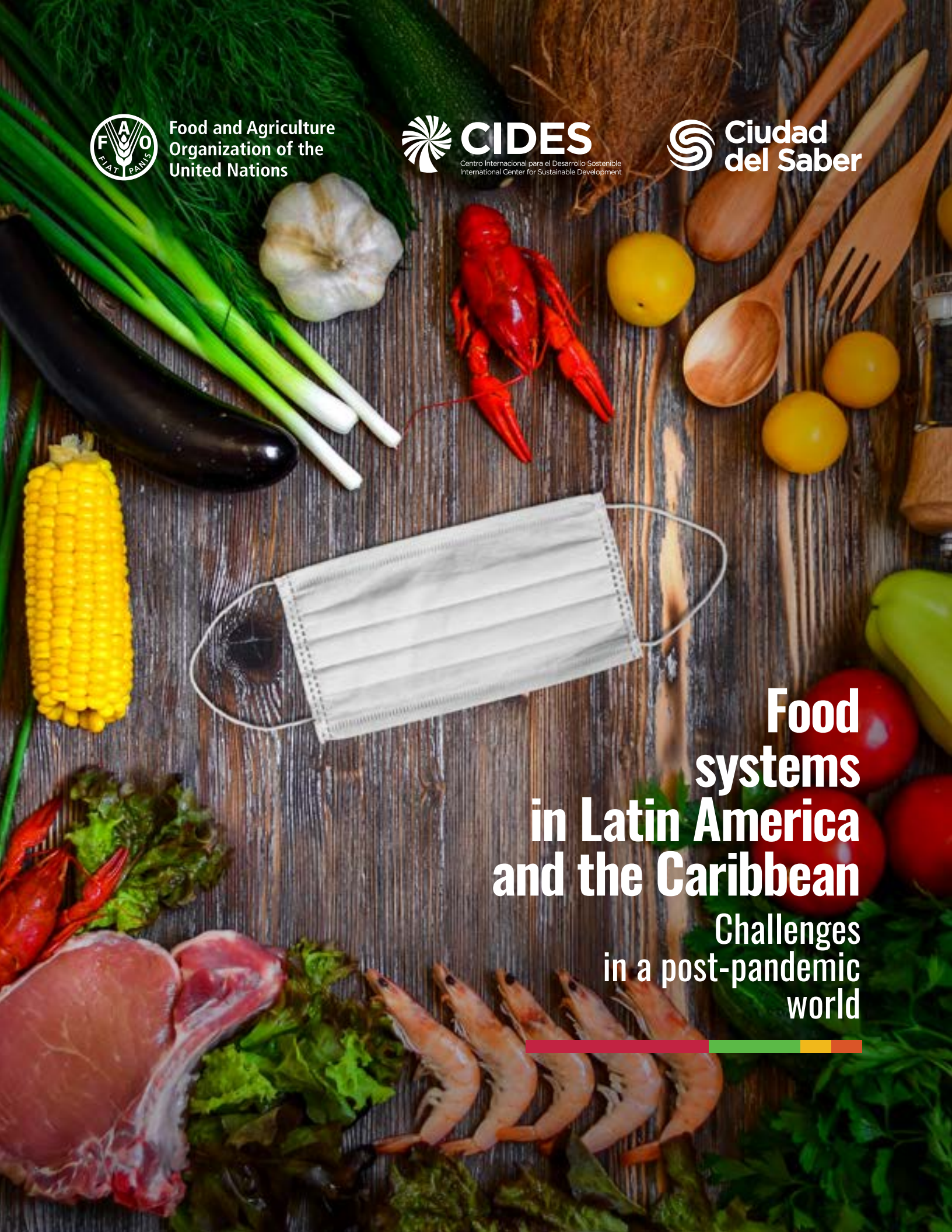

Food and Agriculture Organization of the United Nations

CIDES
Centro Internacional para el Desarrollo Sostenible
International Center for Sustainable Development

Ciudad del Saber

Food systems in Latin America and the Caribbean

Challenges in a post-pandemic world

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AUTHORS:

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FOREWORD

Our ancestors began colonizing the planet around 70 000 years ago. They were driven by the search for what we today refer to as food security. It was undoubtedly a very limited sense of food security: the need to obtain food that would provide them with enough energy to survive from one day to the next.

Nowadays, food security is something more complex. For nearly 700 million of our fellow humans, having access to minimal energy remains their daily need. Two billion people do not know if they will be able to have enough food at any given time and must frequently reduce the quantity or quality of what they eat. Three billion people – almost four out of every ten inhabitants in the planet – do not have the means to eat healthy. Additionally, it turns out that food, and the agriculture that produces it, play a significant role in some of the most serious manifestations of the environmental and climate crisis of our time. It is no longer just a question of the degree of access to food, but of the way it is produced, processed, transported, traded and consumed, and of its planetary effects. All this creates a new notion of food security in the 21st century.

There is a very dynamic process going on at the regional level, from which some consensus on agrifood systems are gradually emerging. No one can deny that the postwar development of these systems in Latin America and the Caribbean (LAC) has been lavish in the benefits it has brought to our peoples. They are sources of employment and opportunity for tens of millions of people, starting with family farmers and artisanal fishermen. They are spaces in which prodigious scientific and technological innovations are expressed. They are manifestations of the fabulous gastronomic cultures of our peoples. The development of agrifood systems in the region has contributed significantly – and continues to do so – to the economic growth of the countries that comprise it. Through its enormous net food exports, the region is a pillar of global food security.

Together with all this we have the undesirable consequences of the way in which agrifood systems have developed in LAC. While food is exported to all corners of the globe, 204 million people in the region live under moderate or severe food insecurity, and one in four adults suffers from obesity. It is more than likely that the pandemic will aggravate both these indicators of malnutrition, since the lack of employment or income, and the disruption of key programmes such as school feeding, will push millions towards cheaper and less nutritious food, or to a condition in which they will not be able to fully satisfy their food needs.

Along with the prosperity derived from increased agricultural production and productivity, a quarter of the rural population lives in extreme poverty. Furthermore, 80% of agricultural workers hold informal jobs.

While the region has achieved the difficult task of declaring 23.6% of land areas and 18.1% of marine areas as protected, it is also true that agrifood systems are, to some extent, jointly responsible for 89% of the species lost between 1970 and 2014. Additionally, agriculture, in a broad sense, contributes more than half of the greenhouse gases emitted in the region.

The construction of a sustainable equation between economic prosperity, social inclusion and well-being, human health, and the environmental and climatic footprint of food systems is the central challenge faced by agrifood public policy in the region. This has been acknowledged by specialized organizations such as FAO and the World Bank, and I also believe it to be an ethical imperative.

A book could hardly be timelier than this one. It reaches its readers as the world prepares for the Food Systems Summit, convened by the Secretary-General of the United Nations, António Guterres:

> "The Summit will awaken the world to the fact that we all must work together to transform the way the world produces, consumes and thinks about food. It is a summit for all, wherever we are, a summit of the peoples. It is a summit for everyone everywhere – a people's summit. It is also a solutions summit that will require everyone to take action to transform the world's food systems." (United Nations, 2020).

The authors of this book delve into the diagnoses, but above all, they propose solutions, conceived from the Latin American and Caribbean experience, in dialogue with the vast and sometimes cacophonous world debate on agriculture and food. These are not simple or univocal solutions, because unfortunately, the nature of the issue calls for strategies that cover different dimensions and engage all segments of our societies.

For instance, if we agree that the environmental sustainability and climate resilience of agrifood systems are desirable goals, and that they are also attributes for competitiveness in world markets, then we have no choice but to discover – by thinking and doing – the way to build more fruitful dialogues between agricultural and environmental authorities, and determine which are the institutional and technological innovations that will allow us to be more productive with a smaller environmental and climate footprint.

The same is true if we acknowledge that poor diets today are a leading cause of disease and mortality in the region, and that, therefore, we need to regain the balance in the timeless equation between food and health. We want to continue enjoying low-cost food so that everyone can access it – food that is safe, convenient, and easy to prepare by people who are short on time –, but we urgently need it to be nutritious and healthy food.

Is this easy? No. Is there an alternative path? I think not. We have no choice. Like our ancestors 70 thousand years ago, we must once again make our own long journey through this new and more complex food security. This book makes a valuable contribution to this endeavour, one that is worth betting on and committing to.

Julio A. Berdegué

FAO Assistant Director-General
and Regional Representative
for Latin America and the Caribbean

INTRODUCTION

For the International Centre for Sustainable Development (CIDES) and the City of Knowledge Foundation (FCDS), the alliance with the Food and Agriculture Organization of the United Nations (FAO) constitutes a space to strengthen sustainable nutrition culture and raise regional awareness about the importance of its integration into the public and territorial policies of Latin American and Caribbean countries. In the case of Panama – the work base of CIDES/FCDS and the FAO Subregional Office for Mesoamerica –, cooperation between our institutions has been decisive in the organization and development of the National Conferences on Sustainable Development (ENADES), as well as in the processes of formulation and implementation of public policies on food and nutritional security.

The Letter of Agreement for the provision of services to examine trends in Agriculture and Food Systems in Latin America and the Caribbean towards 2030 stems from this spirit of cooperation. It establishes the framework for the publication of this book.

The book has been prepared by authors from different international organizations – including FAO, IFPRI, UNCTAD and ECLAC, as well as legislators and academics from prestigious Latin American universities – seeking to foster reflections for the Global Food Systems Summit, to be held in September 2021. It contextualizes the region's food systems within a post COVID-19 pandemic scenario and raises new challenges (and opportunities)

for policy makers, decision makers, the private sector, and the general public. Likewise, it offers important reflections on sustainability, from production to consumption, with the call to promote better governance of the global and regional food system. In order to face what some authors have deemed "the Syndemic of the century", the participation of companies, research centres, academia, NGOs, government agencies and international organizations will be necessary.

We reiterate our gratitude to the authors and editors of this publication. We hope that it becomes a reference for the formulation of food policies in the countries of the region.

Good reading to all.

Juan Moreno Lobón
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1
THE TRANSFORMATION OF FOOD SYSTEMS: A PLANETARY CHALLENGE

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and Former Director General of FAO.

1.1 BACKGROUND

At the end of February 2020, a group of specialists convened by CIDES (International Centre for Sustainable Development) and FAO met in Panama City for a Workshop on food systems. Their objective was to discuss new trends in food systems and establish the possible scope and contents of a flagship publication for Latin America and the Caribbean (LAC) on the topic. This publication would be aimed at facilitating decision-making by governments, private sector entities, and organizations linked to the agrifood sector, as well as facilitating FAO technical cooperation to countries and their contribution to achieving the SDGs.

At the time, the coronavirus was starting to spread throughout the world, but the WHO was still reluctant to declare a pandemic. However, by the end of March the virus was already present on all continents, including Latin America and the Caribbean.

As the expected impact of the pandemic on Food and Nutritional Security (FNS) was not clear at the time,[1] international organizations issued a series of recommendations encouraging countries to avoid taking measures that could further aggravate the situation and the impact of the health crisis on poverty and food security. Our decision was to maintain the terms of reference sent to the participating authors, asking them to include in their articles, if possible, a few analyses of the measures taken by governments in response to the crisis unleashed by the coronavirus, emphasizing on the implications of such measures on food systems. As can be seen from the texts published herein, this guidance has resulted in the different approaches seen in the works that make up this book.

[1] See Chapter 2, *The Impact of the COVID-19 Pandemic on the Supply and Demand of Food Products in Latin America and the Caribbean*, by Mario Jales.

This introductory chapter will first address some fundamental issues – within the context of FNS – being discussed on the international agenda before the pandemic and, particularly, refer to a handful of key publications that drew attention to the importance of transforming food systems within the framework of the Sustainable Development Goals (SDGs). Next, some of the changes in public policies implemented by LAC countries in response to the pandemic will be highlighted. The chapter ends with the theoretical framework used to structure the publication (Table 1.1), which is based on the conceptualization of food systems developed by the High Level Panel of Experts for Food Security and Nutrition (HLPE).[2]

1.2 KEY FNS ISSUES PRIOR TO THE PANDEMIC

January 2019 saw the publication of the report *Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems* (Willett *et al*., 2019). This report had an immediate impact among those who are concerned about FNS worldwide. According to the report:

> "Food systems have the potential to nurture human health and support environmental sustainability; however, they are currently threatening both. Providing a growing global population with healthy diets from sustainable food systems is an immediate challenge.
>
> "Although global food production of calories has kept pace with population growth, more than 820 million people have insufficient food and many more consume low-quality diets that cause micronutrient deficiencies and contribute to a substantial rise in the incidence of diet-related obesity and diet-related non-communicable diseases, including coronary heart disease, stroke, and diabetes.
>
> "Unhealthy diets pose a greater risk to morbidity and mortality than does unsafe sex, and alcohol, drug, and tobacco use combined. Because much of the world's population is inadequately nourished and many environmental systems and processes are pushed beyond safe boundaries by food production, a global transformation of the food system is urgently needed." (Willett *et al*., 2019).

This central idea pointed to a necessary and urgent **global transformation of our food systems**, which was not exactly a novelty concept and had already been called for in previous HLPE/CFS reports from 2017, but it had much more impact this time. Perhaps because it was followed, in that same month of January, by another report from The Lancet Commission on Obesity, *The Global Syndemic of Obesity, Undernutrition, and Climate Change* (Swinburn *et al*., 2019), which for the first time emphasized on the interrelationship between growing obesity, the malfunctioning of food systems, and climate change. According to this new report:

> "Malnutrition in all its forms, including obesity, undernutrition, and other dietary risks, is the leading cause of poor health globally. In the near future, the health effects of climate change will considerably compound these health challenges. Climate change can be considered a pandemic

[2] See report on *Nutrition and Food Systems* (HLPE, 2018), available at: http://www.fao.org/3/I7846ES/i7846es.pdf).

> because of its sweeping effects on the health of humans and the natural systems we depend on (i.e., planetary health). These three pandemics – obesity, undernutrition, and climate change – represent The Global Syndemic that affects most people in every country and region worldwide. They constitute a syndemic, or synergy of epidemics, because they co-occur in time and place, interact with each other to produce complex sequelae, and share common underlying societal drivers" (Swinburn *et al*., 2019).

The Lancet Commission was not only clear as to what it meant by *The Global Syndemic*, but it emphasized among its key messages that "**The pandemics of obesity, undernutrition, and climate change represent three of the gravest threats to human health and survival**. These pandemics constitute The Global Syndemic, consistent with their clustering in time and place, interactions at biological, psychological, or social levels, and common, large-scale societal drivers and determinants." (Swinburn *et al*., 2019).

The report further acknowledges that:

> "Although the Commission's mandate was to address obesity, a deliberative process led to reframing of the problem and expansion of the mandate to offer recommendations to collectively address the triple burden challenges of The Global Syndemic.
>
> "First, the prevalence of obesity is increasing in every region of the world. No country has successfully reversed its epidemic because the systemic and institutional drivers of obesity remain largely unabated.
>
> "Second, many evidence-based policy recommendations to halt and reverse obesity rates have been endorsed by Member States at successive World Health Assembly meetings over nearly three decades, but have not yet been translated into meaningful and measurable change. Such patchy progress is due to what the Commission calls policy inertia, a collective term for the combined effects of inadequate political leadership and governance to enact policies to respond to The Global Syndemic, strong opposition to those policies by powerful commercial interests, and a lack of demand for policy action by the public.
>
> "Third, similar to the 2015 Paris Agreement on Climate Change, the enormous health and economic burdens caused by obesity are not seen as urgent enough to generate the public demand or political will to implement the recommendations of expert bodies for effective action.
>
> "Finally, obesity has historically been considered in isolation from other major global challenges. **Linking obesity with undernutrition and climate change into a single Global Syndemic framework focuses attention on the scale and urgency of addressing these combined challenges and emphasizes the need for common solutions.**" (Swinburn *et al*., 2019).

Undoubtedly, this has been the great innovation and merit of the Lancet Commission report: in addition to drawing attention to the urgency of containing the obesity pandemic, it links such pandemic to other forms of undernutrition – including hunger – and with climatic change. No less important is the Commission's emphasis

on the fact that solutions cannot afford to be point solutions, but will need to include a global change in our food systems, from the way we produce it to its distribution and consumption. And even more important: denouncing the "political inertia", both nationally and internationally, due to the lack of policies and effective operational measures to fight the three pandemics and their interactions. Regardless, any analysis carried out in Latin America and the Caribbean about the three aforementioned pandemics will reach the conclusion that the measures taken to combat them are still incipient given the magnitude of the problem.

For instance, Popkin and Reardon (2018) had already warned that the LAC region was facing an important health problem related to diet, accompanied by enormous economic and social costs. According to them:

> "The shifts in diet are profound: major shifts in intake of less-healthful low-nutrient-density foods and sugary beverages, changes in away-from-home eating and snacking and rapid shifts towards very high levels of overweight and obesity among all ages along with, in some countries, high burdens of stunting." (Popkin and Reardon, 2018).

The authors emphasize that diet changes have occurred in parallel to, and in two-way causality with, changes in the broad food system, encompassing "the set of supply chains from farms, through midstream segments of processing, wholesale and logistics, to downstream segments of retail and food service (restaurants and fast food chains)." (Popkin and Reardon, 2018).

Popkin and Reardon's work documents in-depth the recent history of rapid growth and transformation of that broad food system in LAC, with the rapid rise of supermarkets, large processors, fast food chains and food logistics firms. This rapid transformation is, according to the authors:

> "(…) the story of a 'double-edged sword', showing its links to various negative diet side trends, e.g. the rise of consumption of fast food and highly processed food, as well as in parallel, to various positive trends, e.g. the reduction of the cost of food, deseasonalisation, increase of convenience of food preparation reducing women's time associated with that and increase of availability of some nutritious foods like meat and dairy." (Popkin and Reardon, 2018).

The authors further consider that "the transformation of the food system, as well as certain aspects of diet change linked to long-run changes in employment and demographics (e.g. the quest for convenience), as broad parameters that will endure for the next decades without truly major regulatory and fiscal changes." (Popkin and Reardon, 2018).

The authors also focus on the steps that are being and can be taken to curb the negative effects on diet of these changes in the region.They conclude that:

> "Countries in LAC are already among the global leaders in initiating demand-related solutions via taxation and marketing controls. But we also show that this is only a small step forward. To shift LAC's food supply towards prices that

incentivize consumption of healthier diets and demand away from the less healthy component is not simple and will not happen immediately. We must be cognizant that ultimately, food industry firms must be incentivized to market the components of healthy diets. This will primarily need to be via selective taxes and subsidies, marketing controls, as well as food quality regulations, consumer education and, in the medium term, consumers' desires to combine healthier foods with their ongoing quest for convenience in the face of busy lives. In the end, the food industry in LAC will orient itself towards profitable solutions, i.e. those demanded by the broad mass of consumers.

"In summary, the LAC region faces a major diet-related health problem accompanied by enormous economic and social costs. Obesity and many nutrition-related NCDs are linked with both excessive intake of unhealthy ultra-processed food and excessive intake of unhealthy traditional foods, be they deep-fried items, highly refined white bread or confectionaries made in traditional fashions. Most of the way to shift the food system, as we have noted, relates to shifting demand. When consumers demand healthier foods and beverages, we will begin to see these changes for an array of fiscal and regulatory reasons. As noted, we are seeing the beginning of such actions in Chile and Mexico and Brazil, but the road ahead is very long and not simple to achieve." (Popkin and Reardon, 2018).

The "path of shifting demand" is difficult for the countries in the region, given the weakness of the organizations that represent consumers' interests. As Chapter 10 of this book highlights, demand is the most fragile link in existing food chains today, either because its organizations are recent, or because their interests are widely dispersed and deeply divided in terms of income and cultural inequalities that exist in the region.

A recent report by the World Bank (Shekar & Popkin, 2020) explains why overweight and obesity are a time bomb with potentially enormous health and economic impacts, especially for the poor and for those living in low- and middle-income countries, dispelling the myth that this is an issue only in high-income countries and urban areas. The report cites recent research findings (including those of the Lancet Commission), which suggest that changing diets and food systems is also key to address the consistent challenges of childhood stunting and malnutrition, alongside the growing challenges of climate change. According to this report:

"Continued economic growth among the world's low- and middle-income countries will only intensify the magnitude of the devastating impacts of overweight/obesity on health, well-being, and productivity. Furthermore, as economies grow, the burden of overweight/obesity will shift even more toward the poor (...). The effort to reduce obesity is therefore a global public good and governments have a key role to play in addressing this challenge through a comprehensive approach to policy formulation and intervention, including in the agriculture, environment, transport, education, fiscal, and health care sectors.

"While fiscal policies linked mainly to taxation on sugar-sweetened beverages have dominated as key interventions in over 40 countries to reduce consumption of unhealthy foods and there is

> extensive experience in this area, many other regulatory options are being used by countries to improve diet quality. These include front-of package labelling, nutrient profiling, school-based food regulations and education, market and retail solutions, and marketing controls and regulations.
>
> "Front-of-package labelling and related nutrition profiling models with warning labels show great promise; diet-related taxes also remain a promising approach, albeit they will face challenges. (...). A combination of policies, such as those in Chile, promise important synergies and much larger impacts.
>
> [Unfortunately,] "(…) no countries have yet considered tying the taxes to subsidies for healthier legumes, vegetables, and fruits and other healthful, less obesogenic foods, (…). Experience in marketing regulation of unhealthy foods is also limited, except perhaps what has been learned from the marketing of infant formulas. (…). Furthermore, emerging evidence also suggests that impacts of such obesity-prevention policies are starting to be realized." (Shekar & Popkin, 2020).

The question we must ask ourselves is: why this political inertia? It is certainly not due to lack of technical knowledge of the issue, much less lack of statistical, or clinical, information. The simplest answer would be a lack of political will, as well as resistance from the sectors that profit from the situation.

