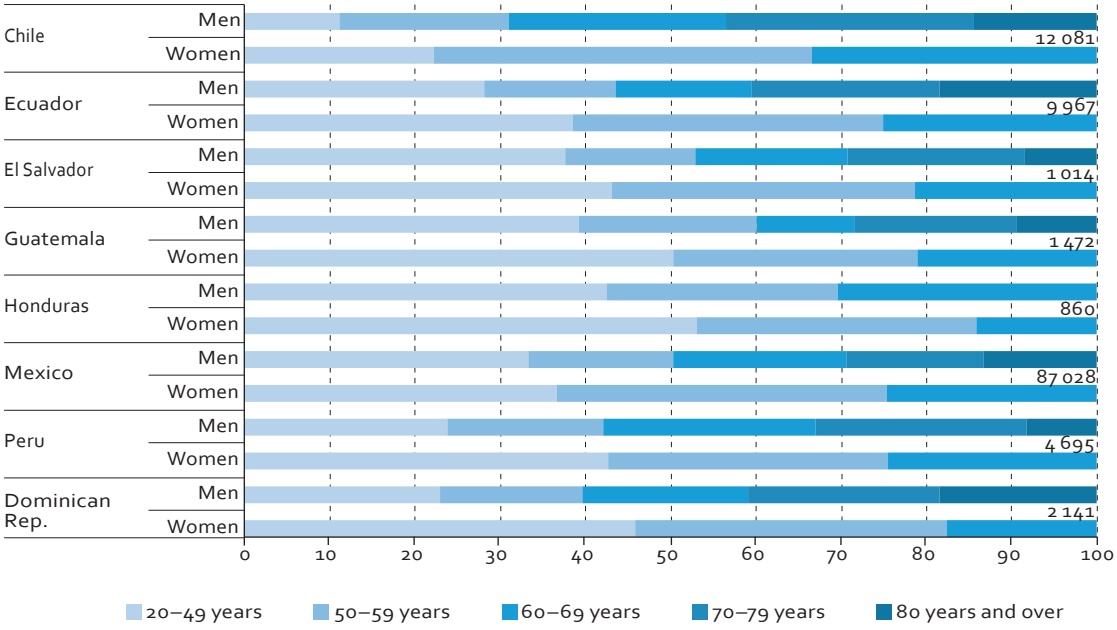
Workplace absenteeism arising from the burden of disease across all countries is estimated to have amounted to 103.3 million lost working days during the year of analysis, with more than half of those (52%) the result of high blood pressure, followed by type 2 diabetes mellitus (39%) and other related diseases (10%).

The burden of mortality resulting from obesity-related causes totalled 119,258 additional deaths across the eight countries, with men accounting for 72% of these deaths. Regarding the age range, as shown in figure 9, almost a third of cases in the eight countries concerned those under 50 years of age (32%), a proportion that increases significantly in Central American countries. Moreover, among 50–70-year-olds, the proportion of these related deaths accounts for 45% of the total cases, which is

[11] These pathologies only refer to data provided by Chile, Ecuador, Mexico and Peru.

higher in relative terms in South American countries and the Dominican Republic. It should also be noted that, according to the accumulated evidence, overweight and obesity do not create a greater risk of death among women aged 60 years and over.

Figure 9
Burden of mortality by age range and sex in the year of study, 2014, 2017, 2018 or 2019[a]
(Percentages and total number of cases)



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[a] The data and estimates for Chile, Ecuador and Mexico refer to 2014, those for El Salvador, Honduras and the Dominican Republic to 2017, those for Guatemala to 2018 and those for Peru to 2019.

Analysis of the health costs arising from malnutrition by excess shows that they have a significant economic impact, in both the public and private sectors of the healthcare system. Costs for the public healthcare system range from US$ 385 million to US$ 6.4 billion in the countries analysed. On average, the cumulative cost of additional cases of high blood pressure amounts to 48%, with this pathology accounting for 67% of cases linked to the obesity-related disease burden. Meanwhile, 47% of costs stem from treatment for type 2 diabetes mellitus, even though the related burden of disease is only 32%. Other pathologies, primarily some types of cancer, account for an average of 5% of the remaining costs.

Roughly 53% of health costs are linked to care for women, a proportion equivalent to the share of women in the burden of related diseases.