But the issue is more complicated. If we look at the complexity of current food systems, as described by the HLPE (box 1.1, at the end of this chapter), we will realize the wide diversity of economic, social, institutional and political actors involved in production, distribution and consumption of food. But this is not only a matter involving the actors who operate these chains, but also, and above all, the actors of the political and institutional "superstructure" that generate the laws, regulations and agreements that condition – not to say determine – the functioning of food systems. And to all this we must add the different types of consumers, with their differences in income, age and culture, as actors who themselves (do not) make "sovereign decisions".

Given this number and complexity of actors, we must add that decision makers in the structural part of the food system are individual entrepreneurs (or groups of them), whereas the superstructural part – pertaining to policies and institutions – is represented by different interest groups, whose decisions always involve much more complex and time-consuming collective actions. There is, therefore, an inherent gap between the different parts of the food system, a difference that is accentuated in times of accelerated innovation, such as the latest decades in the Latin American region. The visible result is the lack of standards, regulations and public policies to guide food systems towards healthy eating, so as to cope with a rapidly changing situation.

In the next section we will look at the consensus that emerged among the main food system actors before the COVID-19 pandemic.

1.3 THE FOOD SYSTEMS DIALOGUES

At the end of 2019, by the time that the first signs of the COVID-19 virus were detected in China, the Food System Dialogues (FSD) – an innovative mechanism that brings together actors of a given food system to voice their main issues – was also presenting their conclusions after synthesizing the opinions of countless debates held for over a year worldwide. According to the report's Executive Summary:

> "The Food Systems Dialogues (FSDs) were launched in 2018 to allow diverse actors from a range of food production and consumption sub-sectors to meet, discuss and explore options for transforming food systems. From these, an overarching vision for food system transformation has been developed and four themes – each with a set of reoccurring 'Red Threads' – have emerged. (...)
>
> "The overarching vision of the FSDs is that food systems should ideally enable all people to be able to eat healthy diets made up of from sustainably produced food that they can both access and afford. This would be achieved through involving all actors across the food web in collective action." (Nabarro, 2019).

The **first theme** that emerged from the dialogues, which took place up to late 2019, was to **incentivize the production and consumption of nutritious and healthy food products**:

> "The Red Threads under this theme are: (1) accelerate the transition towards the production and consumption of healthy and nutritious food products through innovations that are developed and implemented inclusively; (2) minimize food loss and waste within the context of a circular economy; and (3) ensure that public food procurement practices encourage–and offer appropriate incentives for–the consumption of healthy diets produced from sustainably-produced food." (Nabarro, 2019).

The **second theme** identified in the dialogues is to **promote equitable access to food systems through inclusive approaches**:

> "The Red Threads under this theme are: (4) involve all stakeholders (including farmers, fishers, food processors, retailers, carers and chefs) in sustainable food system transitions; (5) pay attention to the interests, livelihoods and voices of food producers and processors (focus on fairness and resilience); and (6) accompany food producers and processors as they make changes to their production and processing practices." (Nabarro, 2019).

The **third theme** identified is to **engage food producers and processors, especially smallholders, in all aspects of climate action and in the promotion of sustainable farming and land-use practices**:

> "The Red Threads under this theme are: (7) remunerate producers for their positive contributions to ecosystem services; (8) encourage a science-based approach to agroecology, with a particular emphasis on the preservation of biodiversity; and (9) explore climate-smart agricultural practices with farmers in different settings and be ready to support their adoption, as and when appropriate." (Nabarro, 2019).

The fourth and final theme identified in the dialogues is to **align financing and investments with desired food systems transformations**:

> "The Red Thread under this theme is: (10) ensure that financial processes and mechanisms align with and encourage the production of healthy and nutritious foods. This theme and Red Thread recognize the central role finance and investments play in food systems transformations and stresses that more solutions-based pathways need to be developed to better support investment decisions." (...)
>
> "The consensus around the Red Threads will be examined in forthcoming FSDs events and the new insights will be incorporated into updates of the report, to be prepared at regular (three monthly) intervals. This report and the updates will be available on the FSDs website (www.foodsystemsdialogues.org). It is intended that these intermittent synthesis reports around Red Threads from the FSDs be an input to the preparations of the proposed 2021 UN Food Systems Summit." (Nabarro, 2019).

The results presented by Nabarro (2019) portray the relative consensus that existed on the need for urgent changes in food systems before the pandemic. We present below a summary of a Dialogue on food systems organized by the Instituto Comida do Amanhã.[3] This virtual event was held at the end of June 2020 in the context of COVID-19's impacts on Brazilian food systems. Participants included a number of actors working in food system, from small farmer associations and traditional communities of "quilombolas" (former descendants of slaves), to former ministers of agriculture and social development, academics, food security and environmental protection NGOs, agricultural and social finance entrepreneurs, and representatives of a municipal government, the national office of the Public Defender and the national agency in charge of the school feeding programme.

They were asked to present "proposals for actions to address a specific area in food systems, with a focus on the post-pandemic scenario in Brazil", considering also possible "ideal futures" for food systems, achievable within a period of up to three years. The final report reaches the following conclusions:

> "Although a wide range of food actors participated in the event, an almost unanimous focus was placed on public policies, government intervention and action, and the readoption or strengthening of previous national food policies that appeared to be more efficient.
>
> "The groups highlighted (i) the importance of civil society participation in the policy-making process and in food policy governance; (ii) the fact that structural policies cannot be forgotten by the current focus on emergency policies, (iii) and the value of intersectoral dialogues as a means to develop better policies and solutions to address current food system challenges. (...)
>
> "Another strong message resulting from the dialogues was the acknowledgment of the relevance of local power and local policies and actions (such as solutions to shorten the food chain) for the transformation of food systems. It

[3] Learn more by visiting: https://www.comidadoamanha.org/

is clear that cities have a more important role to play in Brazil." (Instituto Comida do Amanhã, 2020).

To put in context this last message of the Brazil food systems Dialogue: 2020 is a municipal election year throughout the country, and, given the omission of the other levels of Government (state and Federal) on the issue of food security and nutrition during the pandemic, it is understood that hopes are turning towards the municipal sphere. Furthermore, it is necessary to highlight the long tradition of relevant FNS actions by Brazilian municipalities, and recall that the Fome Zero Programme (Zero Hunger)[4] started from a series of successful experiences at the local level, which were replicated in different localities.[5]

This emphasis on placing expectations on local power can also be understood as part of the urgency to present solutions to the issue, as a result of the pandemic itself, given the need to shorten food chains and reinforce short production and consumption circuits. In any case, when comparing FSD outcomes from before and during the pandemic, the public sector's importance in the implementation of FNS policies is quite clear. Is this the long-awaited opportunity to break the "political inertia" mentioned above and move ahead with a global shift in food systems? Unfortunately, what we have seen so far does not point in that direction.

1.4 WHAT HAS CHANGED WITH THE PANDEMIC?

Without necessarily indicating order of importance, nor pretending to be exhaustive, we will highlight below some points that seem key, and which will be covered in greater detail by the authors of the different chapters of this book.

A. The start of the pandemic generated fears of interruptions in the distribution systemsthat could affect food product supplies;[6] these fears did not materialize in the region, at least not in a scale that could trigger a food crisis, as was thought (FAO and ECLAC, 2020a).

B. Furthermore, exports of agricultural raw materials were not significantly reduced as initially feared (Torero, 2020). On the contrary, the onset of social isolation measures coincided with the end of the cereal harvest in South America, a traditional exporter of agricultural products such as soybeans, corn and wheat, particularly to Asia and Europe. The combination of an increased demand from China to replenish its strategic stocks – partially consumed during the first months of the pandemic –,

[4] Given that the Zero Hunger Programme was born from municipal initiatives, it is necessary to support cities in updating their food policies in the post-pandemic world. The annex to the book that summarizes the main programmes of the Zero Hunger Project (MDA, 2010) is a reference that can, with some updates and adaptations, contribute to the formulation of proposals at the municipal level; it is available at: https://grazianodasilva.com/wp-content/uploads/2020/01/a-i3023e.pdf.

[5] See also Chapter 6 of this book, *Analysis of the Main Trends in Food Regulations and Policies in Latin America and the Caribbean. Brazil Case Study*, by Mauro del Grossi.

[6] See the FAO website dedicated to COVID-19 (includes questions and answers): http://www.fao.org/2019-ncov/en/. Also, a HLPE-CFS analysis with a slightly broader vision of COVID-19 impacts on food and nutrition security: https://fscluster.org/coronavirus/document/impact-covid-19-food-security-and.

on the one hand, and of a devalued United States Dollar in relation to the national currencies of the region, on the other, resulted in a rapid increase of agricultural product exports. A lack of control even forced countries like Brazil to implement emergency policies to reduce import tariffs, in order to ensure the domestic supply of basic products such as rice, for example, as well as to avoid an inflationary acceleration of the food products consumed in the poorest households. It should be noted that the export restriction measures adopted by some countries in the 2008-2010 crisis were not repeated in 2020, thus avoiding "panic buying" in international commodity markets, as has been seen before.

C. Social confinement, implying the restriction of people's movement outside their homes, drastically changed the growing habit of eating outside, especially in large cities. The readoption of home meal preparation caused a drastic change in the demand for some traditional food products by lower-income populations, with the subsequent change in the products' relative prices.[7] The result was what has been deemed "poor people's inflation," i.e., a much higher increase in the prices of basic foodstuffs, which has raised inflationary rates.

D. Fresh products, especially those produced and consumed locally, were those most affected by movement restrictions in local markets at the start of the pandemic. Short production and consumption circuits were initially greatly affected by the new health requirements, thus compromising the distribution of fresh products considered healthier, and drastically reducing family farmers' incomes. Fortunately, the availability of online marketing platforms partially offset the loss of income for the minority of small farmers who already had good Internet connectivity. Community Supported Agriculture (CSA) initiatives were strengthened in the pandemic as a promising model to directly connect a certain group of consumers, at one end, with family farmers, at the other, allowing even to cover the costs of production totally or partially.[8]

E. The disruption of school lunch programmes due to school closings during the pandemic was perhaps the most dramatic example of a sudden cut in public policies that guaranteed at least one healthy meal for school children. The consequences of this have not yet been quantified, but there is already coverage in newspapers that shows the worsening of the quality of diet for these children. This translates into a shift in eating habits in the direction of processed and ultra-processed products, as well as increased overweight and obesity. It should be noted that, in countries like Brazil, where 30% of school meals are provided thanks to a policy that

[7] Article by Haddad *et al*. (2020) on the impact of COVID-19 on food systems. This article includes a table with an excellent mapping of each potential effect and the corresponding mitigating remedy, available at: https://www.gainhealth.org/sites/default/files/news/documents/covid-19-crisis-and-food-systems-probable-impacts-and-potential-mitigation-and-adaptation-responses.pdf.

[8] See pre-pandemic examples in Brown and Miller (2008), available at: https://doi.org/10.1111/j.1467-8276.2008.01220.x.

promotes local purchases of fresh products from family farming, the disruption in supply has mainly affected local family farmers.

F. The few existing indicators show that there was a drastic reduction in the disposable income of those who are poorest, especially those who worked under informal and precarious conditions. Palliative measures that included the transfer of monetary resources through bonuses, vouchers and other mechanisms, adopted by several Latin American governments, initially prevented an overall increase in poverty and food insecurity in the region. But the prolongation of the pandemic throughout 2020, and the possibilities of subsequent waves of contagion, indicate that the restrictions adopted may need to be extended until at least the highest risk groups are vaccinated. This leaves the region in a state of permanent uncertainty about the future, which contributes to further reducing public and private investments, which had already fallen due to the economic and political crises affecting several countries in the region.

G. The acceleration of this and other trends that were already manifesting in LAC before the pandemic allows us to infer that the "new normal" in the region so far has aggravated the worst conditions that existed previously. This is particularly true of income and wealth distribution in the region, which was already deeply uneven —among the worst in the world— before the pandemic.

H. The virtual world of "online life" imposed by the pandemic has greatly accelerated innovation, mainly in the areas of telecommunications and information technology. Unfortunately, these new technologies are not available as public goods for everyone and, therefore, are not accessible to the poorest sectors. Furthermore, the rural world was already experiencing a great digital divide in relation to the urban world before the pandemic. This due to its much greater needs for public and private infrastructure to facilitate access to the Internet, which has become part of the basic conditions for survival during the pandemic. Large producers of raw materials, highly capitalized by the excellent results of last year's exports, have substantially accelerated the adoption of these and other innovations, thus widening the differences with small family farmers who need public policy support to adopt them.

I. Due to the high levels of indebtedness of federal and regional governments in the region —strongly hit by the pandemic—, nothing seems to indicate that we will have important investments in infrastructure in the short term to face this dichotomy between large and small producers, further deepened during the crisis.

J. Faced with this crisis of reduced private investment and capacity for wider-reaching public financing in an increasingly uncertain future, cities will be ever more dependent on themselves for eating healthy and reducing healthcare costs arising from poor nutrition. Additionally, healthy

eating has become a necessity, as a way to prevent serious illness from COVID-19. This opens a window of opportunities for a municipal FNS agenda where, among the key components, is the search for alternative forms of more sustainable production, thus stimulating circuits of increased production and consumption (such as KM ZERO)[9] and incentives for the consumption of fresh and healthy food from family farming. If we will be able to take advantage of these windows of opportunity that the pandemic brings, only future collective decisions that break with the "political inertia" will tell.

To conclude, we can say that WHAT to do is clear, but the most complicated thing now is HOW. Here, a few actors stand out as key protagonists in LAC. They include the Parliamentary Fronts Against Hunger and the aforementioned Food Systems Dialogues, with participation of social organizations, the private sector and the public sector in search of national and local consensus for the formulation of new public policies. And we must not forget the importance of academia to contribute scientific evidence for the formulation of these new public policies on food and nutrition security.

The challenge is global, but given the different contexts in LAC, the processes must reach the territories where the role of cities is increasingly important. Social organizations, including not only those of producers, but also those of consumers, need to join forces in the political lobby. Political will translated into resources is only achieved with social pressure. That is why it is essential to make the best of our democracy to elect good representatives in congresses and governments. The agricultural sector has a great opportunity to support the transformation of food systems towards sustainable, inclusive and healthy systems in the post-pandemic world.

[9] Learn more by visiting: https://www.kmzerohub.com/

Box 1.1

Food Systems Conceptual Framework

In 2015, the Committee on World Food Security (CFS) requested the High Level Panel of Experts on Food Security and Nutrition (HLPE) to prepare a report on Nutrition and Food Systems, to be presented at the Committee on World Food Security (CFS)'s 44th Session in October 2017. What follows is a verbatim reproduction of some key points in the report's conceptual framework:

2. A food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes. This report pays specific attention to nutrition and health outcomes of food systems. It identifies three constituent elements of food systems, as entry and exit points for nutrition: food supply chains; food environments; and consumer behaviour.

3. The food supply chain encompasses all activities that move food from production to consumption, including production, storage, distribution, processing, packaging, retailing and marketing. The decisions made by the many actors at any stage of this chain have implications for other stages. They influence the types of food available and accessible, as well as the way they are produced and consumed.

4. The food environment refers to the physical, economic, political and socio-cultural context in which consumers engage with the food system to acquire, prepare and consume food. The food environment consists of: "food entry points", i.e. the physical spaces where food is obtained; the built environment that allows consumers to access these spaces; personal determinants of food choices (including income, education, values, skills, etc.); and the political, social and cultural norms that underlie these interactions. The key elements of the food environment that influence food choices, food acceptability and diets are: physical and economic access to food (proximity and affordability); food promotion, advertising and information; and food quality and safety.

5. Consumer behaviour reflects the choices made by consumers, at household or individual levels, on what food to acquire, store, prepare and eat, and on the allocation of food within the household (including gender repartition, feeding of children). Consumer behaviour is influenced by personal preferences determined by taste, convenience, culture and other factors. However, consumer behaviour is also shaped by the existing food environment. Collective changes in consumer behaviour can open pathways to more sustainable food systems that enhance food security and nutrition (FSN) and health.

6. These three components of food systems impact consumers' capacity to adopt sustainable diets that are: protective and respectful of biodiversity and ecosystems; culturally acceptable; accessible; economically fair and affordable; and nutritionally adequate, safe and healthy, while optimizing natural and human resources.

7. A wide variety of food systems and food environments can exist or co-exist at local, national, regional and global levels. The typology suggested in this report evaluates food systems along both food supply chains and the food environment. It identifies three broad types of food systems: (1) traditional food systems; (2) mixed food systems; and (3) modern food systems.

8. In traditional food systems, consumers rely on minimally processed seasonal foods, collected or produced for self-consumption or sold mainly through informal markets. Food supply chains are often short and local, thus access to perishable foods such as animal source foods (ASF) or certain fruits and vegetables can be limited or seasonal. Food environments are usually limited to one's own production and informal markets that are daily or weekly and may be far from communities.

9. In mixed food systems, food producers rely on both formal and informal markets to sell their crops. Highly-processed and packaged foods are more accessible, physically and economically, while nutrient-rich foods are more expensive. Frequent branding and advertising accompany everyday activities, seen on billboards and in print publications, while food labelling is sometimes provided in markets. Even when food-based dietary guidelines are available, most consumers have little or no access to this information. Food safety and quality standards exist, but may not always be followed by producers.

10. Modern food systems are characterized by more diverse food options all year long, and by processing and packaging to extend food's shelf life. These systems include both formal and easily accessible markets in high-income areas and food deserts and food swamps in low income areas [that is, areas with an overabundance of "unhealthy" foods and little access to "healthy" foods]. While the cost of staples is lower relative to ASF and perishable foods, specialty foods (e.g. organic, local) are more expensive. Consumers' access to detailed information on food labels, store shelves, and menus and food is highly promoted. Food safety is monitored and enforced, and storage and transport infrastructures (including cold chain) are generally prevalent and reliable. (...)

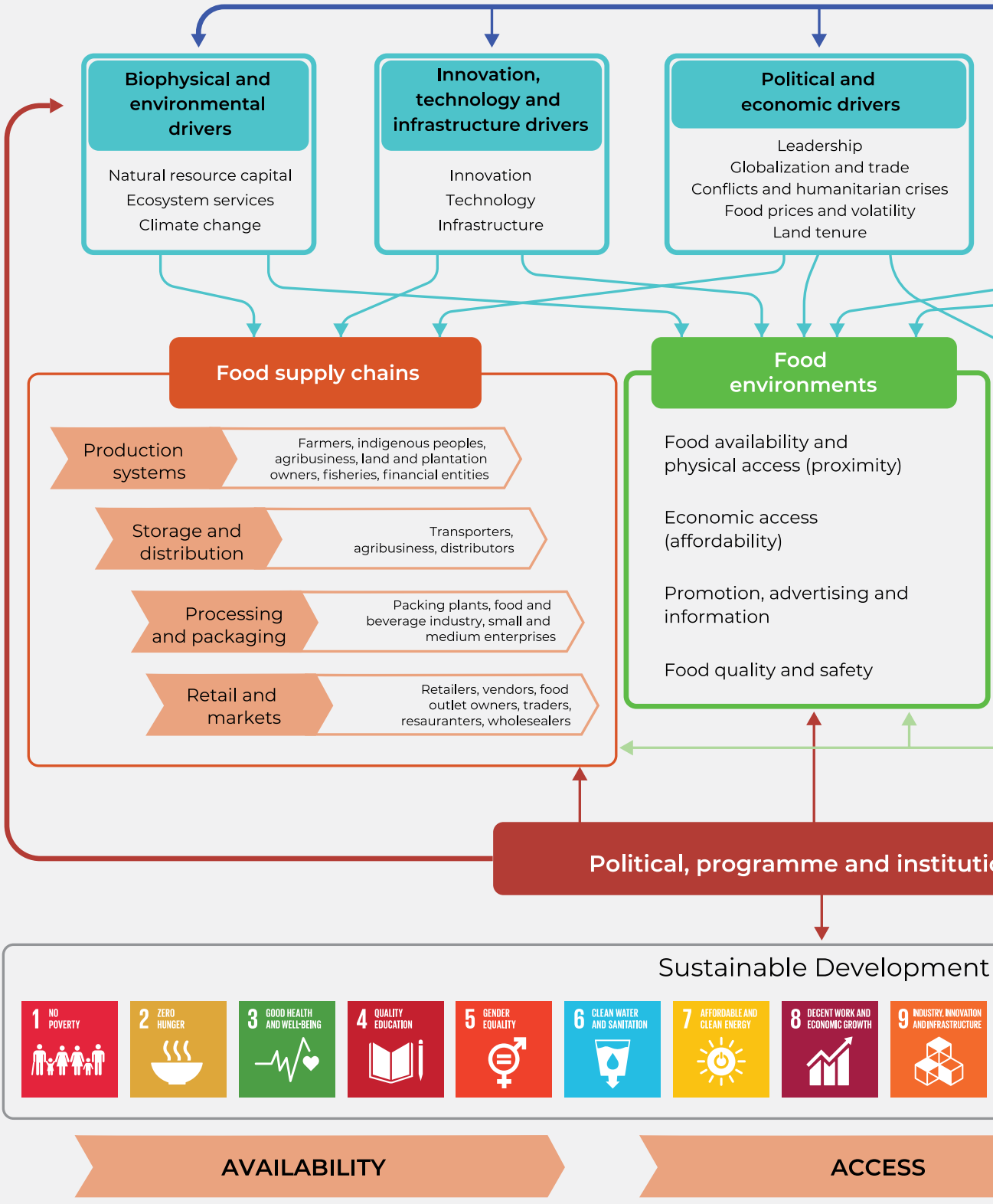
11. Globally, one person in three is malnourished. If current trends continue, one in two could be by 2030, in stark contrast with the objective to end all forms of malnutrition by 2030. Malnutrition takes different forms: undernutrition (underweight, stunting and wasting); micronutrient deficiencies; and overweight and obesity. These forms of malnutrition affect all countries, whether developed or developing and can also co-exist within countries, communities, households and individuals. (...)

14. Overweight and obesity are rising quickly and affect all countries. Worldwide obesity has more than doubled since 1980. In 2014, a staggering 1.9 billion adults were overweight, of which 600 million were obese. In 2014, an estimated 41 million children under five were overweight, a quarter living in Africa and almost half in Asia. These rising rates are linked to increases in diet related non-communicable diseases (NCDs) such as cancer, cardiovascular disease and diabetes. Overweight and obesity are now associated with more deaths worldwide than underweight. (...)

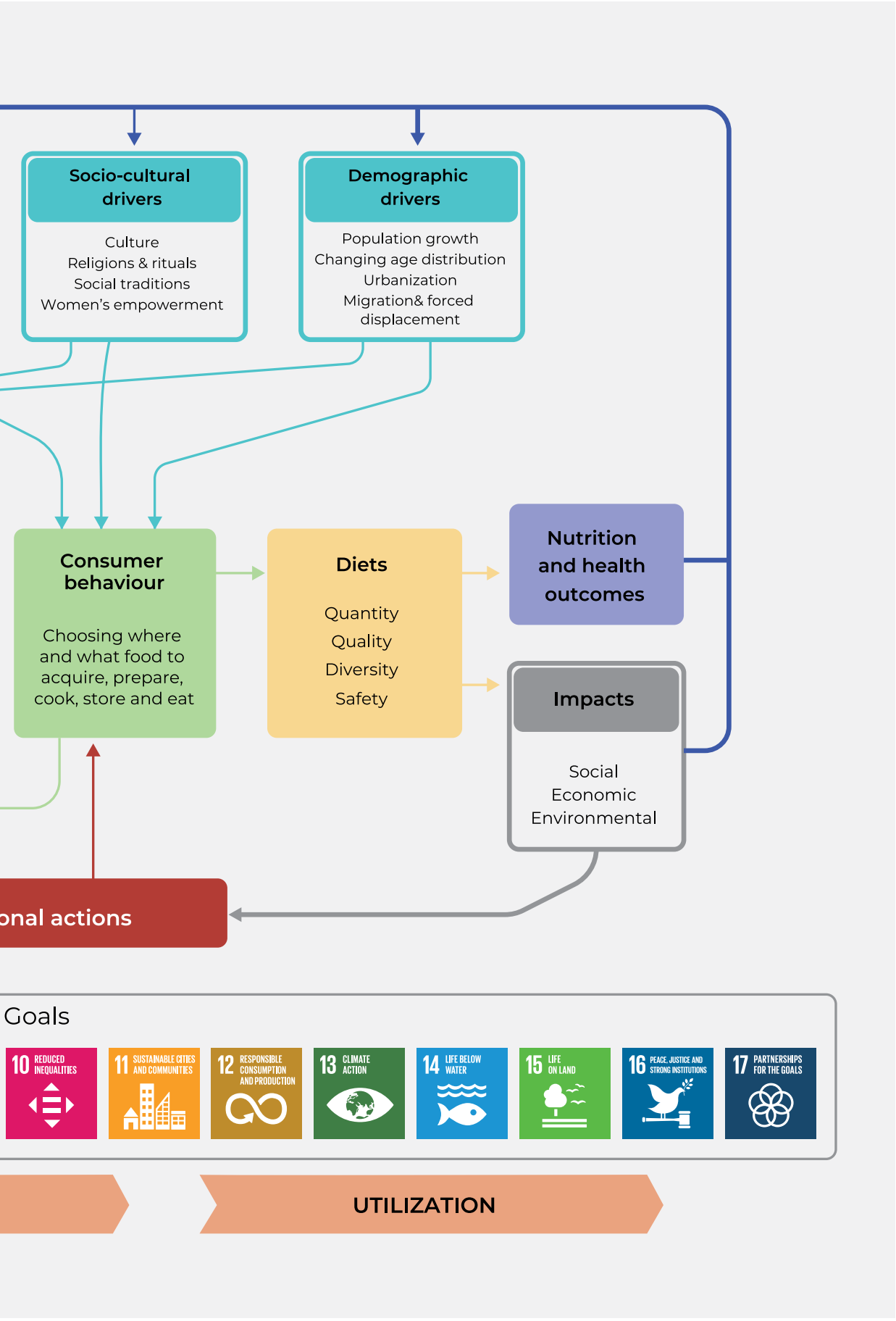
16. Traditional food systems currently are associated with the highest prevalence of undernutrition, including stunting, wasting and under five mortality, as well as the highest prevalence of micronutrient deficiencies but with lower levels of overweight and obesity in adults. All burdens of malnutrition co-exist in mixed food systems: this is a challenge in terms of prioritizing policies and programmes to tackle these multiple burdens. Finally, modern food systems are associated with lower levels of undernutrition and micronutrient deficiencies but higher levels of overweight and obesity.

Source: HLPE (2018).

Figure 1.1
Conceptual Framework of Food Systems for Diets and Nutrition



Source: Adapted from HLPE (2018), p. 26.


Socio-cultural drivers
Culture
Religions & rituals
Social traditions
Women's empowerment
Demographic drivers
Population growth
Changing age distribution
Urbanization
Migration& forced displacement
Consumer behaviour
Choosing where and what food to acquire, prepare, cook, store and eat
Diets
Quantity
Quality
Diversity
Safety
Nutrition and health outcomes
Impacts
Social
Economic
Environmental
onal actions
Goals
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
UTILIZATION

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2
THE IMPACT OF THE COVID-19 PANDEMIC ON THE SUPPLY AND DEMAND OF FOOD PRODUCTS IN LATIN AMERICA AND THE CARIBBEAN

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2.1. INTRODUCTION

Food systems in Latin America and the Caribbean face unprecedented pressure due to the COVID-19 pandemic. The health crisis and the measures taken to contain the spread of the virus have affected all elements and activities related to production, collection, distribution, processing, preparation, and consumption of food. This includes people, the environment, inputs, processes, infrastructures, and institutions. The drastic restriction of people's mobility, together with the concomitant economic contraction, have impacted the demand and supply of food products in the region and in the rest of the world. Particularly, social isolation and reduced family incomes have stimulated the consumption of cheaper and less fresh foods. In turn, the food supply has proven to be resilient, although the pandemic's impacts are uneven between subsectors and more damaging for small producers.

In Latin America and the Caribbean, the global health emergency met a context of growing poverty, food insecurity and malnutrition, despite the rapid expansion in food production and trade flows in recent years. The pandemic's adverse effects on the eating habits of consumers and the livelihoods of smaller producers may widen the pre-existing gaps between food availability, access and consumption in the region. This is of particular concern given the challenges posed by climate change, deforestation, desertification, and water stress. To build back better under a post-COVID-19 framework, it is crucial to draw lessons from the crisis and redesign public policies, so as to encourage transformations that promote food security, nutrition and the development of sustainable and inclusive food systems in the region.

This chapter is organized into five sections. Sections 2.2, 2.3, 2.4 and 2.5 assess the impacts of the COVID-19 pandemic on food production, consumption, trade flows and prices in Latin America and the Caribbean, respectively. Section 2.6 summarizes key findings and provides final considerations.

2.2. THE PANDEMIC'S IMPACT ON PRODUCTION

The COVID-19 pandemic and the measures adopted to contain the spread of the virus have impacted the various actors involved in the production, collection, processing, and distribution of food products in Latin America and the Caribbean in different ways. Effects have varied from one subsector to another depending on the convergence of very diverse factors, such as the perishable nature of products, the production's labour intensity, the exposure to other sectors of the economy and the orientation towards domestic or international markets. Additionally, the health emergency has unevenly affected producers in different scales. Particularly, family farmers, smaller ranchers and artisanal fishermen have been more vulnerable to confinement and physical distancing measures, given that they market fresher produce, rely more heavily on outdoor produce fairs, have limited storage capacities, and do not always have effective and efficient social protection systems.

Preliminary figures for 2020 indicate that regional production of staple foods – especially cereals, oilseeds, and sugar – was higher than in 2019. In the case of cereals, an expansion of 2.2 percent is expected in the total production.[10] The increase would be most significant for rice (5.5%) and wheat (4.3%), and more modest for corn (1.6%) and other secondary grains (0.6%). On the other hand, products that are most perishable and have the highest added value – such as fish, seafood, meat and leafy vegetables – have suffered production drops in several countries in the region. For instance, during the second quarter of 2020, the added value of fishing fell by 29.1 percent in Belize, 28.0 in Nicaragua, 15.8 in Peru and 14.0 in Argentina, compared to the same quarter of 2019.[11]

The effects of COVID-19 on food production have also differed between countries according to the organization of their food systems, the structure of their economies, and the producers' access to various transmission channels. The health emergency's adverse impacts tend to be greater in countries where food systems were already undergoing crises before the COVID-19 outbreak. Particularly, two countries in the region are still included by the Food and Agriculture Organization of the United Nations (FAO) in the list of "countries in crisis that need external food aid": Haiti (since June 2016) and the Bolivarian Republic of Venezuela (since March 2019). In these countries, the health emergency has aggravated difficulties faced by producers and exacerbated the lack of resources to deal with food insecurity.

On the other hand, some net food exporters, such as Argentina and Brazil, have strengthened their

[10] Author's estimate based on data from IBGE, INE, FAO / SMIA, MAG, MAGYP and SIAP.

[11] Author's estimate based on data from the Central Bank of Belize, Central Bank of Nicaragua, INDEC and INEI.

reputations as reliable global suppliers, given their strong performance as food producers and exporters during the first three quarters of the pandemic. By intensifying the race for new international food suppliers, the pandemic has contributed to the acceleration of expansion processes or the opening of markets, which has favoured some producers. Nevertheless, most of the benefits have been concentrated in capital and technology-intensive agribusiness sectors, while family farming has faced more difficulties to deal with the pandemic and become integrated in global food markets.

The three following subsections look into the effects of the COVID-19 pandemic on agricultural, fishery and aquaculture production in Latin America and the Caribbean. Subsection 2.2.1 examines the transmission channels, both direct and indirect, through which the pandemic has impacted food production. Subsection 2.2.2 analyses the perceptions of food producers, entrepreneurs and technicians on the pandemic's effects on their activities. Subsection 2.2.3 looks into the changes in value added for agricultural, fishing and aquaculture activities in the second quarter of 2020, their relationship with the COVID-19 pandemic, and the measures taken to confront the spread of the novel coronavirus.

2.2.1 Transmission channels

The effects of the health crisis have been transmitted to the productive sector of Latin America and the Caribbean by direct and indirect means. Examples of direct effects include the infection of personnel, restrictions on the mobility of people and goods, and the increase in production costs due to the adoption of new health and safety protocols. Overall, direct transmission channels had limited impact on food production in the region during the first three quarters of the pandemic.

In turn, indirect transmission channels consider the effects of the pandemic on economic growth, employment, family income, exchange rate, credit, international trade, and investment, among other factors that have impacted food markets. Also relevant are the health crisis' indirect effects on sectors of the real economy, such as energy, food services and tourism, to which some food subsectors are closely linked. Indirect transmission channels are the ones that have impacted production the most. Up next, we look into direct and indirect channels through which the COVID-19 pandemic has influenced – to different degrees – food production in Latin America and the Caribbean.

Restrictions on mobility

Governments in Latin America and the Caribbean introduced various restrictions on the population's freedom of movement and economic activity. Some countries, such as Argentina, El Salvador and Grenada, imposed mandatory generalized quarantines nationwide. Border closures, curfews, reduction of working hours and limitations in the hours of operation of market centres were also adopted, at different times, throughout the region. These measures reduced activity in most sectors, but had a more limited impact on food production, given that agriculture, fishing and food manufacturing industry were declared as essential activities and exempted from mandatory social isolation in

much of the region.

Nevertheless, the essential activity status of agriculture and fishing was not always seen in practice. In some countries, restrictions implemented by sub-national authorities – such as the closing of borders between departments and provinces – caused circulation problems and kept producers from carrying out their activities efficiently. Such impediments occurred mainly at the beginning of the pandemic, in the weeks immediately following the adoption of social isolation measures in the region. In Argentina, for instance, restrictions on the movement of trucks in some municipalities and provinces temporarily interrupted the flow of grain to internal users and ports. The lack of alignment between policies at different levels of the Argentine government was resolved through a national decree that established the essential nature of food production, processing, transportation, and delivery. In general, this decree has been respected and reinforced at the state and municipal levels. Isolated cases of restriction on the movement of vehicles, with localized repercussions on the movement of grains and the collective transport of rural workers, were also seen in Brazil, although less frequently than in Argentina. In the Dominican Republic, the problems related to the movement of rural workers and lack of transportation experienced at the beginning of the pandemic were also solved by the government through resolutions (Jacquet, 2020).

Agricultural producers surveyed in various Latin American and Caribbean countries agree that restrictions on mobility have had a limited impact on production, but a considerable one on trade, especially due to transportation and logistics issues (see subsection 2.2.2). In response to the increased potential for transportation issues, many farmers chose to expand their storage capacity in order to better withstand potential supply chain disruptions between the field and the ports. However, among small producers with limited storage capacity, transport delays and cancellations contributed to increased losses, especially for products that are more perishable.

At the start of the pandemic, restrictions on free movement also made it difficult to obtain supplies and fuel in some countries. For example, in the Plurinational State of Bolivia, the suspension of public and private transportation generated deficiencies in the access of small producers to agricultural inputs, especially in municipalities far from departmental capitals (Mendoza *et al*., 2020). In Argentina, the fishing sector faced difficulties accessing fuel in some ports during March – despite the normal operation of the country's energy industry – due to the standstill of the companies in charge of transporting fuel to vessels (Industrias Pesqueras, 2020).

Restrictions adopted in response to the pandemic also fuelled an increase in absenteeism among workers during the first weeks after the social isolation measures were adopted. In Ecuador, for instance, although shrimp exporters were operating almost at full capacity before the pandemic, the imposition of a curfew led to absenteeism among workers and a slowdown in production and processing activities (FAO, 2020c). However, these initial interruptions were eventually overcome. Food supply chains have

largely stabilized, in part due to government support and action.

Infection of personnel

One of the pandemic's most direct effects on food production has been the temporary suspension of activities in some production units due to the infection of part of the staff by the novel coronavirus. This type of interruption has been more common in labour-intensive subsectors and in plants that meet conditions conducive to the spread of the virus (such as limited ventilation or low temperature). In Latin America and the Caribbean, outbreaks of COVID-19 have occurred in meat processing plants (e.g. in Argentina, Brazil and Paraguay), fish and seafood processing plants (as in Argentina and Chile) and in packing plants for fruits, roots and tubers (such as in Costa Rica). The consequent standstill of production, albeit temporary, has contributed to the reduction of production in some sectors, such as poultry meat in Brazil during the second quarter of 2020 (IBGE, 2020a). However, it is worth noting that the vast majority of food processing and packaging plants in Brazil and in the rest of the region have not suffered stoppages due to COVID-19 outbreaks.

Health and safety protocols

In order to reduce contagion in work environments, guarantee food safety, and maintain normal supply, employment, and economic activity, the public and private sectors in Latin America and the Caribbean have developed new health and safety protocols for various subsectors. In response, producers and companies have invested considerable sums in adapting infrastructures and production processes, which in turn has elevated production costs.

In Argentina, the government has edited COVID-19 health protocols for ten food subsectors: beekeeping, poultry, meat processing plants, livestock, food and beverage industry, dairy, nuts, sheep, pigs and fruit and vegetable products. Other countries in the region, such as Brazil, Chile, Guatemala, Mexico, Paraguay, Peru and the Dominican Republic, have also published good practice protocols for food subsectors. In Brazil, some companies in the agrifood sector have entered into agreements with the Public Ministry of Labour for the implementation of more strict security measures than those required by the country's legislation. These measures include testing for COVID-19 among employees, providing appropriate personal protective equipment, and increasing the space between workers on production lines. However, not all companies have agreed to implement these protocols voluntarily.

The pandemic has also reinforced concerns regarding food safety in international trade, which have been reflected in the intensification of sanitary and phytosanitary controls by importing countries. Despite the lack of consensus in the international scientific community on the transmission of COVID-19 through food, the tightening of safety requirements has negatively impacted some producers in Latin America and the Caribbean. For instance, the discovery of traces of coronavirus in shrimp packaging from Ecuador and chicken wings from Brazil motivated China and the Philippines to temporarily suspend their imports from a few

companies in these countries. This, in addition to immediate economic losses, also damaged the producers' reputation.

Contraction of demand

Food markets are not insulated from changes in the broader economy. Therefore, the shocks caused by the pandemic in broader economic levels have been passed on to the demand and supply of food products. The overall decline in economic activity, employment and income has impacted the purchasing power and eating habits of families (see section 2.3). The pandemic's adverse effects on food services and tourism have also contributed to reduce demand for certain food products. This has had an impact on the production and income of producers, especially those with less access to government social programmes.

Producers that directed a significant part of their production to food services have seen their sales drop in several countries in the region, which in turn has required production adaptations. Subsectors such as leafy vegetables, fish and seafood have been most affected due to the more perishable nature of their products. At the start of the pandemic, after the closure of restaurants and the restriction of movement in supply centres, the subsequent reduction in sales generated significant losses among producers, mainly the smallest ones and those with limited storage and refrigeration capacity. In Brazil, for instance, the reduction was more evident among vegetables producers destined for *haute cuisine* (such as sprouts, mushrooms and baby leaf lettuces) and fast-food restaurants (such as lettuces, cucumbers and tomatoes) (EMBRAPA, 2020). The unstable demand and price for lettuce caused producers in some regions of Brazil to reduce their sown areas. In the state of São Paulo, for example, part of the area devoted to growing lettuce was replaced by less perishable crops, such as cabbage and cauliflower (CONAB, 2020b, 2020c).

The drop in demand caused by the tourism standstill has also affected farmers, ranchers and fishermen in Latin America and the Caribbean, resulting in a reduction in short or medium-term production in order to adapt to the market. Relatively speaking, the impact has been more significant in the Caribbean, given the great weight of tourism in this subregion's economy. Food producers in smaller Caribbean countries are particularly vulnerable to the decline in tourism, given that a significant portion of production in these countries was destined for tourist consumption prior to the pandemic.[12] Food producers in smaller Caribbean countries are particularly vulnerable to the decline in tourism, given that a significant portion of production in these countries was destined for tourist consumption prior to the pandemic.[13] In Barbados, for instance, hotel and restaurant closures led to an oversupply of chicken, which culminated in a 40% cut in production in June 2020 (Central Bank of Barbados, 2020. In the Dominican Republic, chicken production registered a 9.5 percent contraction in the second

[12] Tourism accounted for 26% of gross domestic product (GDP), 35% of employment, and 42% of Caribbean exports in 2019 (ECLAC, 2020d). The sector has an even greater weight in the smaller countries. For instance, tourism accounted for more than 40% of GDP and 75% of employment in Antigua and Barbuda and Saint Lucia in 2019.

[13] For instance, in Barbados, pork consumption in the tourism sector equaled 53% of domestic supply and 83% of local production, on average, between 2014 and 2017.

quarter of 2020 compared to the same quarter of the previous year, also due to abundant stocks in local farms. This was not only due to the closure of the tourism sector and other food outlets, but also to the closure of the border and limitations in trade with Haiti (Central Bank of the Dominican Republic, 2020).

On the other hand, in Cuba, the tourism standstill due to the pandemic had a positive consequence for some farmers. In a context of scarcity and rationing of inputs and fuel, especially after the tightening of international sanctions, a part of the quotas normally allocated to the tourism sector was reallocated to agricultural activities (FAO, 2020b).

Reduction in energy prices

By restricting the transport of people and products globally, the COVID-19 pandemic has reduced demand for fuels and contributed to the decline in the price of oil and biofuels.[14] This reduction in energy prices has affected food production in Latin America and the Caribbean in three important ways. First, the amounts of sugarcane and soybeans used for biofuel production have dropped significantly, increasing their availability for food industries. Second, production costs in agriculture and fishing have been pushed down, as these activities are energy-intensive (both directly, in the form of fuel, and indirectly, through energy-intensive agricultural inputs, such as fertilizers, pesticides and lubricants).[15] Third, food production prospects in the Bolivarian Republic of Venezuela have become less favourable, as lower oil revenues have worsened the country's ability to address acute shortages of agricultural inputs and fuel.

Depreciation in the exchange rate

The COVID-19 pandemic and the fall of oil prices caused strong swings in currency markets in 2020. Overall, currencies of developed economies were strengthened between January and October 2020, while the exchange rates of several economies Latin American markets fell substantially against the United States Dollar, particularly the Brazilian real (−26.3%), the Argentine peso (−20.7%), the Colombian peso (−13.5%) and the Uruguayan peso (−12, 5%) (figure 2.1). In general, the region's currencies underwent an accelerated depreciation in March and April, and a partial recovery between May and June. Although the Chilean, Mexican and Uruguayan pesos partially recovered or stabilized between May and June, the Argentine peso, the Colombian peso, the Brazilian real and the Peruvian sol continued to depreciate.

The depreciation of the exchange rate has supported food exports in several countries in the region (see section 2.4), especially in Argentina and Brazil; this has created incentives for producers to expand production.