As shown in table 2, total public and private healthcare costs relative to GDP range from 0.15% in Chile to 5.03% in Guatemala, while relative to public spending, these costs range between 3.6% and 453.6%, respectively. In Guatemala, the costs are therefore equivalent to 4.5 times the total amount of resources allocated by the central government to cover healthcare and prevention, which is almost 1.3 times the expenditure in El Salvador and 0.9 times that in Ecuador.

Table 2
Overweight and obesity-related healthcare costs, relative to GDP and public social spending on health in the year of study, 2014, 2017, 2018 or 2019
(Millions of dollars at current prices and percentages)

		Countries							
		Chile 2014	Ecuador 2014	El Salvador 2017	Guatemala 2018	Honduras 2017	Mexico 2014	Peru 2019	Dominican Republic 2017
Public system costs	Millions of dollars	330	1 497	586	3 596	115	6 134	1 106	1 128
Private costs	Millions of dollars	55	126	218	121	168	297	606	289
Total healthcare costs	**Millions of dollars**	**385**	**1 623**	**805**	**3 717**	**283**	**6 431**	**1 712**	**1 416**
	Percentage of GDP	**0.15**	**1.61**	**3.24**	**5.03**	**1.24**	**0.50**	**0.75**	**1.86**
	Percentage of public spending on health	**3.6**	**90.5**	**126.7**	**453.6**	**41.9**	**18.4**	**29.6**	**111.5**

Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

The loss of productivity arising from overweight and obesity is based on two components: premature mortality and workplace absenteeism. Premature mortality in the countries studied, in the respective year of analysis, generated related costs of around US$ 2 million in Honduras, El Salvador and the Dominican Republic, and more than US$ 350 million in Mexico. In addition, workplace absenteeism points to an estimated total of US$ 33 million and US$ 685 million in Chile and Peru, respectively (see table 3).

Table 3
Total costs associated with overweight and obesity in the year of study, 2014, 2017, 2018 or 2019
(Millions of dollars)

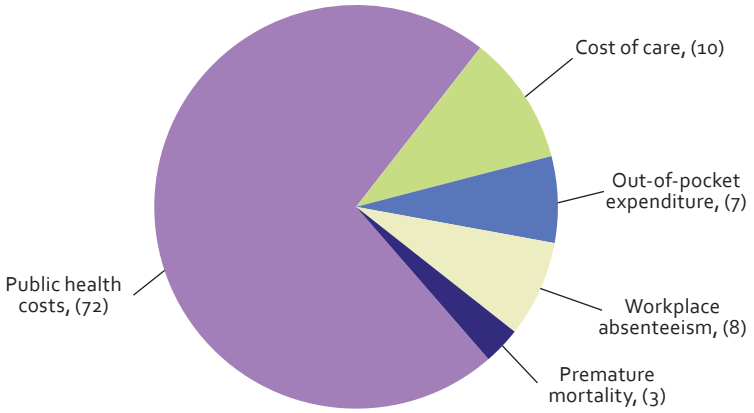
	Countries							
	Chile 2014	Ecuador 2014	El Salvador 2017	Guatemala 2018	Honduras 2017	Mexico 2014	Peru 2019	Dominican Republic 2017
Healthcare cost	385	1 623	805	3 717	283	6 431	3 317	1 416
Public	330	1 497	586	3 596	115	6 134	2 606	1 128
Private	55	126	218	121	168	297	711	289
Loss of productivity	108	123	50	97	53	883	706	45
Mortality	75	37	2	5	2	354	21	2
Absenteeism	33	87	47	92	51	529	685	43
Total cost	**493**	**1 746**	**855**	**3 814**	**336**	**7 314**	**4 022**	**1 461**
Percentage of GDP	**0.19**	**1.73**	**3.4**	**5.2**	**1.5**	**0.56**	**1.8**	**1.9**

Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

In the countries studied, the greatest loss of productivity occurs among men, which is explained both by the higher burden of mortality described in the section on impacts and by the gaps in workplace participation and wages that affect women, which generate differential alternative costs. The greatest losses are recorded among older age groups, particularly among persons aged 50–59 years, essentially because of the related burden of mortality increases at those ages.