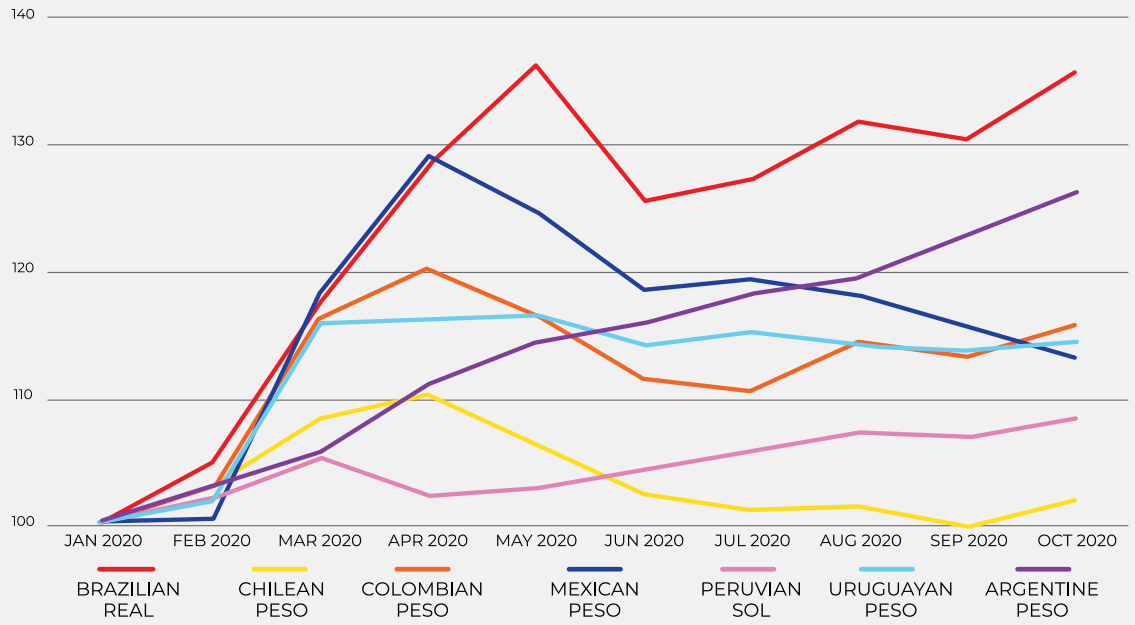
[14] The price of oil in 2020 was strongly influenced by a price war in the sector.

[15] Lowering the cost of inputs would help stabilize farm incomes and ease downward pressure on farm prices (Schmidhuber and Qiao, 2020).

Figure 2.1

Evolution of Exchange Rates, monthly averages, sample of seven currencies from Latin America and the Caribbean, 2020

(January 2020 = 100)



Source: Prepared by the author based on data from the IMF (Chilean peso, Colombian peso, Mexican peso, Uruguayan peso, Brazilian real and Peruvian sol) and the Central Bank of the Argentine Republic (Argentine peso).

In the sub-sectors that compete with imports, the depreciation of the exchange rate has strengthened the competitiveness of local production *vis-à-vis* imports.

However, the rise in the United States Dollar has made some inputs, such as agrochemicals and livestock medicines, more expensive, since many of them are usually imported, or manufactured domestically from imported raw materials. This has reduced producers' ability to buy inputs, especially those already facing liquidity constraints. The reduction in the use of inputs could result in a drop in yields. This issue is particularly acute in countries facing recurrent difficulties in accessing imported inputs, such as Haiti and the Bolivarian Republic of Venezuela.

2.2.2 Stakeholder perceptions

Given that it is still relatively early to fully quantify the impact of the pandemic on economic activity, several surveys have been carried out with producers, businessmen, technicians and government authorities. Their purpose is to better understand the situation of agricultural, fishing and aquaculture activities in Latin America and the Caribbean in the context of COVID-19. These surveys capture the stakeholders' own perceptions and perspectives on the challenges they face on the ground, and provide insights that can contribute to better targeted policy making.

In the Plurinational State of Bolivia, a survey conducted by the Ministry of Defence and the Ministry of Rural Development and Lands during the second quarter of 2020, among technicians and authorities from 120 municipalities, indicates that the COVID-19 pandemic has not been the most determinant factor in the 2019-2020 agricultural campaign (Mendoza *et al*., 2020). According to those surveyed, the health crisis comes in tenth place among the adverse phenomena that directly affected production, with a one percent incidence in the responses. For comparison purposes, the most frequently cited events were frosts (18%), hailstorms (17%) and droughts (17%). However, most informants do indicate that the pandemic indirectly impacted the commercialization of agricultural products. The lack of transportation, supplies, storage infrastructure and commercialization spaces – cited by 48, 42, 35 and 28 percent of the participants, respectively – is among the main issues caused by the pandemic. The concentration of difficulties in the commercialization stage, as well as the important role played by the lack of transportation, are findings that also figure among the main results of other surveys carried out in the region.

A survey conducted by the Inter-American Development Bank (IDB) with 105 family farmers in five Latin American and Caribbean countries – Argentina, the Plurinational State of Bolivia, Paraguay, Peru, and the Dominican Republic – also suggests that the pandemic's impact has been limited in the production stage, but significant in the commercialization stage (Salazar *et al*., 2020). Although a minority (23%) of those surveyed agree that the COVID-19 crisis affected production, the majority (65%) indicate that it did hinder commercialization of their products. The main reason for the drop in sales is the difficulty in transporting products to markets, reported by 70% of participants.

Regarding the upcoming harvest, 57% of farmers surveyed by the IDB agreed that production would not be affected by the pandemic, although a significant portion (39%) did believe that the health crisis would cause a reduction in production. This implies a difference of 18 percentage points between those surveyed who believed that the pandemic would hamper production and those who did not (compared with perceptions about the previous harvest). According to IDB researchers, the reduction in income has generated liquidity problems among producers and reduced their ability to acquire inputs. Regarding future sowing, just over half (53%) of those surveyed mentioned that they intended to plant less than usual due to the crisis, mainly due to the drop in demand and the difficulty in paying for inputs and transportation.

In Argentina, a survey carried out in July 2020 by the CREA Movement (Regional Consortia for Agricultural Experimentation) with a sample of 1 181 agricultural entrepreneurs, reveals that the sanitary isolation measures taken by national and provincial governments to tackle the pandemic did not generate negative impacts on the economic and financial situation of most companies, nor on commercialization. Among the agricultural companies that experienced difficulties in selling their products (15% of the total), many are located in provinces or municipalities that implemented restrictions which made it difficult to transport products, despite the fact that the activity should not

experience obstacles in this regard, since it is considered essential by the federal government. Furthermore, some regional products – such as pigs and sheep – experienced a significant reduction in domestic demand as a result of mandatory isolation, and met with difficulties when acquiring inputs (CREA, 2020a).

2.2.3 Value added

The value added of agricultural, fishing and aquaculture activity in Latin America and the Caribbean, at constant prices, decreased by 0.6 percent in the second quarter of 2020, compared to the same quarter of the previous year.[16] This result was due to a combination of factors, including the COVID-19 pandemic. The impact varied between different subregions: although the contraction was slightly more pronounced in South America (−0.9%), an expansion of 0.4% in Central America and the Caribbean was observed. The effect was also varied at the country level: 13 countries experienced negative growth, while 9 registered positive results (figure 2.2). The main downward instances occurred in Saint Lucia (−12.7%), Belize (−12.2%), Argentina (−10.8%), Jamaica (−7.9%) and Chile (−5.9%). In contrast, the most notable increases were observed in Paraguay (12.8%), the Dominican Republic (4.3%), Panama (4.1%), Barbados (3.7%) and Guatemala (2.0%).

Changes in value added result not only from the evolution of production, but also from the variation in prices. Although the second quarter of 2020 was characterized by a sharp drop in prices for a significant part of agricultural, fishery and aquaculture products, it is technically feasible that the impact on quantities produced was less intense. Our focus on the second quarter of 2020 is because this is the first period of analysis to occur entirely under the COVID-19 pandemic, and the only one with data available at the time of this writing.[17] The year's second quarter also coincides with the period when confinement and physical distancing measures in Latin America and the Caribbean were most widespread, given that several countries in the region relaxed freedom of movement restrictions as of June.

The 0.6 percent contraction in the value added of agricultural, fishing and aquaculture activity in LAC was modest compared to the 14.7 percent contraction in the region's gross domestic product (GDP) for the same period.[18] The low elasticity in the price of food products

[16] Author's calculation, based on official data from 22 countries in the region: Argentina, Barbados, Belize, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Saint Lucia and Uruguay. The added value of agricultural, aquaculture and fishing activity is used as a proxy for the added value of the primary food sectors, due to the unavailability of more detailed data. Food products represented 95% of the value of agricultural production in Latin America and the Caribbean in 2014–2018.

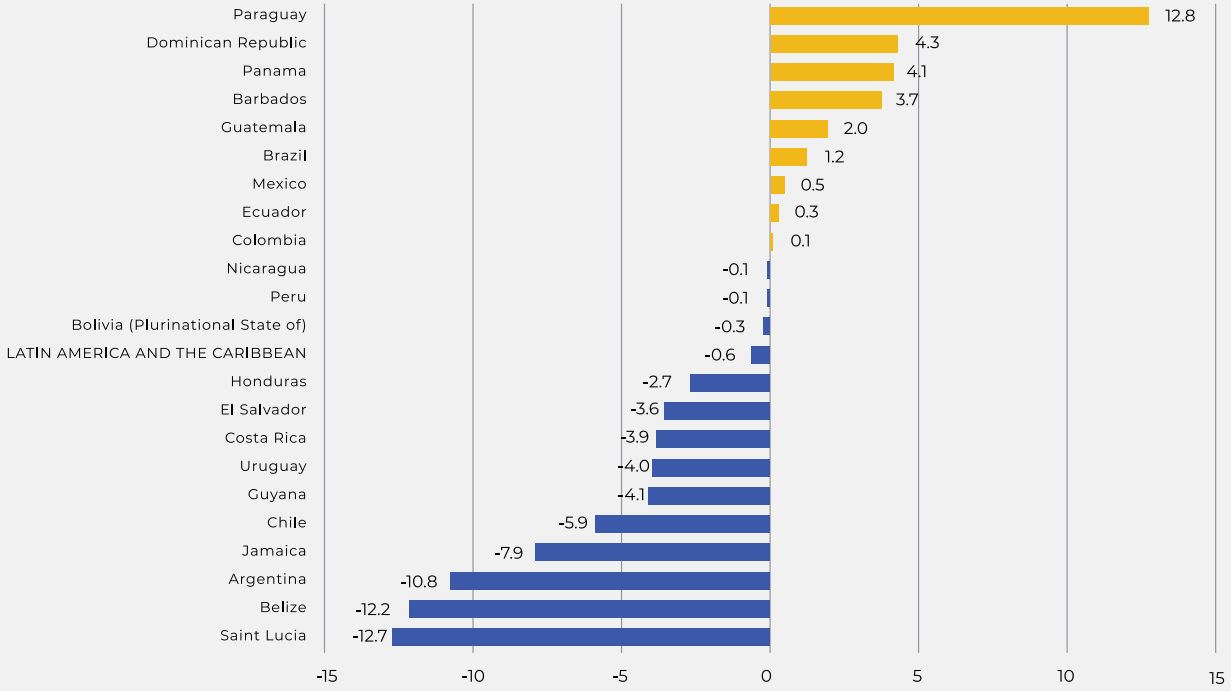
[17] Countries publish data on GDP and the added value of economic activities on a quarterly basis. Once the COVID-19 pandemic was declared on March 11, 2020, less than three weeks went by in the first quarter of 2020 under the global health crisis.

[18] Author's calculation, based on official data from 23 countries in the region: Argentina, Barbados, Belize, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Saint Lucia, Trinidad and Tobago, and Uruguay. At the time of this writing, no official data were available for the Bahamas, Cuba, Haiti, Suriname, Venezuela (Bolivarian Republic of) and the countries of the Lesser Antilles (except Barbados, Saint Lucia and Trinidad and Tobago).

Figure 2.2

Growth Rate of the Agriculture, Livestock, Fisheries and Aquaculture Value Added, Latin America and the Caribbean, second quarter of 2020, by country

(Percentage)



Source: Prepared by the author based on official national data.

Notes: Value added at constant prices.
For all countries, except Barbados and Guyana, the growth rates refer to the second quarter of 2020, compared to the same quarter of 2019. For Barbados and Guyana, the growth rates refer to the first semester of 2020, relative to the same semester of 2019.
At the date of this writing, data not available for the Bahamas, Cuba, Haiti, Suriname, Venezuela (Bolivarian Republic of) and the countries of the Lesser Antilles (except Barbados and Saint Lucia).

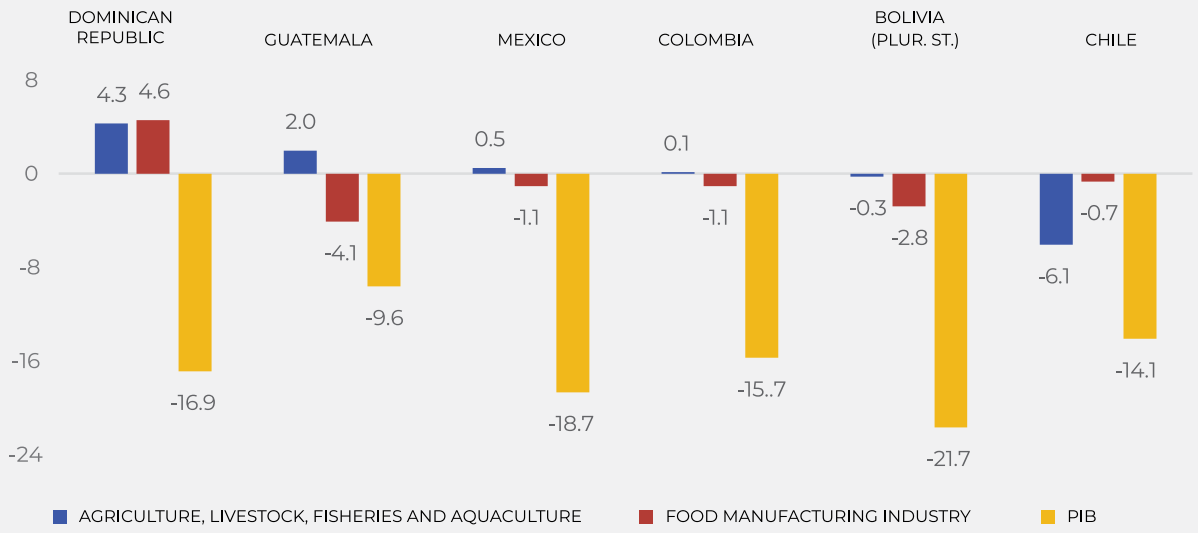
explains, in part, the greater relative resilience of the food-producing sectors. The condition of being considered an essential activity also helps explain the lower retraction in production for these sectors.

A sample of six countries in the region which have available data for the food manufacturing industry indicates that this industry also showed results above GDP for the second quarter of 2020 (figure 2.3). In four of these countries (Colombia, the Plurinational State of Bolivia, Guatemala and Mexico), the food manufacturing industry underperformed the agricultural, fishing and aquaculture industries. However, the industry did outperform the primary food sectors in two other countries (Chile and the Dominican Republic). The greatest differences between the growth rates for these sectors were observed in Guatemala (6.1 percentage points in favour of the primary sectors) and Chile (5.4 percentage points in favour of the food manufacturing industry).

Figure 2.3

Growth Rates for GDP, Food Industry Value Added, and Agricultural, Fisheries and Aquaculture Activity Value Added, selected countries of Latin America and the Caribbean, second quarter of 2020

(Percentage)



Source: Prepared by the author based on official national data.

Notes: Value added at constant prices. Growth rate compared to the second quarter of 2019. Countries ordered by the growth rate of agricultural, fishing and aquaculture activity value added.

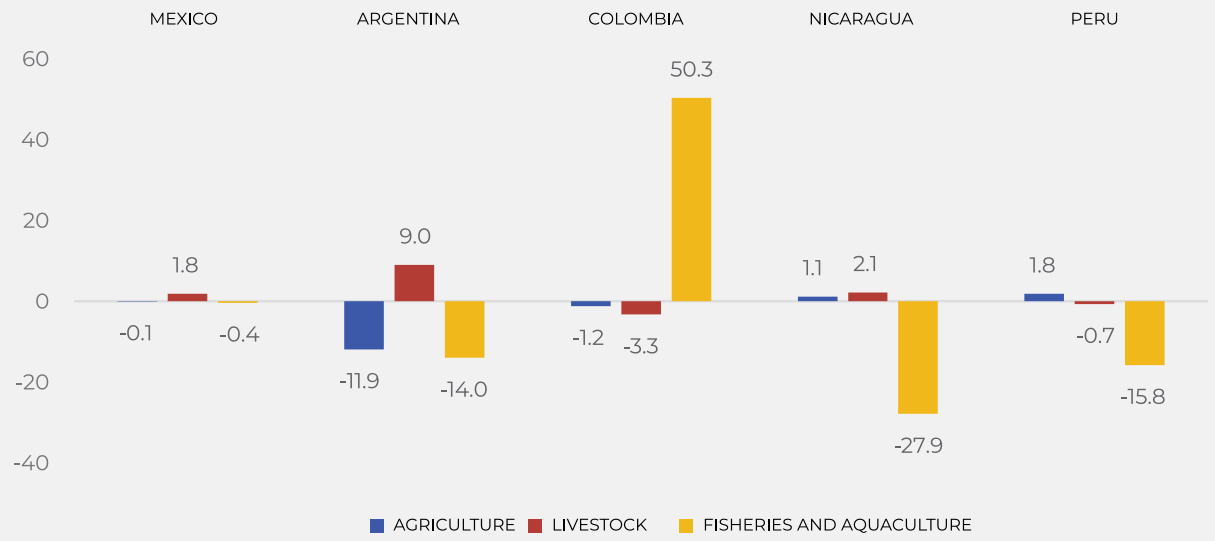
Significant variations are observed at the subsector level. In Brazil, a country responsible for 47 percent of the value of agricultural food production in Latin America and the Caribbean in 2014-2018, the second quarter of 2020 was characterized by an expansion of agriculture and a retraction of livestock. The opposite occurred in Argentina and Mexico, where the added value of livestock increased compared to the second quarter of 2019, while those of agriculture, fisheries and aquaculture decreased. Nevertheless, the magnitude of changes in these two countries was different (figure 2.4). In Mexico, the modest rise in livestock (1.8%) more than offset even more modest declines in agriculture (−0.1%) and fishing (−0.4%), resulting in an overall growth of 0.5% for agriculture, livestock, fishing and aquaculture as a whole. On the contrary, in Argentina, substantial drops in agriculture (−11.9%) and fishing (−14.0%) outweighed the rise in livestock (9.0%), resulting in a negative performance overall (−10.8%).

In turn, in Colombia, both agriculture and livestock experienced negative growth (−1.2 and −3.3%, respectively), which were offset by a 50.3% expansion in fishing and aquaculture. As a result, the sector's added value as a whole grew by 0.1%. In Nicaragua, a scenario diametrically opposed to that of Colombia was observed: agriculture and livestock grew (1.1% and 2.1%, respectively), while fishing and aquaculture

Figure 2.4

Growth Rates for Agriculture, Livestock, and Fisheries and Aquaculture Value Added, selected countries of Latin America and the Caribbean, second quarter 2020

(Percentage)



Source: Prepared by the author based on official national data.

Notes: Value added at constant prices. Growth rate compared to the second quarter of 2019.

decreased 27.9%. As a consequence, the overall added value of agriculture, livestock, fishing and aquaculture decreased by 0.1%. In Peru, the situation was similar the one observed in Nicaragua, with the exception of a modest decrease in the value added of livestock.

The impact of the COVID-19 pandemic on food production in Latin America and the Caribbean cannot be viewed in isolation from other factors such as weather conditions, plagues and diseases, and public policies. The pandemic has not been the only, nor necessarily the most important, of the forces behind the shifts observed in 2020. Its role as an explanatory variable has varied significantly between countries and sectors. For example, the emergence of COVID-19 has not been the most determining factor in the drop in value added for agricultural, fishing and aquaculture activity seen in Belize and Chile in the second quarter of 2020.

In Belize, adverse weather conditions and pests reduced the yields of important crops. Sugarcane production – the country's main agricultural product – decreased by 14.0 percent in the second quarter of 2020, compared to the same period in 2019, due to the drought of 2019 and early 2020 (SIB, 2020).[19]

[19] In turn, Belize's sugar production fell by 24.9 percent in the second quarter of 2020, compared to the same quarter of 2019. This was due to the reduction in sugar cane deliveries, as well as high levels of sludge in the cane, caused by torrential rains in May and June 2020 (Statistical Institute of Belize, 2020).

In turn, orange and grapefruit yields contracted due to drought and citrus greening disease, while shrimp farming was hampered by early mortality syndrome (Central Bank of Belize, 2020).

In Chile, fruits and annual crops were severely affected by a prolonged drought. According to the Central Bank of Chile (2020), the reduction in value added of fruit crops in the second quarter of 2020, compared to the same period of 2019, was due to a lower production of nuts, kiwis, apples and wine grapes, caused by both water scarcity and excessive temperatures. Regarding annual crops, drought and the reduction of sown areas contributed to significant drops in the production of corn and wheat. In turn, the establishment of biological closures in the north of the country resulted in lower catches of anchovy, which triggered a 6.3 percent drop in fishing activity value added in the second quarter of 2020, with regards to the same quarter of 2019 (Central Bank of Chile, 2020).

However, in some sectors the pandemic has indeed been the most determining factor. For example, in Belize, the closure of the borders with Guatemala and Mexico due to the health emergency paralyzed exports of cattle and caused a 68.9 percent drop in livestock production during the second quarter of 2020, compared to the same quarter of 2019 (SIB, 2020).[20]

[20] Before the pandemic, Belize's beef cattle exports were mostly done informally. The first formal exports were made in August 2020, under new cross-border trade mechanisms agreed with neighbouring countries. Formalizing these trade flows has been a positive outcome brought on by the COVID-19 crisis.

In Honduras and Peru, the COVID-19 pandemic has been the main determining factor in the retraction of the livestock subsector, since it prevented the normal operation of restaurants, hotels and other related establishments. It also led to lower demand due to the drop in household income (Central Bank of Honduras, 2020; INEI, 2020b). In the second quarter of 2020, a drop of 0.7% was observed in Peruvian livestock value added, compared to the second quarter of 2019; this was driven by decreases in the production of cattle (−3.7%) and poultry (−0.6%) (INEI, 2020b).

Contraction in external demand caused by the COVID-19 pandemic has also been a determining factor in the production drop of food products in Latin America and the Caribbean. For instance, cultivation of melons, watermelons, shrimp and fish in Honduras, as well as the capture of shrimp and lobsters, have contracted as a result of decreased orders from trade partners, due to the closing of hotels, restaurants and schools (Central Bank of Honduras, 2020).

2.3 THE PANDEMIC'S IMPACT ON CONSUMPTION

Food demand in Latin America and the Caribbean has undergone significant changes due to the COVID-19 pandemic. On the one hand, the health crisis' adverse effects on economic growth, employment and income have caused a significant reduction in families' purchasing power and altered the composition of demand in favour of cheaper foods. On the other hand, the measures adopted to contain the spread of the virus have fostered consumption

habit transformations among the population. For instance, restrictions on people's mobility and limitations on the operation of outdoor produce fairs decreased the demand for fresh food and encouraged the purchase of storable and less perishable products. In turn, the closing of schools and universities, restrictions on food services, the tourism standstill and the suspension of sporting events, cultural festivals and other gatherings, have contributed to a drastic reduction in the consumption of food outside of home, which has only been partially offset by an increase in consumption within the household.

The pandemic's impact on the consumption of food products in Latin America and the Caribbean has varied between countries and subsectors, as well as over time. At first, families increased the volume of their purchases – especially of less perishable products –, which resulted in empty supermarket shelves in several countries in the region. Beyond this initial period, dominated by so-called "panic shopping", other changes were observed in the population's consumption habits. Such changes were reflected not only in the quantities demanded of each product, but also in the prevalence of different market channels (fairs vs. supermarkets), transaction segments (face-to-face vs. online) and places of consumption (establishments vs. households). In some countries, the gradual relaxation of social isolation measures between June and September 2020 reversed the downward trend in consumption of certain food products. However, the pandemic may have contributed to a change in consumer behaviour and priorities, creating new trends or accelerating existing ones.

In Latin America and the Caribbean, the health crisis has contributed to a reduction in demand for more expensive and perishable products, as well as for food previously consumed mainly outside the household. These trends have been partially offset by an increase in the consumption of cheaper and less fresh food products, which contributes to a weakening of diets' nutritional profiles. The pandemic's impacts on hunger and malnutrition in the region are analysed in detail in Chapter 3.

The pandemic has influenced consumer behaviour in the region. Many have adapted their shopping habits to the restrictions dictated by the emergency. Some of these changes can potentially transform food demand in the long term, especially if containment measures for the novel coronavirus prove durable. The region's experience with past economic crises suggests that shifts in consumer habits can last. The following subsections analyze the main transformations that have affected food product demand in the region: reduction of employment and family income, reduction of consumption outside the household, changes in market channels, the strengthening of online shopping and changes in relative prices.

Reduction in employment and income

An 8.1% drop in LAC's GDP is expected for 2020, the second largest drop among all world regions, surpassed only by South Asia (figure 2.5) (IMF, 2020a). Additionally, workers in the region have been the most affected globally: it is estimated that income from work fell by 19.3% during the first three quarters of 2020, while the reduction was less than 11% in Africa, Europe,

the Arab States, North America and most of Asia (figure 2.6) (ILO, 2020b). This more pronounced deterioration of the labour market in Latin America and the Caribbean is due, in large, to the high prevalence of informality in the region, with an estimated 80% loss in informal workers' income (ILO, 2020a).[21] As a result, the significant reduction in worker purchasing power has triggered important changes in the eating habits of families in the region.

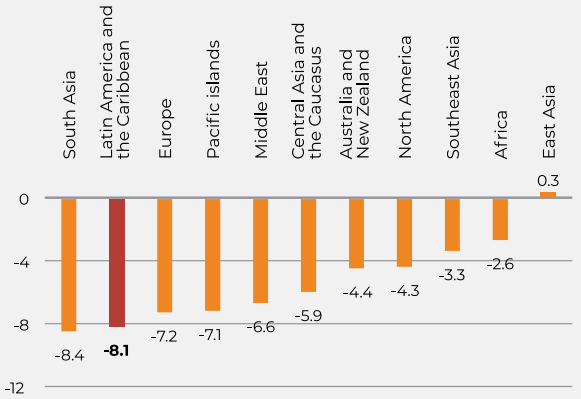
In the first months of the pandemic, the reduction in household purchasing power in Latin America and the Caribbean was aggravated by the retraction in remittances received from family members living abroad. While this problem was acute between March and May 2020, it reverted in the following months. Figure 2.7 shows that remittances received by six countries in Latin America and the Caribbean fell drastically in March and April 2020, compared to the same months in 2019, but recovered since May in three of these countries (Jamaica, Mexico and the Dominican Republic) and since June in three others (Colombia, El Salvador and Guatemala). The increase in remittances is partly explained by the improvement in employment figures in the United States of America, the main country of origin for family remittances received in Latin America and the Caribbean. The unemployment rate in this country fell 2.3 percentage points between July and September 2020 (from 10.2 to 7.9%), while the reduction was 2.6 percentage points among Hispanics (from 12.9 to 10.3%).

[21] Labour informality reached 51 percent of employed persons in Latin America and the Caribbean in 2019 (ILO, 2020c).

Figure 2.5

Real Gross Domestic Product Growth, 2020, by region

(Percent change)



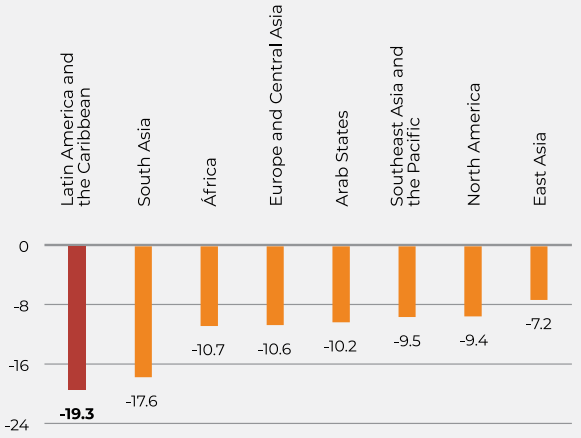
Source: Prepared by the author based on IMF data.

Note: North America refers to Canada and the United States of America.

Figure 2.6

Earned Income Growth, January – September 2020, by region

(Percent change)



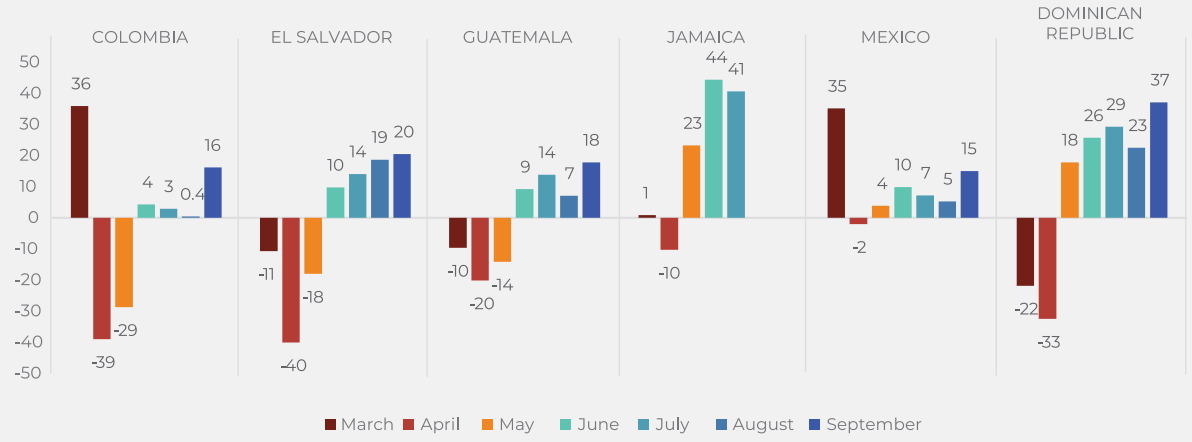
Source: Prepared by the author based on ILO data.

Note: Growth compared to the period of January to September 2019.

Figure 2.7

Growth in Remittances Received, sample of six countries in Latin America and the Caribbean, January to September 2020

(Percent change compared to 2019)



Source: Prepared by the author based on official national data.

Notes: For Jamaica, data available from March to July; for the other countries, from March to September.

Although food demand tends to be inelastic in relation to income, the type and quality of the products consumed are more susceptible to changes due to reduced family budgets. Substituting for cheaper food products has been one of the strategies adopted by families to cope with the crisis. Price has become a more important decision-making factor than before the pandemic. Therefore, consumers are more careful when shopping at different sales point. This has resulted in a change in the mix of products purchased by families, lowering demand for some foods and increasing it for others.

The drop in family income has motivated consumers to seek more affordable sources of protein. This has implied a reduction in the consumption of meat, dairy products and fish, and an increase in the consumption of eggs and plant-based proteins. This type of substitution has been commonly observed in Latin America and the Caribbean in periods of economic recession. In certain countries, the health crisis has accelerated pre-existing trends, also influenced by weak economic performance and growing levels of poverty and inequality.

Part of the substitution of animal protein has occurred between different types of meat. In Uruguay, for example, total meat consumption fell by 4.8% in the first three quarters of 2020, compared to the same period of the previous year. This was manifested by reductions in the consumption of pork (7.2%), beef (11.2%) and sheep meat (28.8%) (INAC, 2020). However, consumption of poultry meat increased by 12.6% during the same period, driven by consumers' shift towards cheaper protein sources. A similar trend was observed in Argentina, but more modest in magnitude: consumption of poultry meat increased by 2.5% in the first eight months

of 2020, compared to the same period of 2019, while consumption of pork and beef decreased by 0.7% and 1.5%, respectively (MAGYP, 2020a, 2020b, 2020c).

Consumers have also migrated between different cuts of the same type of meat, which has contributed to a reduced demand for more expensive cuts in favour of more affordable cuts. In Brazil, substitution between cuts of beef has led to an increase in the relative prices of the cheaper cuts. For example, fillet mignon, considered a noble cut, accumulated a price drop of 22.7% in the first half of 2020, while *cupim* (hump of zebu), a cheaper cut, registered a price increase of 4.2% in the same period (IBGE, 2020a).

Among social strata and lower-income countries, meats have been replaced in greater number by eggs and products of plant origin. In Peru, egg consumption increased by 3.6% in the first eight months of 2020, compared to the same period of 2019, while chicken meat consumption increased by 1.6%, just slightly above population growth. On the other hand, consumption of milk, processed meats and cheese fell by 4.6, 11.8 and 23.0%, respectively (MINAGRI, 2020a, 2020b).

The drop in work-derived income has been partially and temporarily offset by government transfers (in kind or in food) to low-income consumers and more vulnerable populations. In Honduras, for instance, Operation Honduras Solidaria supplied non-perishable food from house to house, in order to avoid gatherings. The first distribution stage, which began in late March, served 695 000 families, while distributions carried out in July and August served 803 000 and 730 000 families, respectively (Secretaría de Defensa Nacional, 2020). In Guatemala, the government introduced the Bono Familia, a cash transfer of up to 1000 *quetzales* a month (about USD 130), for three months, to approximately 2 million households. Similar programmes have been introduced, adapted, or expanded in most of the region in response to the pandemic. Nevertheless, many countries are facing difficulties in extending transfers, given the reduction in revenues caused by the economic slowdown. The pandemic's effect on food product consumption will be greater when current government transfers are interrupted.

Reduced consumption away from home

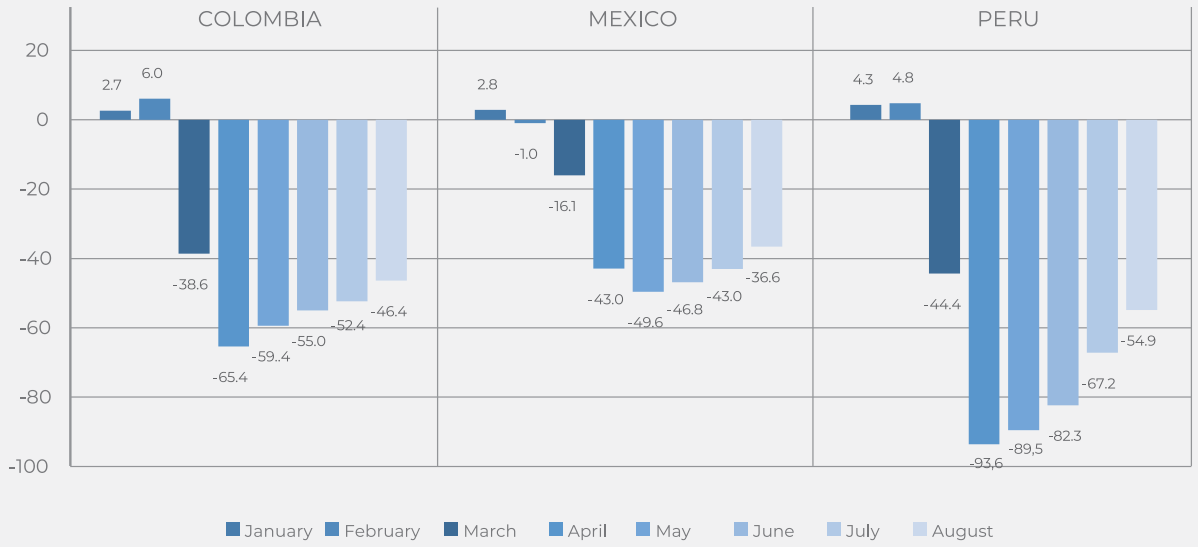
The pandemic has transformed eating habits in Latin America and the Caribbean. With the shift from workplaces to homes and the closing of schools and universities, meals that were previously prepared in restaurants, bars, cafes and canteens began to be prepared at home. This has implied changes in food product demand, since the items most commonly consumed at home tend to be different from those consumed away from home.

The pandemic has dealt a severe blow to the foodservice sector. In the second quarter of 2020, the sector's value added decreased by 68.4% in Argentina, 46.6% in Mexico, 41.1% in Guatemala and 35.4% in Saint Lucia, compared to the same quarter of the previous year (Bank of Guatemala, 2020; CSO, 2020; INDEC, 2020c; INEGI, 2020). In Peru and Colombia, real income from food and beverage preparation services registered a decrease of 53.9% and 40.4%, respectively, in the first eight months of 2020, compared to

Figure 2.8

Real Monthly Revenue Growth from Food and Beverage Preparation Services, Colombia, Mexico, and Peru, 2020

(Percent change compared to 2019)



Source: Prepared by the author based on data from DANE, INEGI and INEI.

the same period of the previous year (DANE, 2020; INEI, 2020a).[22] The drop in the sales of restaurants, bars and catering services was even sharper in April 2020, when the revenues of these establishments fell by 93.6% in Peru and 65.4% in Colombia. Since then, in response to the implementation of the different phases of economic reactivation, progressively lower drops have been observed in these countries (figure 2.8). However, revenues from food and beverage services in Peru, Colombia and Mexico for August 2020 were 54.9, 46.4 and 36.6% lower, respectively, than in August 2019.

In Chile, fast-food sales registered a 75.7% drop in the second quarter of 2020, compared to the same period in 2019. On average, only 30% of the country's fast-food outlets were open in this period, mostly offering only home delivery or pick-up services (CNC, 2020).[23] In many Latin American and Caribbean countries, restaurants have adapted to new circumstances through greater adherence to home delivery and pickup services. In Brazil, for instance, the proportion of restaurants offering home delivery services increased from 49% in March 2020 to 63% in September of the same year, while the proportion of customers eating outside the restaurants (home delivery or pick-up) went from 49% to 85%.

[22] DANE figures, published in nominal values, have been converted into real values based on the Consumer Price Index (CPI) for the food and non-alcoholic beverage division.

[23] In Chile, a large part of the fast-food outlets is located in shopping centres. Therefore, these were unable to open due to the physical isolation measures in force in the country at the time.

The reduction in consumption away from home has unevenly affected various food subsectors. Vegetables, sugar, meats, fish and seafood are among those most negatively impacted, given the important weight that consumption away from home used to have in the total consumption of these products before the pandemic. For these products, the observed increases in consumption at home have not offset the drop in the volumes sold to restaurants, bars, schools and other establishments. In Brazil, for example, lettuce sales fell 22% in March, April and May 2020, compared to the same period in 2019, largely due to the reduced demand from restaurants and cafeterias (CONAB, 2020a). In the case of iceberg lettuce, the most common variety in restaurants, especially the fast-food segment, the decline was 33%. Despite the subsequent relaxation of social isolation measures, demand did not go back to normal: although lettuce sales in the state of São Paulo increased by 9% in July 2020, compared to June of the same year, the volume was 18% lower than in July of the previous year (CONAB, 2020c). The year-on-year drop in the level of trade was due to reductions in both demand and supply, as many producers also reduced sowing in response to the uncertainties posed by the pandemic (see section 2.2).

Sugar consumption has also been negatively impacted by the drop in consumption away from home, especially by the reduction in carbonated beverage sales. Following the closing of restaurants, bars, cinemas and stadiums, The Coca-Cola Company and PepsiCo's beverage sales volumes in Latin America and the Caribbean fell by 9% in the second quarter of 2020, compared to the same quarter of 2019. This retraction was more moderate in the third quarter of 2020 (4% in the case of Coca-Cola and 7% for Pepsi), due to the relaxation of social isolation measures in some countries. Coca-Cola's partial recovery in sales volume was driven by a solid performance in Brazil (8% sales expansion compared to the third quarter of 2019), while results remained negative in the Southern Cone (−8%) and the rest of Latin America and the Caribbean (−6%). It should be noted that the company uses sugar in the production of its carbonated beverages in most of the region, but not in Mexico, where it mainly uses high fructose corn syrup. It is estimated that the use of sugar by Coca-Cola in Latin America and the Caribbean fell by 11.7% in the second quarter of 2020, and 2.3% in the following quarter, compared to the same quarters of 2019.[24] The decrease in sugar consumption in South America would contribute to the 1.5% drop expected for world consumption in 2020, while in Mexico the reduction would be minimal (Rabobank, 2020).

Changes in market channels

Traditional market channels, such as outdoor produce fairs, street kiosks, and informal commerce, have been adversely affected by isolation and physical distancing measures in several Latin American and Caribbean countries. In certain places, the fairs have been suspended, while in others their hours or frequency of operation have been restricted. In Chile, for instance, 20% of the 1 114 produce fairs saw their services partially or totally altered in April 2020, while 27 of the 346 municipalities

[24] Author's calculations based on data from The Coca-Cola Company (2020a, 2020b). It is estimated that the use of high fructose corn syrup by the company in Latin America and the Caribbean fell by 6.0%, both in the second and third quarters of 2020, compared to the same quarters of 2019.

closed their fairs (Escobar *et al*., 2020). These types of barriers to traditional market channels have led to increased consumer dependence on supermarkets.

Higher supermarket prices, compared to the prices of traditional channels, have reinforced the loss of household purchasing power, which already face difficulties due to the reduction in income from work and family remittances. In this context, the difficulty of accessing produce fairs and other traditional market channels has intensified demand for cheaper and potentially less nutritious food, which could negatively impact food security in the region.

A survey of 4 265 consumers in Brazil conducted in May 2020 revealed that the percentage of consumers who purchased vegetables in street markets and kiosks fell from 21% before the pandemic to 11% today (Nascimento *et al*., 2020). On the other hand, supermarkets consolidated their position as the main vegetable outlet in the country, reaching 33% of shoppers, compared to 28% before the pandemic. The proportion of consumers in the survey who indicated buying directly from producers also increased (from 8% to 13%).

In the context of the COVID-19 health crisis, alternative market circuits have been strengthened, offering a source of fresh, local, healthy and agro-ecological food, which reflects the preferences of a segment of consumers who increasingly demand higher health standards and socio-environmental sustainability (Barrionuevo *et al*., 2020). The pandemic has generated greater consumer awareness about nutrition and health, encouraging nutrient and vitamin-rich diets that strengthen the immune system. As a result, the cultural and territorial identity of many food products has also been enhanced as an element of market differentiation. For example, in Ecuador, Cooperativa Sur Siendo, which connects 100 producers with consumer groups in Quito through online orders, quadrupled the number of baskets sold per week, possibly as a result of the closing of produce fairs (Barrionuevo *et al*., 2020).