As shown in table 3, the cost for the public healthcare system accounts for the largest share of the total cost in the eight countries. On average, the public health system accounts for 72% of the total costs linked to overweight and obesity, followed by the private costs linked to treatment and out-of-pocket spending, which jointly amount to 17% of the total. The costs related to productivity losses represent an average of 11% of additional costs. This distribution reveals an important difference compared to undernutrition, where the majority of costs are incurred through lost productivity (see figure 10).

Figure 10
Average distribution of overweight and obesity-related costs in the year of study, 2014, 2017, 2018 or 2019
(Percentages)



Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

C. Aggregated costs of the double burden of malnutrition

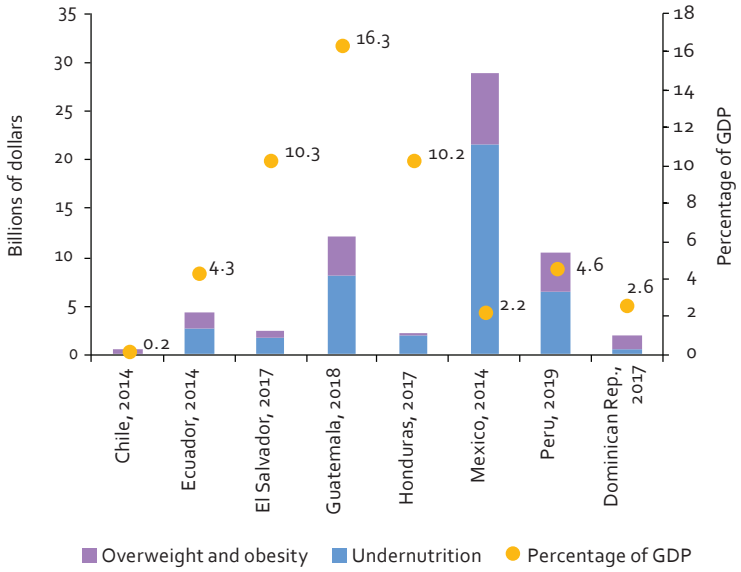
Adding the costs related to undernutrition among children under 5 years of age and those related to overweight and obesity among adults aged 20 years or over, the double burden of malnutrition is linked to a total cost that, in 2014, reached US$ 493 million in Chile and US$ 28.83 billion in Mexico. When these amounts are compared with each country's GDP for the relevant year, the greatest relative share was in Guatemala, where the estimated costs were equivalent to 16.3% of GDP in 2018, followed by El Salvador and Honduras in 2017, where they accounted for 10.3% and 10.2% of GDP respectively (see table 4 and figure 11). This reveals the high relative cost of the double burden of malnutrition in Central American economies, whose levels of hunger and poverty are among the highest in the region.

Table 4
Costs of the double burden of malnutrition in the year of study, 2014, 2017, 2018 or 2019
(Millions of dollars and precentages of GDP)

	Countries							
	Chile 2014	Ecuador 2014	El Salvador 2017	Guatemala 2018	Honduras 2017	Mexico 2014	Peru 2019	Dominican Republic 2017
Undernutrition	-	2 599	1 705	8 220	2 005	21 516	6 562	500
Overweight and obesity	493	1 746	855	3 814	336	7 314	4 023	1 461
Total cost	**493**	**4 345**	**2 559**	**12 034**	**2 341**	**28 830**	**10 585**	**1 961**
Percentage of GDP	**0.19**	**4.31**	**10.3**	**16.3**	**10.2**	**2.2**	**4.6**	**2.6**

Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/ World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

Figure 11
Costs of the double burden of malnutrition in the year of study, 2014, 2017, 2018 or 2019
(Billions of dollars and percentages of GDP)



Source: Prepared by the authors, on the basis A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

As shown in the above figure, undernutrition accounts for the largest share of costs in six of the eight countries studied, ranging between 60% and 82% of the total. The exceptions are Chile, which has managed to win the fight against child undernutrition, and the Dominican Republic, which has seen a nutritional transition in which, while stunting affects only 6.7% of children under 5 years of age, obesity affects 38.1% of adult women (over 18 years of age) and 25.0% of adult men.