A part of the expense that families used to make on meals away from home has also been transferred to the purchase of food in retail stores. As a result of restrictions on the operation of both produce fairs and food services, supermarkets in Latin America and the Caribbean strengthened their position during the first months of the pandemic. In March 2020, supermarket sales grew 22.6% in Colombia, 16.3% in Mexico, 11.0% in Brazil, 9.6% in Argentina and 7.2% in Chile, compared to March 2019 (figure 2.9). Between April and July, sales remained above previous-year levels in Brazil, Colombia and Mexico, but they fluctuated significantly in Argentina and Chile. In August 2020, sales slowed in all sampled countries, except in Chile, where an exceptional expansion was observed.[25]

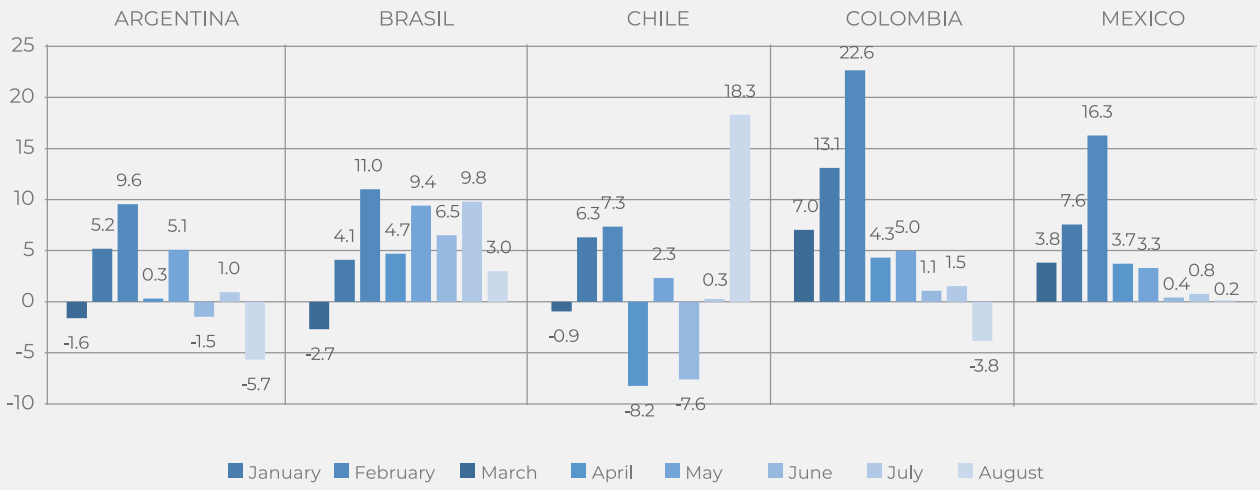
In the second quarter of 2020, the sales of food products on the two largest retail groups in Brazil – Carrefour Brazil and GPA – increased by 16.2% and 18.0%, respectively, compared to the second quarter of 2019. In Mexico, the four

[25] Law 21 248, which came into force on July 31, 2020 and allows the withdrawal of up to 10% of the value of pension funds, may have contributed to the increase in Chilean supermarket sales in August. The graduation of some communes to phase 2 of the Step by Step plan (*Paso a Paso*) may also have contributed.

Figure 2.9

Real Monthly Sales Growth of Supermarkets, Argentina, Brazil, Chile, Colombia and Mexico, 2020

(Percent change compared to 2019)



Sources: Prepared by the author based on data from DANE, IBGE, INDEC, INE and INEGI.

Notes: Data for Colombia correspond to non-specialized retail businesses which predominantly sell food, beverages or tobacco; those in Mexico correspond self-service retail stores.

largest self-service competitors also reported revenue increases in the same period. However, according to a qualitative survey conducted among supermarket managers in Argentina, 44.4% of the informants considered that their sales decreased in September 2020 due to the COVID-19 pandemic, while 2.8% indicated that their sales increased, and 52.8% agree that they did not change (INDEC, 2020b).

Growth of the digital segment

The COVID-19 pandemic has contributed to an increased adoption of digital technologies to commercialize food products in Latin America and the Caribbean. Consumers have responded to the pandemic by adhering more to digital commercialization segments, especially among the highest socioeconomic levels.

In Argentina, online supermarket sales grew by 320% in the first half of 2020, compared to the same period of the previous year (INDEC, 2020a). Digital segment penetration in total supermarket sales reached 6.1% in Argentina in July 2020, and 13.2% in Chile in June of the same year. These levels are comparable to those observed in the United States of America (6.6%), France (10.2%) and the United Kingdom of Great Britain and Northern Ireland (12.4%) (Cencosud, 2020; INDEC, 2020a; Kamel *et al.*, 2020). In Brazil, digital food sales in Carrefour Brasil and GPA – the two largest retail groups in the country – grew 377% and 272%, respectively,

in the second quarter of 2020 (Grupo Carrefour Brasil, 2020; GPA, 2020). In June 2020, the online segment share in total food sales reached 7.7% in Carrefour Brazil and 15.3% in GPA. In Mexico, average daily unique visitors to online supermarkets grew by 250% between March and June 2020. After the reopening of shopping centres and physical stores, this average decreased gradually, stabilizing in August 2020 at 150% above pre-pandemic times (AMVO, 2020).

However, given the high degree of socioeconomic inequality in the region, there are significant gaps in consumer access to digital technologies. For instance, while 77.3% of Brazil's population and 70.3% of Costa Rica's population had connectivity options with quality standards in 2018, the corresponding rates in Honduras and Peru were 37, 6% and 47.6%, respectively (IICA *et al*., 2020). There are also considerable digital gaps between socioeconomic strata, regions of the same country, and between cities and the countryside. For instance, in a sample of seven Latin American countries, less than 36.8% of the rural population had access to quality connectivity services in 2018, while the comparable figure for urban areas was 71% (IICA *et al*., 2020).

In several countries in Latin America and the Caribbean, new businesses have opened offering food products online, interacting with consumers through social media or instant messaging applications, and providing home delivery. Chapter 9 analyses the impact of new information and communication technologies on food supply and distribution systems in the region.

2.4 THE PANDEMIC'S IMPACT ON INTERNATIONAL TRADE

The value food product exports from Latin America and the Caribbean increased by 8.4% in the first eight months of 2020, compared to the same period of 2019. This increase was driven by exchange rate depreciation (see section 2.2), the rise in world food prices (see section 2.5) and the expansion of import demand from East Asia. On the other hand, the value of Latin American and Caribbean food product imports decreased by 3.2%, which resulted in an increase of 13.6% in the value of the region's net food exports.

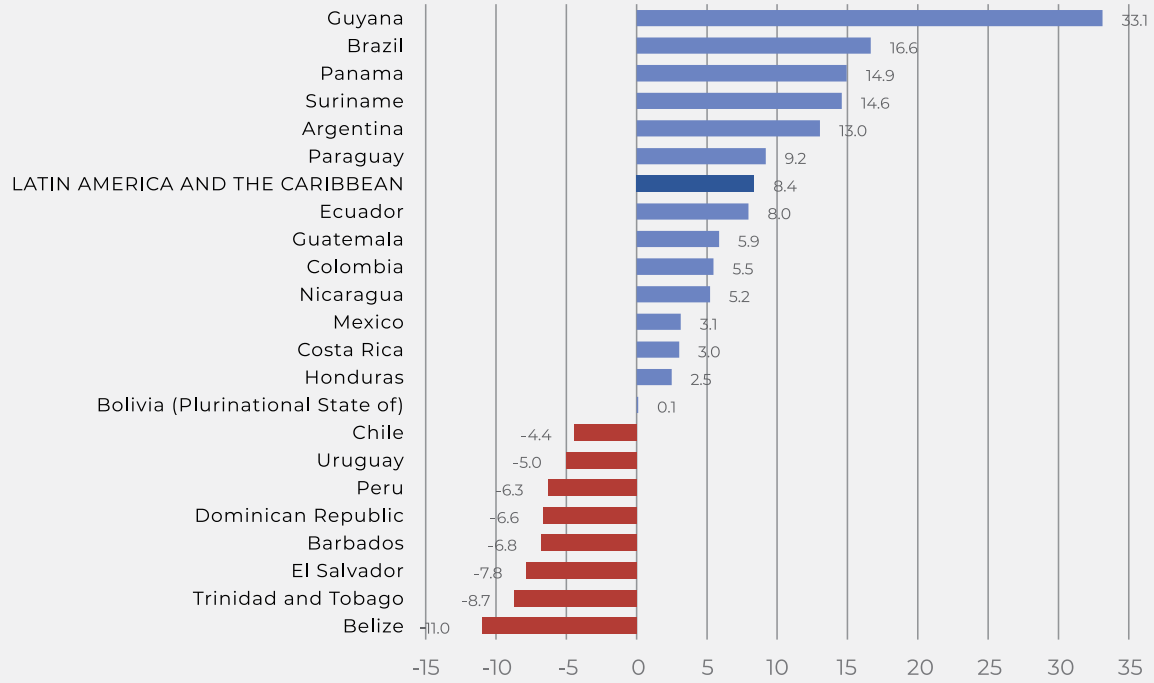
The expansion in exports was greater in South America (10.4%) than in Central America and the Caribbean (2.9%). However, the impact was varied among countries: 14 showed expansions, while 8 registered negative results (figure 2.10). The largest relative increases were seen in Guyana (33.1%), Brazil (16.6%), Panama (14.9%), Suriname (14.6%) and Argentina (13.0%). On the other hand, the main drops occurred in Belize (−11.0%), Trinidad and Tobago (−8.7%), El Salvador (−7.8%), Barbados (−6.8%) and the Dominican Republic (−6.6%).

Among the Latin American and Caribbean countries with the highest relative increases in food product exports, two of them are small countries (Guyana and Suriname) where rice weighs importantly on exports, while other two (Argentina and Brazil) are large global exporters of oilseeds, vegetable oils, cereals, meat and sugar, among other products. Guyana and Suriname exported USD 265 million worth of food products in the first half of 2020; this equals

Figure 2.10

Growth Rate of Food Exports, Latin America and the Caribbean, 2020 (partial), by country

(Percentage)



Source: Prepared by the author based on official national data.

Notes: Chile, Costa Rica and Ecuador: January-July; Guyana, Panama, Suriname and Uruguay: January-June; Trinidad and Tobago: January-April; other countries: January-August. Data not available, at the date of this writing, for the Bahamas, Cuba, Haiti, Jamaica, Venezuela (Bolivarian Republic of) and the countries of the Lesser Antilles (except Barbados and Trinidad and Tobago). It includes chapters 1 to 4, 7 to 12 and 15 to 22 of the Harmonized System, except for position 2207.

less than 0.5% of the overall value exported by Latin America and the Caribbean in the same period. However, their rice exports soared in the context of the COVID-19 pandemic due to increases in cereal demand and prices. Rice exports from Guyana and Suriname grew 156% and 106%, respectively, in the first half of 2020, compared to the same half of the previous year, especially to countries in the Caribbean basin (the Bolivarian Republic of Venezuela, Jamaica and Trinidad and Tobago) and Europe. As a result, rice's share in total food export earnings increased from 35% to 66% in Guyana and from 20% to 37% in Suriname.

On the other hand, other traditional exporting subsectors suffered significant drops in their exports to other countries. Guyana's sugar exports dropped 37%, while fish and seafood exports were down 30% in Guyana and 16% in Suriname.

In absolute terms, food exports from Latin America and the Caribbean expanded by almost USD 11 billion in the eight months after the COVID-19 outbreak in Asia. Brazil has played a leading role in this expansion, since its food exports increased by USD 7.5 billion in the same

period, accounting for 68.3% of the total regional expansion. Argentina comes in second place, with an increase of USD 2.3 billion. Together, Brazil and Argentina account for 90% of the increase in the value of the region's food exports during the pandemic.

Brazilian sugar exports have been heavily impacted by the COVID-19 pandemic, but also by the price war that took place between several oil-producing countries. By restricting locomotion and transportation, the pandemic has decreased demand for fuel, which has impacted not only oil, but also biofuel prices, such as ethanol and biodiesel. In Brazil, ethanol and sugar are produced by the same processing plants and from the same raw material: sugar cane. Falling demand and prices for ethanol encouraged Brazilian producers to produce more sugar and less ethanol. For instance, in the second half of September 2020, Brazilian processing plants allocated 45.2% of sugarcane to sugar production and 54.8% to ethanol production, while a year before, the mix had been 34.6% for sugar and 65.4% for ethanol. As a result, sugar production grew 44% in the first five months of the 2020 harvest, compared to the same period in 2019, while export quantity increased 61% and export value 55%.

Meat exports from Brazil and Argentina have been influenced by depreciation in the exchange rate, but also by other factors not linked to the pandemic. For instance, the African swine fever decimated a significant part of the animals in China and increased the demand for imported meat. The Mexican meat sector benefited from the pandemic as disruptions in processing plants in the United States of America led to an increase in Mexican meat exports to this market. Exports of orange juice concentrate from Brazil, as well as citrus from Argentina, have also benefited from an increase in demand as a result of the pandemic, since such products are considered healthy and beneficial for people's immune systems.

In turn, cross-border trade has been negatively impacted from border closures. Section 2.1.3 analysed the case of cattle exports from Belize to Guatemala and Mexico. Similar cases were observed on the borders between Haiti and the Dominican Republic, and between Colombia and Ecuador. Restrictions on international air travel also hurt exports of fresh and higher value-added products. For instance, nearly half of Chile's fresh salmon shipments to the United States of America were previously on commercial passenger flights.

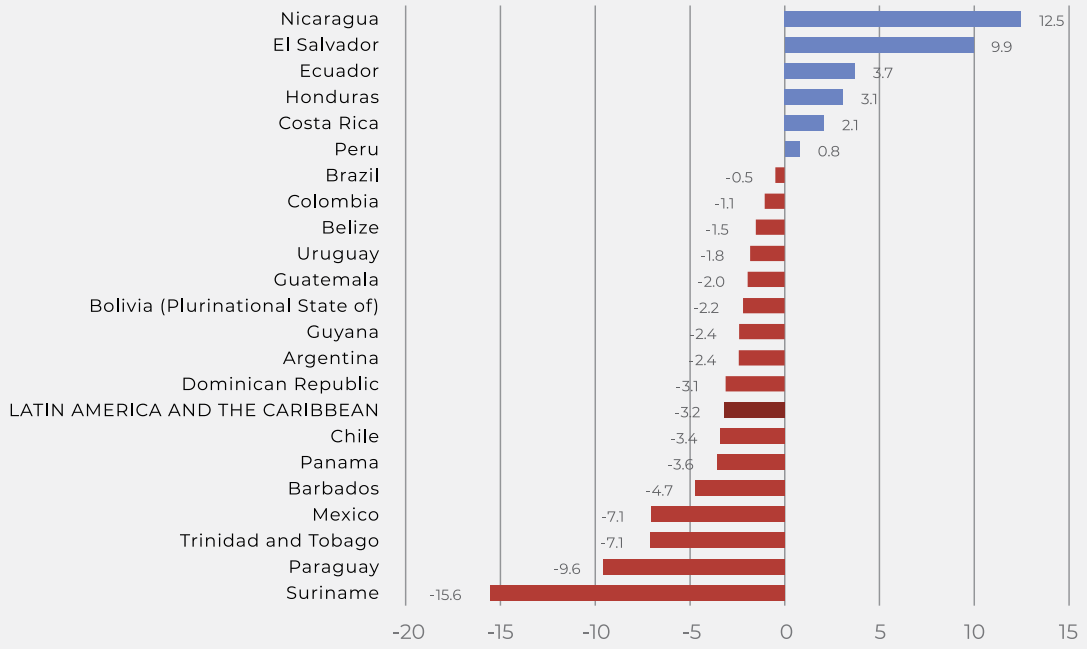
The pandemic's impact on food product imports has also varied significantly in the region. The value of imports fell in 16 countries but increased in 6 others (figure 2.11). The largest drops occurred in Suriname (−15.6%), Paraguay (−9.6%), Trinidad and Tobago (−7.1%), Mexico (−7.1%) and Barbados (−4.7%), while the most notable increases occurred in Nicaragua (12.5%), El Salvador (9.9%), Ecuador (3.7%), Honduras (3.1%) and Costa Rica (2.1 %).

Although the drop in the value of imports has been more evident in Central America and the Caribbean (−4.2%) than in South America (−1.6%), greatly varying results within the two subregions can be observed. Among Central American and Caribbean countries, imports fell in Mexico (−7.1%) and the Caribbean (−3.6%)

Figure 2.11

Growth Rate of Food Imports, Latin America and the Caribbean, 2020 (partial), by country

(Percentage)



Source: Prepared by the author based on official national data.

Notes: For Chile, Costa Rica and Ecuador, the data cover the period from January to July; for Guyana, Panama, Suriname and Uruguay, from January to June; for Trinidad and Tobago, from January to April; for the remaining countries, from January to August. Data not available, at the date of this writing, for the Bahamas, Cuba, Haiti, Jamaica, Venezuela (Bolivarian Republic of) and the countries of the Lesser Antilles (except Barbados and Trinidad and Tobago). Includes chapters 1 to 4, 7 to 12 and 15 to 22 of the Harmonized System, except for position 2207.

but rose in Central America (2.6%). In South America, most of the countries have undergone changes of less than 2.5%, the most notable exceptions being Suriname and Paraguay, where the greatest drops in the value of food imports were observed in all of Latin America and the Caribbean.

To secure domestic supplies and reign-in rising prices, several governments have temporarily eliminated or reduced import tariffs on key food products. The crisis has also presented an opportunity to review bilateral agreements that Latin American and the Caribbean countries maintain between themselves. For instance, Mexico reopened its market to Uruguayan rice imports (which had been suspended since 2019 due to the detection of a plague in several containers) and granted an annual quota of 100 000 tons of black beans to Argentina (FAO and ECLAC, 2020b). Such measures contribute to strengthen intraregional trade.

2.5 THE PANDEMIC'S IMPACT ON PRICES

The pandemic was one of the several factors that affected food product prices in 2020. Likewise, the health crisis' influence on them has varied from subsector to subsector, from country to

country, and over time. Up next, the pandemic's impact on world prices and consumer prices in Latin America and the Caribbean is reviewed.

World prices

The COVID-19 pandemic played a major role in the drop in world food prices between March and May 2020. Along with other factors, it also influenced the evolution of prices between June and October of the same year. The worsening of the health situation in Europe in October 2020, after the significant increase in the number of COVID-19 cases, and the subsequent tightening of physical distancing measures, increased uncertainties regarding demand, and may lead to declining world prices of food products.

The FAO Food Price Index – a measure of the monthly change in international prices of the most commonly traded basic food products – showed a V-shaped trajectory in the first ten months of 2020: first, it fell dramatically between January and May; then it rose rapidly between June and October. As the index consists of the weighted average of the sub-indices of five product groups (vegetable oils, sugar, meat, cereals and dairy products), it can mask important discrepancies between subsectors.

Between March and May, following the declaration of the COVID-19 outbreak as a global pandemic, world food prices fell dramatically, driven by demand contraction due to the pandemic's economic and logistical impacts. In May, the FAO price index reached its lowest since 2016. Other factors, such as the price war in the oil sector, trade disputes between the world's largest economies, and an expanding supply in several key producer countries also influenced world price behaviour during this period. The prices of sugar and vegetable oils were strongly affected, not only by reduced demand from the food sector, but also by the reduced demand for fuels and the collapse in the prices of oil, ethanol and biodiesel. As a result, the FAO price sub-indices for these two commodity groups registered the largest drops in the first five months of 2020. In turn, the price sub-index for cereals declined only marginally, as the increase in the international price of rice was not enough to offset the sharp drop in the price of corn, caused by reduced demand for both animal feed and biofuel production.

The FAO Price Index reached a tipping point in May. Between June and October, the sub-indices for vegetable oils, sugar, cereals and dairy products continued to rise, while the sub-index for meat remained on a downward trend. In October, the sub-indices for cereals and dairy products were 11 points and 0.5 points above their January levels, respectively, while the sub-indices for vegetable oils and sugar were close to recovering their January levels. In contrast, the sub-index for meat was 13 points below its January 2020 level. The rise in prices of four of the five product groups monitored by FAO was due to the confluence of three key factors: (i) the recovery of global demand, following the easing of restrictions related to the COVID-19 pandemic in several countries; (ii) the prospects for reduced production due to unfavourable weather conditions in some countries; (iii) the reduction of inventories to more than what was previously foreseen in many countries; and (iv) the partial recovery in international oil prices.

The FAO Fish Price Index – a weighted average of the monthly change in international price indices for five groups of fishery and aquaculture products (tuna, whitefish, salmon, other pelagic fish and shrimp) – showed a downward trend between January and April 2020, a partial recovery in May and June, and a further decline in July and August. During the first eight months of 2020, the index remained below the levels recorded for the previous three years. The sub-indices of four of the product groups showed downward trends in 2020, except for the tuna sub-index, which fluctuated month-on-month.

Consumer prices

Although variations in world food prices have influenced domestic prices in Latin America and the Caribbean, they have continued to be determined by internal dynamics. Such dynamics include supply and demand conditions, macroeconomic stability, exchange rates, and public policy instruments.

In July 2020, food inflation in Latin America and the Caribbean was the highest among all world regions. Estimated by FAO at 18.4%, it was almost three times higher than the world average of 6.6%. However, food inflation in Central America (5.8%) and the Caribbean (6.1%) remained below the world average. In contrast, the figure for South America (23.7%) was influenced by the high rates observed in the Bolivarian Republic of Venezuela (1 538%), Suriname (49.3%) and Argentina (43.3%). Food inflation rates in these countries were not only the three highest in the Western Hemisphere, but also among the six highest in the world, with the Bolivarian Republic of Venezuela occupying the first position worldwide, Suriname the fifth and Argentina the sixth. Haiti, with a food inflation rate of 26.5% in July 2020, ranked fourth in the region and eighth in the world.

Figure 2.12 illustrates the evolution of the Consumer Price Index (CPI) for food and beverages in other 16 countries in Latin America and the Caribbean during the period from January to August 2020. Among these countries, the greatest percent variations were registered in Guatemala (8.4%), Uruguay (6.2%), Jamaica (4.9%), Brazil (4.5%) and Honduras (4.4%). On the other hand, the variation was negative in Paraguay, null in El Salvador, and less than 2% in Costa Rica and Peru.