In the absence of suitable public policy measures, the costs estimated here are those incurred by the countries studied in the year of analysis, which cannot be reversed and, furthermore, will continue

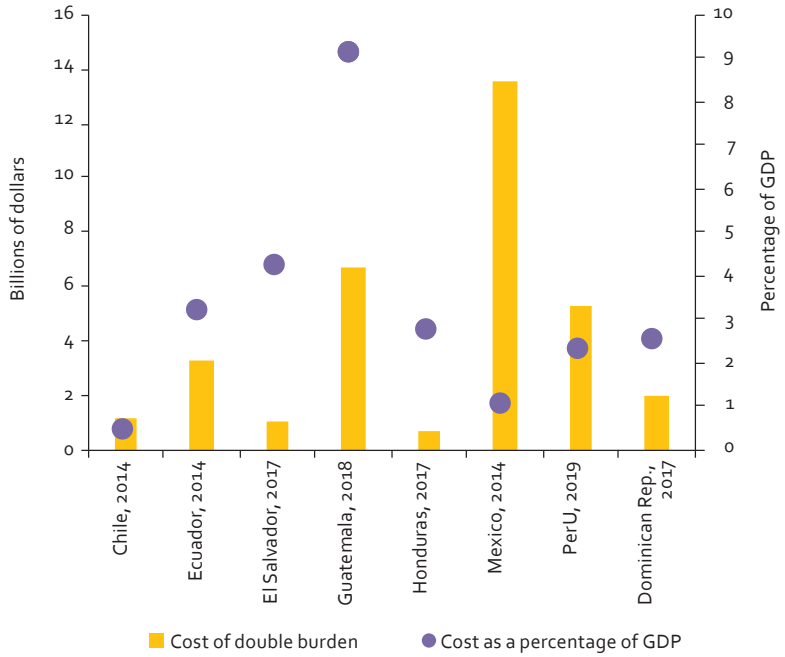
to be generated in the future and additional costs will be added if future generations are not protected from undernutrition. As a counterpoint to the costs arising from malnutrition throughout the life cycle in the main three impacts analysed in this report, it is important to consider the savings that would be made through early interventions, harnessing the 1,000-day window of opportunity for mothers and children from pregnancy onward to achieve the Goals under the 2030 Agenda for Sustainable Development.

D. Future costs and potential savings

Up to this point, the year-on-year costs borne by countries as a result of the impacts of child undernutrition and overweight and obesity in adults have been presented. In the future, in the absence of effective policy actions that take this scourge into account, these costs will continue to be incurred. There are associated costs that are irreversible owing to the chronic nature of some of the effects already felt among the population, but work can be done to combat others so as to reverse their economic impacts, while also guaranteeing the right to food and to health. The equivalent annual future costs could therefore be converted into concrete savings for countries if the targets of Sustainable Development Goal 2 —to end hunger in all its forms by 2030— are achieved.

Bearing in mind the projected population growth of the cohorts in each component of the study (0–4 years of age for undernutrition and 20 years of age and over for overweight and obesity), in the respective year of analysis for each country, the failure to develop effective and efficient policies to address current nutritional conditions would result in cumulative additional costs equivalent to 15 times the current total for all the countries studied, with annual costs equivalent to between US$ 1.049 billion and US$ 13.600 billion.[12] These values, in turn, represent the potential annual savings if each of the countries studied successfully reverses the trends of the double burden of malnutrition (see figure 12).

Figure 12
Latin America (8 countries): projected future costs of the double burden of malnutrition
(Equivalent annual cost in billions of dollars and percentages of GDP)



Source: Prepared by the authors, on the basis of A. Fernández and R. Martínez, *The cost of the double burden of malnutrition: social and economic impact. Summary of the pilot study in Chile, Ecuador and Mexico*, Economic Commission for Latin America and the Caribbean (ECLAC)/World Food Programme (WFP), 2017; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. El Salvador*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. República Dominicana*, ECLAC/WFP, 2019; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Guatemala*, ECLAC/WFP, 2020; M. Prost and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Honduras*, ECLAC/WFP, 2020; and C. Mejía and R. Martínez, *El costo de la doble carga de la malnutrición: impacto social y económico. Perú*, ECLAC/WFP, 2022.

[12] Estimate made using net present value and equivalent annual cost, with a reduction rate of 3% over a horizon of 64 years, representing the period in which younger people will cease to be part of the working-age population.

IV. Policy alternatives

The national teams that participated in the studies summarized here actively contributed to the discussion on public policy proposals to address the double burden of malnutrition in the respective countries, taking individual realities into account. In this section, some of the proposals made will be presented and detailed, alongside alternatives to be included in international discussions.