Overall, food prices followed different paths in the region's countries throughout the first eight months of 2020. In three countries (Colombia, Ecuador and El Salvador), the CPI for food and beverages reached a peak between April and June, and fell thereafter. In three other countries (Honduras, Jamaica and Peru), the index continued on an upward trend between March and July, but declined in August. However, five countries (Brazil, Chile, Guatemala, Mexico and Uruguay) showed almost uninterrupted growth in food prices between March and August. Likewise, in other four countries (Costa Rica, the Plurinational State of Bolivia, Paraguay and the Dominican Republic), the downward trend in prices registered between March and May gave way to an upward trend from June-July.

In nine sampled countries (Brazil, Chile, Colombia, Ecuador, El Salvador, Honduras, Mexico, Peru and Uruguay), the most significant increases in food prices occurred in the first

Figure 2.12

Monthly Evolution of the Consumer Price Index, Food and Beverages, sample of 16 Latin American and Caribbean countries, January to August 2020

(2014-2016 = 100)

Sources: Prepared by the author based on official national data compiled and published by ECLAC.

Notes: Figures for Brazil correspond to the National Consumer Price Index (INPC). Data for July and August 2020 not available for Nicaragua.

months of the pandemic, especially in March and April. Overall, the COVID-19 pandemic contributed to this increase through exchange rate depreciation, increased demand for key products in national basic food baskets, and a reduced supply caused by export restrictions introduced in some countries. In Brazil, for instance, expectations regarding social isolation caused peaks in demand and prices for rice, bananas, coffee and eggs, among other products (Kreter, Souza and Servo, 2020).

In four other countries (Costa Rica, the Plurinational State of Bolivia, Paraguay and the Dominican Republic), the most significant increases in consumer prices occurred in the last two months analysed (July and August). This coincides with the rebound in world prices, reflected in the recovery of the FAO Price Indices for vegetable oils, sugar, cereals and dairy products, mentioned above. It should be noted that exchange rate depreciation contributed significantly to the loss of purchasing power in countries and subsectors where an important part of the domestic supply comes from imports.

2.6 CONCLUSION

The COVID-19 pandemic and the measures taken to contain the spread of the virus have impacted production, consumption, international trade and prices of food products in Latin America and the Caribbean in an unprecedented fashion. However, effects have differed between countries, subsectors and actors, according to the organization of food systems, the underlying socioeconomic structures, and the level of exposure of producers and consumers to the various transmission channels.

Food production in the region has been more resilient than expected, especially among staples such as grains, oilseeds and sugar. However, more perishable products with higher value added, such as fish, seafood, meats, and vegetables, have suffered production drops in several countries. In the second quarter of 2020, value added of agricultural, fishing and aquaculture activities in Latin America and the Caribbean decreased by 0.6% compared to the same quarter of the previous year, a modest drop when compared to the 14.7% drop in regional GDP for the same period. The low price-elasticity for food demand, as well as the exclusion of agriculture, fishing and aquaculture from activities affected by mandatory social isolation measures, explain the greater resilience of the food-producing sectors.

However, the health emergency has unevenly affected producers of different scales. Particularly, family farmers, smaller ranchers and artisanal fishermen have been more vulnerable to social isolation measures. Among the main obstacles faced are the lack of transportation (for workers and products), limited access to inputs, storage infrastructure scarcity, and restrictions on the operation of produce fairs and informal market channels.

In several export-oriented countries and sectors, capital and technology-intensive agribusiness has expanded production and exports in light of exchange rate depreciation, recovery of import demand in East Asia and rising prices. However, the pandemic has also required the investment of considerable sums to adapt infrastructures and production processes, in order to reduce contagion in work environments and guarantee food safety. Still, in some cases the operation of processing and packaging plants has been temporarily paralyzed due to COVID-19 outbreaks. In other cases, business partners have temporarily suspended imports from certain companies due to the detection of traces of the novel coronavirus in food product packaging.

Restrictions in people's mobility and the generalized retraction of economic activity,

employment and income, have reduced households' purchasing power and changed their eating habits. Particularly, the pandemic has stimulated consumption of cheaper and less perishable foods, which could exacerbate food insecurity and malnutrition in the region. Due to the high labour informality prevalent in Latin America and the Caribbean, workers in the region have been those most adversely affected by the pandemic worldwide. Such impacts are often heightened in countries where food systems were already in crisis prior to the COVID-19 outbreak.

Restrictions in the operation of produce fairs and informal channels have led to greater consumer dependence on supermarkets. Higher prices charged in these channels have reinforced the loss of household purchasing power and intensified demand for cheaper and potentially less nutritious food. Likewise, restrictions on mobility have contributed to accelerating the adoption of digital technologies for the commercialization of food products, both through supermarkets' online channels and small businesses that interact with consumers through social networks or social media or instant messaging applications and home delivery. However, the pandemic has also contributed to an increase in direct purchases from producers and generated greater consumer awareness regarding nutrition and health, especially diets rich in nutrients and vitamins that strengthen the immune system.

In turn, limitations on the operation of food services, the closing of schools and universities, the tourism standstill and the suspension of cultural and sporting events have contributed to a reduction in food consumption away from home, which has been only partially offset by an increase in consumption within the household. This has reinforced shifts in food product demand, as items consumed at home tend to differ from those more commonly consumed away from home. Leafy vegetables, sugar, meats, fish, and seafood have been negatively impacted, given their significant weight on consumption away from home before the pandemic. At the same time, restaurants and similar establishments have adapted to the new circumstances through increased adoption of home delivery and on-site pick-up services.

The region's governments have taken countless measures to ensure food production and supply. Not only have they included agriculture, fishing and food manufacturing among the activities considered as essential (and therefore exempt from mandatory social isolation measures), but also developed new health and safety protocols, facilitated producers' access to credit, inputs and fuels, and promoted platforms to link producers more directly with consumers. Furthermore, to ensure minimal consumer access to food, several governments in the region have introduced, adapted, or expanded transfer programmes (in kind or in food) to low-income consumers and vulnerable populations. To control the rise in prices, several governments have temporarily eliminated or reduced import tariffs, awarded import quotas with preferential tariffs, and facilitated sanitary, phytosanitary and customs procedures. To guarantee income and stimulate demand, many governments have suspended social security charges, postponed payment of taxes, and strengthened or extended unemployment benefits.

The pandemic's adverse effects on consumers' eating habits and smaller producers' livelihoods may widen the gaps that already existed between the availability, access, and consumption of food in the region. To build back better in a post-COVID-19 world, it is crucial to draw lessons from the crisis and redesign public policies to incentivize transformations that promote food security, good nutrition, and the development of sustainable and inclusive food systems in the region. ■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3
HUNGER, FOOD INSECURITY, MALNUTRITION AND FOOD SYSTEMS IN LATIN AMERICA AND THE CARIBBEAN

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3.1. INTRODUCTION

A food system's success of can be measured by its ability to adequately feed all the people who participate in it. In 2019, 47.7 million people in Latin America and the Caribbean lived with hunger, with 13.2 million added in the last 5 years, and 191 million were affected by moderate or severe food insecurity. Chronic malnutrition fell from 22.7% to 9% in the last three decades, but child overweight increased from 6.2% to 7.5% in the same period, well above the world average of 5.6% (FAO, IFAD, PAHO, UNICEF and WPF, 2020).

Food system performance has traditionally been measured through its ability to ensure agrifood product availability, its economic efficiency, or job creation. However, new considerations have been added in recent years about its behaviour in terms of environmental sustainability, economic inclusion, or even its efficiency to reduce food losses and waste. Regardless of the food system outcome to be studied, it seems obvious that those related to adequate nutrition should be the prioritized. A food system that is unable to properly feed and nourish all people who participate in it is a food system that does not fulfill its primary function.

Therefore, this chapter focuses on the evolution of the main indicators related to hunger, food insecurity and the different forms of malnutrition in Latin America and the Caribbean. In order to characterize the situation more precisely, it takes into account the region's particularities, such as high levels of inequality – which also manifest in people's food and nutrition habits according to their income levels –, gender, ethnicity, or rural vs. urban condition. It is hoped that the information contained in this chapter will help highlight the gaps that are still present in the functioning of current food systems, as well as contribute to build a new policy agenda aimed at closing such gaps.

3.2 THE SUSTAINABLE DEVELOPMENT GOAL 2 (SDG 2) INDICATORS, A ROADMAP TO TRANSFORM FOOD SYSTEMS

Hunger, food insecurity and different forms of malnutrition point towards the distance that separates us from achieving the human right to adequate nutrition. The targets related to food and nutrition in the Sustainable Development Goal 2 (SDG 2), Zero Hunger, can be seen as a guide to ensure that we meet this human right and achieve the rest of the Goals in the 2030 Agenda.

The indicators used to measure progress towards the fulfillment of this Goal complement each other and try to highlight, from different perspectives, countries' progress towards accessible healthy diets for their entire populations. An acknowledged challenge, and one of particular importance for a region with high levels of inequity, lies in disaggregating the information provided by these indicators, so that the populations with the most severe lags can be identified.

The indicators shown in this chapter to characterize the situation regarding food and nutrition are mainly those included in the targets that make up SDG 2. Therefore, they still do not include the different impacts of the COVID-19 pandemic. In any case, data available on food consumption, nutritional surveys and forecasts on the increase in poverty in the region in 2020, suggest significant worsening in food and nutrition for the coming years.

Hunger

Hunger is an uncomfortable or painful physical sensation caused by insufficient consumption of food energy (FAO, IFAD, PAHO, UNICEF and WFP, 2019). Beyond its technical definition, hunger in the twenty-first century is an ethical and moral issue. It is the tip of an iceberg that shows that, despite having all the means to remedy it, there are political and structural obstacles that do not allow it.

The main way to characterize hunger is through the undernourishment indicator.[26] Its prevalence in the world has decreased considerably during the last two decades. Between 2000 and 2019, undernourishment on a global scale went from 13.2 to 8.9 percent. However, in the past 5 years, that improvement has stalled. In the region, the prevalence of undernourishment between 2000 and 2019 also fell by more than 3 percentage points, from 11.1 to 7.4 percent. However, the lowest prevalence was registered in 2014, equaling 5.6% of the regional population. From that year, and until 2019, hunger increased to 7.4%. This upward trend observed in the last 5 years occurs in a context of economic decline or low growth, increased poverty,[27] and high recurrence of extreme weather events and political conflicts. Even without accounting for the possible impact of the COVID-19 pandemic, if this trend continues over the next

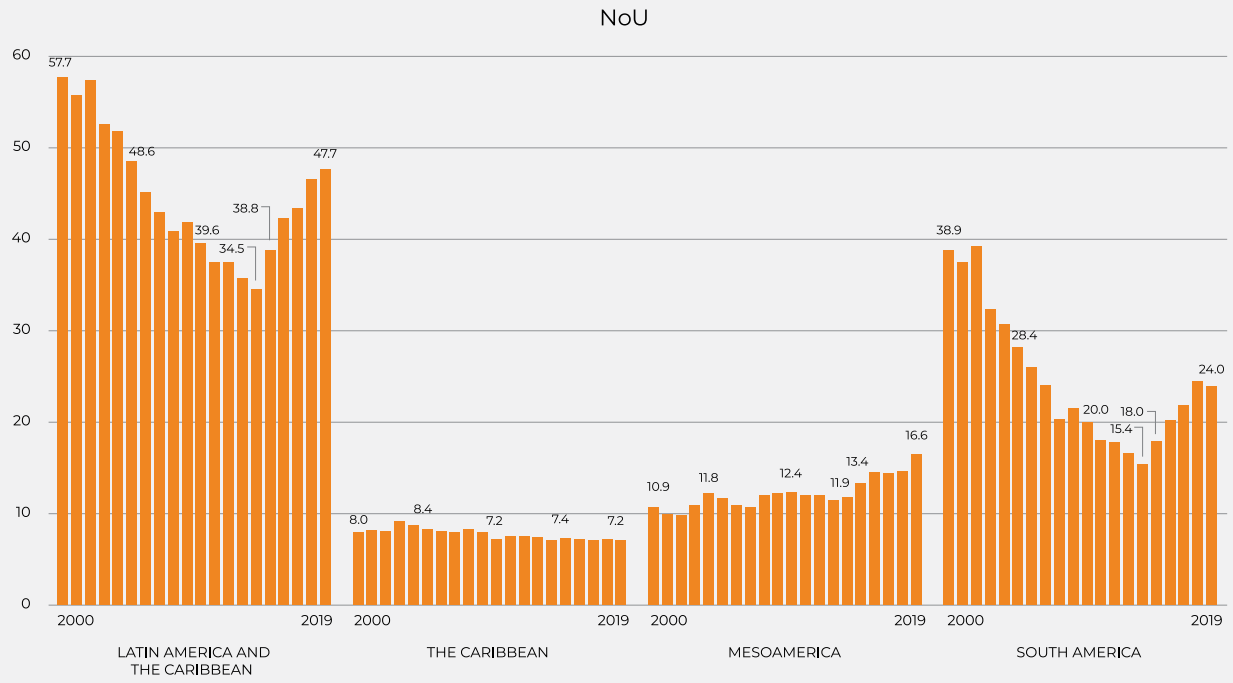
[26] The undernourishment indicator estimates the proportion of people who lack sufficient food to meet the energy needs to lead a healthy and active life for a year. The estimate relies on the following parameters: (a) average dietary energy consumption, (b) coefficients of variation and symmetry that account for inequality in dietary energy consumption, and (c) the minimum energy consumption threshold necessary to lead a healthy life.

[27] Between 2014 and 2019, extreme poverty increased by 26 million people (ECLAC, 2019).

Figure 3.1

Number of Undernourished Persons, Latin America and Subregions, 2000-2019

(millions of people)



Source: Prepared by the author based on data from FAO (2020a).

decade, by 2030 the region could reach 9.5% undernourishment (FAO, IFAD, UNICEF, WHO and WFP, 2019).

In broad terms, the correlation between undernourishment and extreme poverty is high. This is especially relevant in Latin America and the Caribbean, where the average calories provided by food systems far exceed the minimum energy requirements to carry out an active life.[28] For this reason, the positive and negative trends in the region in terms of hunger are usually related mainly to the development of its economic cycles. However, although it is true that in certain countries there are also changes in undernourishment due to other factors, the nature and characteristics of this indicator do not allow them to be easily identified.

Food insecurity is more than hunger

Using the definition agreed upon by more than 180 FAO Members during the 1996 World Food Summit, food security exists when all people at all times have physical, economic and social access to enough safe and nutritious food to meet their dietary needs and food preferences to lead an active and healthy life. Evidently, the undernourishment indicator is insufficient

[28] The correlation between undernourishment and extreme poverty measured in 18 countries of the region was 67.2% in 2017 (FAO and PAHO, 2017). Average food availability for Latin America and the Caribbean is more than 3 000 kilocalories per day per person, a figure that far exceeds the minimum energy requirements of 1 866 kcal/day/person.

Box 3.1

Degrees of Food Insecurity

Prevalence of food insecurity measures people without access to nutritious and sufficient food due to lack of economic or other resources. It is based on a survey applied to people age 15 or older. The survey has eight questions that allow us to identify the degree of food insecurity.

Severe food insecurity: A level of food insecurity at which people have probably run out of food, go hungry and, in the most extreme cases, go days without eating, which puts their health and well-being at serious risk.

Moderate food insecurity: Level of food insecurity in which people face uncertainties regarding their ability to obtain food and, at certain times of the year, are forced to reduce the quantity or quality of the food they consume due to lack of money or other resources, which reduces the quality of their diets, disrupts eating habits, and can have negative consequences for their nutrition, health and well-being.

Source: FAO, IFAD, UNICEF, WHO, and WFP (2020).

to measure the progress of countries and their populations with regards to food security. For this reason, before the new indicator to measure food insecurity with greater precision was even included in SDG 2, several countries in the Americas had developed methodologies to measure people's ability to access food.

The food insecurity indicator, measured through the Food Insecurity Experience Scale (FIES), is especially relevant for countries with characteristics that are common in Latin America and the Caribbean. First, it is more sensitive when identifying changes in the food security of vulnerable groups – who in many cases are very close to the poverty threshold – and can anticipate possible changes in consumption patterns and food quality affecting different forms of malnutrition. It also facilitates the measurement of seasonal changes in food security,[29] and allows information to be disaggregated for individuals, which facilitates the measurement of food insecurity according to sex or ethnic group. It can also be used to monitor the progress of programmes and policies designed to reduce food insecurity at different levels. Therefore, it is an indicator with great capacity to identify changes in food security in middle and upper-middle income countries and high levels of inequality.

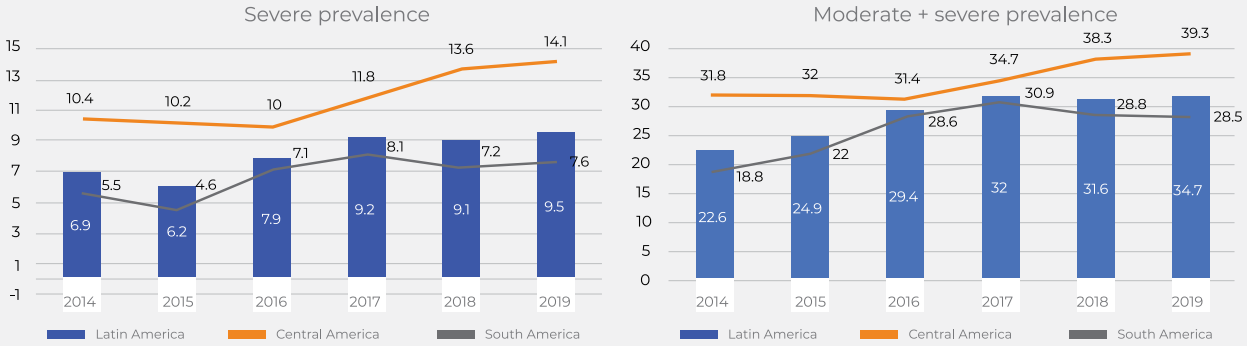
Finally, this Scale makes it possible to analyze different food system outcomes in terms of food and nutrition, as it has high correlations with several of the indicators that measure malnutrition. In turn, it can also be linked to

[29] For instance, a specific module has been developed for use in the context of the COVID-19 pandemic. See: FAO. 2020f. Using the Food Insecurity Experience Scale (FIES) to monitor the impact of COVID-19. Rome (available at http://www.fao.org/3/ca9205en/ca9205en.pdf).

Figure 3.2

Prevalence of Food Insecurity, Latin America and Subregions, 2014-2019

(percentage)

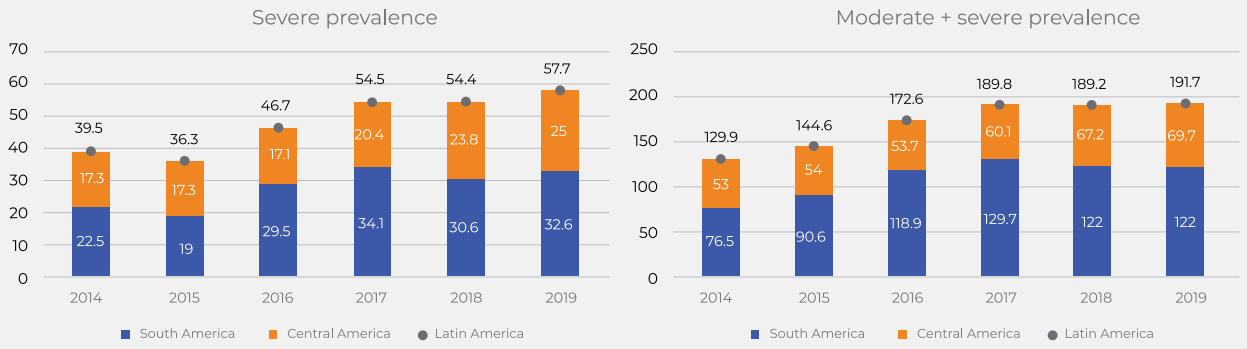


Source: Prepared by the author based on data from FAO (2020a).

Figure 3.3

Number of People with Food Insecurity, Latin America and Subregions, 2014-2019

(millions of people)



Source: Prepared by the author based on data from FAO (2020a).

essential elements of such systems, such as food environments and access to more affordable and healthier diets.

During 2019, moderate or severe food insecurity affected 2 billion people worldwide, more than a quarter of the world's population. In Latin America, 191 million people were affected by moderate or severe food insecurity in 2019. In terms of prevalence, these figures mean that almost a third of the population (31.7 percent) in Latin America was forced to decrease the quality and quantity of the food they consumed in 2019.

Food insecurity showed a growth trend between 2014 and 2019, when the number of people affected by moderate or severe food insecurity in Latin America increased by 61.8 million. In

terms of prevalence, it rose from 22.6 to 31.7% in 5 years. This included an increase of 17.9 million in the population suffering from severe food insecurity, where its prevalence rose by 2.6 percentage points.

Food insecurity and gender gap

As pointed out above, one of the advantages of the Food Insecurity Experience Scale is that it shows information disaggregated by individuals and by type of population. This allows for an analysis according to gender, which points to a significant gap between men and women.

As with other socio-economic indicators, food insecurity worldwide affects women to a greater extent than men.[30] In 2019, the prevalence of moderate or severe food insecurity in Latin America was 32.4 percent for women and 25.7 percent for men, which accounts for almost 20 million more women than men among those affected (figures 3.4 and 3.5).

Although food insecurity tends to affect women to a greater extent in all regions of the world, it is striking that the gap is much greater in Latin America (FAO, IFAD, PAHO, UNICEF and WFP, 2020).[31] Regarding moderate or severe food insecurity, for instance, the gender gap ranged between 1 and 4 percentage points for other world regions in 2019, while in Latin America it reached 6.7 percentage points (figures 3.6 and 3.7). Furthermore, contrary what is happening in other world regions, the gap has been widening in LAC since 2014, just as the prevalence of food insecurity increases.