The starting point for the policy agenda is achieving a holistic approach, with a model based on intersectoral coordination and a long-term perspective, complementing action from different areas that contribute to food and nutrition security and the mitigation of vulnerabilities or their impacts. Basic measures of note include:

i) Address malnutrition in all its forms. In view of the nutrition transition in Latin American and Caribbean countries, malnutrition cannot be addressed through piecemeal approaches, but by refocusing attention on the double burden of malnutrition, taking various anthropometric and biochemical indicators into account. It is essential to design dual-purpose policies to address the double burden of malnutrition effectively and sustainably.

ii) Take a multi-causal approach. Recognize the influence of different factors related to food, health, the economy, education, culture and the environment. Of these, social inequality emerges as a major factor that often worsens the situation. A single perspective is not enough; stakeholders from different sectors must come together to address the problem of malnutrition, harness synergies between sectors and maximize the impact of action. Furthermore, malnutrition must be visualized in the context of food and nutrition security, with consideration of food systems in relation to social protection, health and education systems, climate change and environmental sustainability.

iii) Strengthen structural policies. Ensure access to drinking water, sewage, water treatment and energy; strengthen formal and informal education; expand primary healthcare, especially care focused on maternal and child health (the critical first 1,000 days) with promotion of maternal breastfeeding, and on older persons.

iv) Design and implement government policies. The aims of putting an end to poverty and hunger, as enshrined in Sustainable Development Goals 1 and 2, provide a global strategic framework for countries in the region. These refer to a human right, while also constituting a strategic investment with important benefits for the whole of society and the environment;

this calls for wide-ranging and sustainable decisions over time. Ending poverty, hunger and malnutrition will not only improve the quality of life of the most vulnerable people; it will also strengthen their resilience and economic and social stability.

v) Foster strong institutional frameworks and sustainable policies. Given the nature of the problem, there is need of policies that last. For many public policies, no significant impact of implementation is seen before one or two generations have passed. Hence, a robust institutional framework in terms of legal basis, organizational model, intersectoral coordination, technical and operational capacities and financial structure is required. There is need of regional progress on information, evaluation and monitoring systems to improve decision-making and ensure the effectiveness, efficiency and sustainability of policies.

vi) Strengthen multisectoral monitoring and accountability mechanisms. It is essential to promote a culture of transparency and accountability, in which civil society can access and understand policy design, implementation and evaluation processes. This will facilitate social monitoring and the follow-up of policies to ensure their proper implementation.

vii) Highlight the role of the individual. Although there are large population groups with few options for financing a healthy diet, individual decision-making also plays a key role. It is important to foster informed decision-making among individuals to encourage healthy lifestyles, together with structural measures that make such lifestyles a viable option.

viii) Involve civil society. To guarantee the effectiveness, transparency and legitimacy of policies to address the double burden of malnutrition, it is crucial to establish robust mechanisms for the participation of civil society in design, implementation and follow-up.

Among the specific policies to strengthen the integration of food, health, education and social protection systems to address the double burden of malnutrition, the following are noteworthy:

i) Promotion of sustainable and diversified agriculture. Strengthen environmentally friendly agricultural practices that advance the production of nutritional and varied foodstuffs. Including fruits, vegetables, whole grains and lean proteins. This may be achieved through incentives for family farms or the promotion of sustainable methods of agriculture through access to resources and training.

ii) Support for local and sustainable production and distribution of foods. Implement policies that encourage the local production of nutritional and sustainable foodstuffs, and facilitate access to them among rural and urban communities. This may include local public procurement programmes, support for farmers' markets and the promotion of short supply chains. Moreover, small-scale farmers should be supported through the implementation of environmentally friendly agricultural practices. This may include tax incentives, access to resources and technical capacity-building.

iii) Investment in research and innovation in food. Invest in the research and development of food technologies that facilitate the production of nutritional, accessible and culturally appropriate foodstuffs. This may include the development of fortified foods consumed on a wide scale and the promotion of processing practices for healthy foods.

iv) Promotion of education on nutrition for a healthy life. Integrate educational programmes on nutritional and healthy eating into schools and communities, with the aim of raising awareness of the importance of a balanced diet that includes fruits and vegetables, and highlighting the risks associated with the excessive consumption of ultraprocessed foods.

v) Regulation of food advertising and labelling. Establish regulations that limit the availability and promotion of unhealthy foodstuffs, such as processed foods, sugary drinks and foods with high levels of sugars, saturated fats and salt. This may include policies on clear labelling, restrictions on the advertising of unhealthy foods and regulations on food composition.

vi) Promotion of healthy food environments. Develop policies that promote healthy food options in kiosks, canteens, restaurants and fast-food establishments. In addition, place particular emphasis on the availability of drinking water and encourage physical activity.

vii) Expand the response capacity of primary healthcare. Increase the capacities of health services to include programmes on the prevention, detection and treatment of malnutrition, with the involvement of community workers. More holistic action with a focus on the entire life cycle may also involve expanding and strengthening effective interventions made from the first 1,000 days of life by incorporating the double burden of malnutrition and dual-purpose actions.

viii) Strengthen nutritional surveillance. Implement nutritional surveillance systems that regularly monitor the nutritional status of the population and make it possible to identify trends and groups at greater risk of malnutrition. The aim of this is to plan and evaluate effective action.

ix) Ensure food and nutrition security. Food programmes should be developed and maintained with the delivery of foods relevant to the entire life cycle, such as through national supplementation and strengthening programmes, conditional cash transfer programmes and community kitchens, in line with national and local requirements. There must be a particular emphasis on children and older persons.

x) Social protection throughout the life cycle. Experience shows that it is essential to ensure sufficient income to access required foods, with an emphasis on the sectors of the population more vulnerable to food and nutrition insecurity throughout the region. This calls for an approach based on resilience that makes it possible to address long-standing needs and take a preventive and adaptive approach to the effects of disasters, which are increasingly frequent and varied in the region. Cash transfer amounts must be adjusted to enable families to obtain nutritious and varied foodstuffs, ensuring that they have an adequate diet that will prevent undernutrition, as well as overweight and obesity.

Such policies are not easy to implement. Policymakers and legislators may face opposition from sectors that may be affected by regulations focused on the availability of unhealthy food. For example, the food industry may resist measures that limit advertising and regulate the labelling of ultraprocessed foods. However, such public policies act as a basis for public-private partnerships that boost innovation focused on improving the availability of varied and nutritious diets, especially through small-scale and medium-scale actors. Meanwhile, the implementation of conditional cash transfer programmes with nutrition components may require an increased allocation of resources and encounter resistance from other sectors in view of currently limited fiscal space. Despite this, it should be noted that laws and regulations based on a public policy focused on improving the accessibility and availability of healthy diets are already being implemented in various countries in the region. This shows that it is possible to address these challenges, but implementing these policies in a comprehensive and sustainable manner calls for policy decisions and effective inter-institutional coordination.

It is also important to highlight the long-term benefits of these policies, not only in terms of public health, but also in terms of the cost reductions related to medical care for malnutrition-related diseases, as described in this document, and increased productivity and economic development. In order to highlight these benefits, robust evidence of the effectiveness of these policies must be shown by monitoring and evaluating public policies and interventions that are capable of ensuring quality over the medium and long term. To that end, strengthening the institutional framework of the public sector is critical.

In sum, while implementing policies to address the double burden of malnutrition may be a challenge, it is possible to achieve with strong policy decisions, effective coordination between relevant stakeholders and institutions, and strategic communication that highlights the urgent need for action and the resulting social, economic and environmental benefits.

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The countries of Latin America and the Caribbean are in the midst of a demographic, epidemiological and nutritional transition, as rates of life expectancy, population ageing and chronic diseases are on the rise and there is a marked shift from undernutrition to a combination of the latter with overweight and obesity. Beyond the social impact of this process and the infringement of the rights of those affected by it, there are significant economic costs for society at large. To address these transitions and ensure the right to food and nutrition security for the entire population, evidence-based proposals that make it possible to identify challenges, find public policy opportunities and quantify the desired impacts are therefore essential. This document summarizes the main results of studies on the cost of the double burden of malnutrition carried out in eight countries of the region, as part of the cooperation project between the Economic Commission for Latin America and the Caribbean (ECLAC), the World Food Programme and the governments of the participating countries. It highlights some of the major public policy proposals on food and nutrition security to achieve the targets of Sustainable Development Goal 2 of the 2030 Agenda for Sustainable Development, to end all forms of malnutrition.

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