The fact that women are more likely to suffer from food insecurity is worrisome, not only because it points to a structural problem that renders women inherently more vulnerable, but also because this vulnerability can have repercussions on health during pregnancy and breastfeeding, as well as affect the children's health. In other words, this gap has direct repercussions on the transmission of hunger and malnutrition to the next generation.

The causes that explain why we have this pronounced gender gap regarding food insecurity are not entirely clear and are likely made up by the sum of several factors. As we will see later, this wide gap also repeats itself on indicators of overweight and, above all, obesity in adult women. Various studies worldwide indicate that areas of residence, education levels, access to social services, poverty conditions and household income levels significantly determine the difference in food insecurity levels between men and women. Ultimately, these likely causes may also be closely related to the very functioning of food systems. For instance, women in LAC tend to have lower incomes and less autonomy to access food in their communities, or even at home. Furthermore, the environments where they live their adult lives tend to offer fewer opportunities for physical exercise, and their busy lifestyles allow for less free time for such.

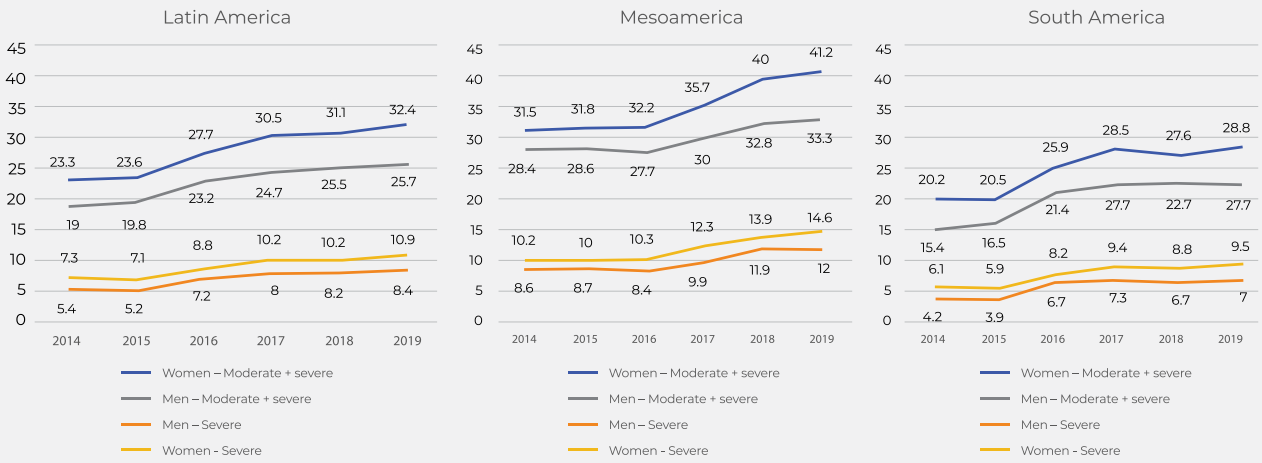
[30] This calculation considers women and men ages 15 and older.

[31] This situation can be explained, in part, by the difficulties that women in the region face when it comes to accessing resources, inputs, markets, credits, services and employment opportunities, which limits their income and livelihoods, and translates into increased poverty and food insecurity.

Figure 3.4

Prevalence of Food Insecurity by Gender, ages 15 and older, Latin America and Subregions, 2014-2019

(percentage)

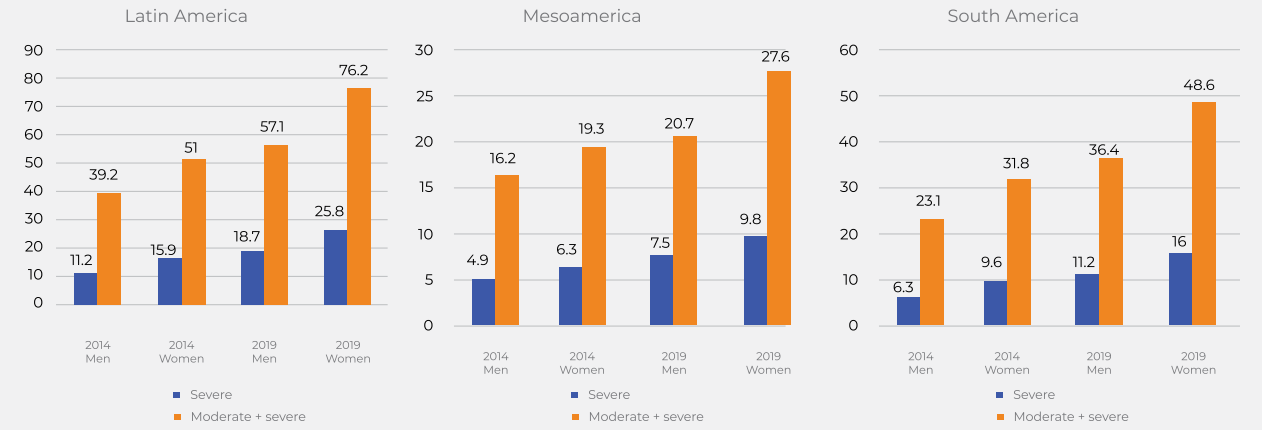


Source: Prepared by the author based on data from FAO, IFAD, PAHO, UNICEF and WFP (2020).

Figure 3.5

Prevalence of Food Insecurity by Gender, ages 15 and older, Latin America and Subregions, 2014-2019

(millions of people)

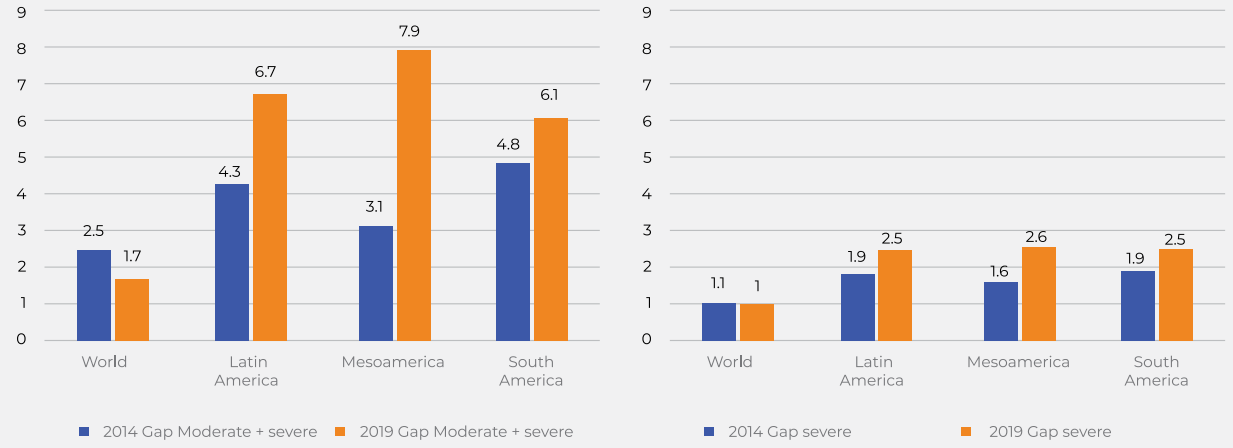


Source: Prepared by the author based on data from FAO, IFAD, PAHO, UNICEF and WFP (2020).

Figure 3.6

Prevalence of Food Insecurity, Gap between Men and Women, Latin America and Subregions, 2014 and 2019

(percentage)

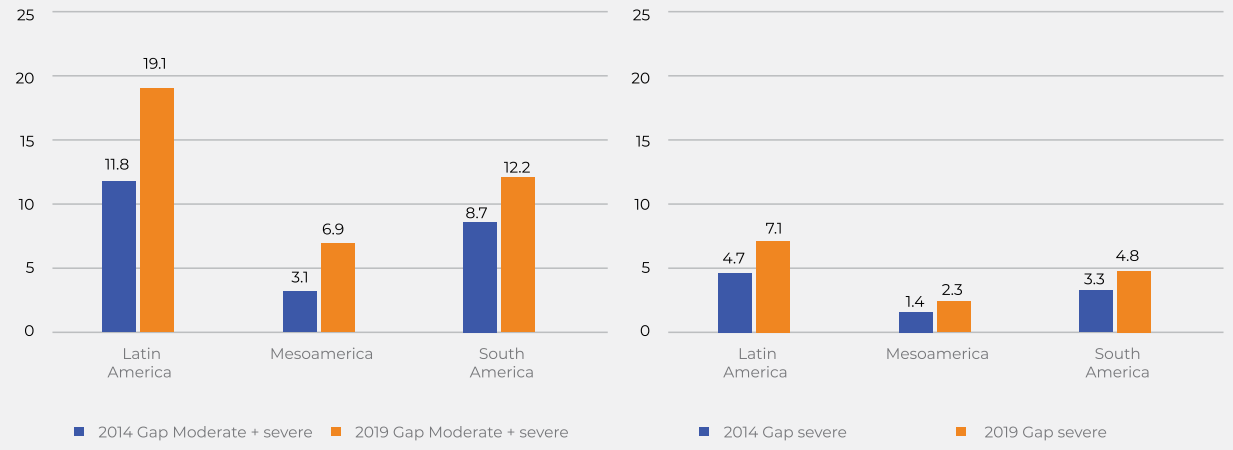


Source: Prepared by the author based on data from FAO, IFAD, PAHO, UNICEF and WFP (2020).

Figure 3.7

Prevalence of Food Insecurity, Gap between Men and Women, Latin America and Subregions, 2014 and 2019

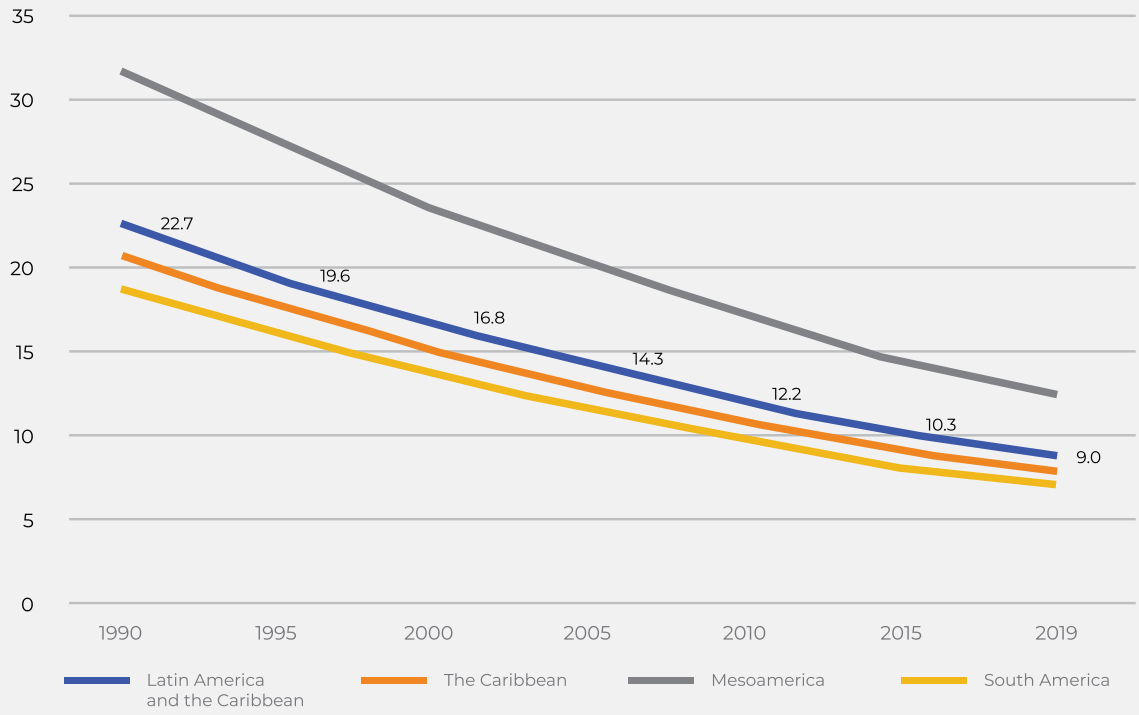
(millions of people)



Source: Prepared by the author based on data from FAO, IFAD, PAHO, UNICEF and WFP (2020).

Figure 3.8

Prevalence of stunting, Latin America and the Caribbean and Subregions, 1990-2019
(percentage)



Source: Prepared by the author based on data from UNICEF, WHO and The World Bank.

Malnourished and overweight children

Food systems' inability of to provide sufficient and nutritious food for all children is possibly the most important argument justifying the revision and transformation of the way we produce, obtain, and consume our food. When a person under the age of five does not reach the expected height for that age, lacks essential micronutrients for proper physical and cognitive growth, or is overweight, we are seriously jeopardizing their future.

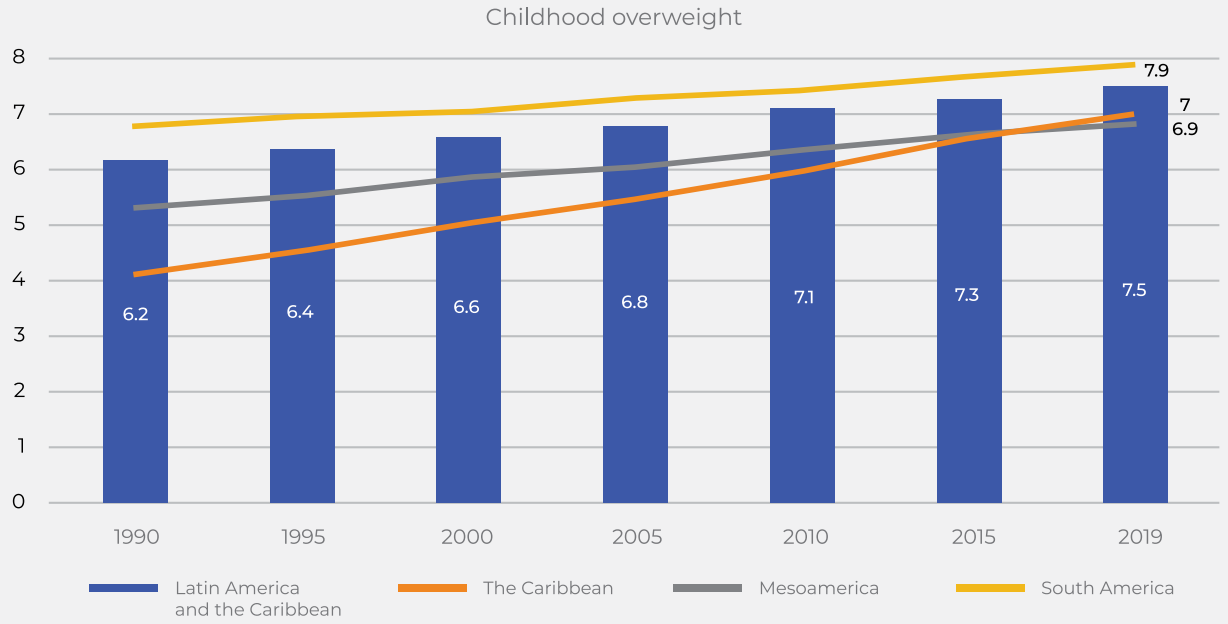
The second target of SDG 2 consists of two indicators that monitor the different forms of malnutrition among girls and boys under 5 years of age. The first of these indicators is the prevalence of stunted growth, which is associated with chronic or prolonged situations of undernutrition, repeated infections, and counterproductive health practices for adequate growth. The second indicator is malnutrition, which in turn is broken down into two: emaciation (pathological weight loss), which implies more acute periods of zero food intake that can cause drastic weight loss,[32] and overweight in relation to height, originated by the consumption of high calorie foods and insufficient physical activity.

[32] Emaciation is the result of recent and severe weight loss, or of the inability to gain weight because the child has not had enough to eat or has an infectious disease leading to weight loss (which can also be related to a lack of access to water and sanitation).

Figure 3.9

Prevalence of overweight in children under 5 years of age, Latin America and the Caribbean and Subregions, 1990-2019

(percentage)



Source: Prepared by the author based on data from UNICEF, WHO and The World Bank.

Notable progress has been made in Latin America and the Caribbean with regards to stunting and emaciation. The behaviour of these two indicators under the COVID-19 pandemic remains to be seen, but the fact is that countries in the region – with several significant exceptions – have indeed shown more positive trends than the rest of the developing world. Although the possible explanations for this behaviour are diverse, we could affirm that a combination of multisectoral policies and programmes sustained over time, focused on reducing malnutrition (water and sanitation, primary care and for pregnant mothers, social protection, and sometimes food aid and nutritional supplements), have yielded significant results. Food systems have been able to produce and supply greater amounts of protein-rich products, animal fats, vitamins and micronutrients, in light of the increase in other forms of malnutrition. The explanation for these achievements could lie, to a greater extent, in the application of policies and programmes focused on those most vulnerable.

In any case, the process of eradicating stunting in Latin America and the Caribbean has advanced considerably in the last two decades. According to estimates by UNICEF, WHO and the World Bank, prevalence of stunting went from 22.7% in 1990 to 9% in 2019 (figure 3.8), falling far below the world average of 21.3%. This means that the number of girls and boys affected by stunting in the region fell by 8 million, from 12.8 to 4.7 million in the same period.

If the trend of recent years continues, the region would be very close to meeting both targets, although one year after the proposed deadline. In contrast, the Caribbean would be the only subregion to meet the 2025 and 2030 targets within the deadline (FAO, IFAD, UNICEF, WHO and WFP, 2020).

Fortunately, the prevalence of acute malnutrition, emaciation, or low weight in the region is 1.3%, which is well below the world average of 6.9%. In terms of population, emaciation affects nearly 700 000 children under the age of 5, of which 400 000 live in South America, 100 000 in Mesoamerica, and another 100 000 in the Caribbean, with prevalence rates corresponding to 1.3, 0.9 and 2.9%, respectively.

This indicator is more sensitive to sudden or conjunctural changes in access to food. Therefore, in 2020, a significant increase in cases of emaciation or acute malnutrition is being detected in several countries in the region, mainly due to the impacts of the socioeconomic crisis caused by the COVID-19 pandemic.

On the other hand, overweight among girls and boys under 5 years of age in the region exceeds the world average of 5.6%, and has shown sustained growth since 1990, with its prevalence rate increasing from 6.2% in 1990 to 7.5% in 2019. This represents an increase of 400 000 overweight children, totalling 3.9 million in 2019.

The causes of the accelerated weight gain among children in the region are also diverse. Evidently, they stem largely from a shift in consumption patterns that are closely related to the evolution of food systems themselves. Although, as noted above, diets in LAC contain more meat, milk, eggs, and less fruits and vegetables; they also contain a high proportion of highly processed products with high levels of sugar, fat, and salt. These consumption patterns, together with inappropriate eating habits and low physical activity, cause an imbalance between energy intake and use, which leads to weight gains.

The health risk that excessive weight at an early age entails for a person's future development is also known. An overweight child is more likely to be obese in adulthood, and to develop chronic illnesses such as diabetes or cardiovascular disease, which can even lead to early death.

In several countries – and within several territories, families and individuals – significant degrees of the two forms of malnutrition coexist. Hence, countries are confronted with the dual challenge of ending undernutrition and stopping overweight. Furthermore, it is important to consider the lack of certain micronutrients as one of the most important challenges that several countries must overcome to ensure adequate nutrition.

Overweight and obesity throughout the entire life cycle

While the increase in overweight in children under five years of age in the Latin American and Caribbean region is among the highest in the world, the increase among school-age children and adults is even greater (FAO, IFAD, UNICEF, WFP and WHO, 2019). Today, after North America and the Southwest Pacific, Latin America and the Caribbean lead the rest of the world in overweight levels for all ages.

In turn, obesity rates increased even faster than overweight rates worldwide between 2000 and 2016. This is especially worrisome, because obese people tend to suffer much more serious health consequences and have a higher risk of mortality compared to non-obese people.

It is reasonable to point out which childhood eating habits will have repercussions on a person's nutritional status during adolescence, youth, and adulthood. For instance, intrauterine growth, infant feeding, and eating habits during preschool age are important factors that may determine overweight and obesity in adults.

Poor early diets can not only have repercussions on people's growth and health throughout their lives, but also consequences on their offspring. Being overweight or gaining excessive weight during pregnancy increases the risk of gestational diabetes and high birth weight, which, in turn, is associated with an increased risk of being overweight and obese later in life. Malnutrition as a consequence of food insecurity can also lead, for instance, to higher weight levels and risks of suffering non-communicable diseases (NCDs) later on. Girls who experienced inadequate foetal growth, especially those not compensated during childhood, are more likely to be stunted in adulthood, and thus to give birth to low-birth-weight children. In this way, they are passing poor nutrition, along with increased NCD risks, to the next generation.

Food insecurity, stunting, and overweight are in many cases related. They are transmitted both throughout a person's life cycle as throughout generations, and can lead to obesity, NCD, and even early death. Not to mention the costs derived from the treatment of these diseases and the loss of productivity of the people who suffer them. This is especially relevant for a region like Latin America and the Caribbean, where there are still high levels of malnutrition, along with an accelerated increase in overweight rates.

3.3. HOW TO ENSURE FOOD AND NUTRITION SECURITY IN THE CONTEXT OF THE COVID-19 PANDEMIC

One of the first lessons we learned from the coronavirus crisis was that, after trying to guarantee the right to health, the second most urgent right is the right to food. The measures put in place to try to stop the spread of the disease during the first months of the pandemic resulted in the cessation of most economic activities, the confinement at home of a large part of the population, and the closing of schools. These actions, necessary from a health perspective, have had devastating effects on a region that relies heavily on informal work as its main source of income and, therefore, on the food and nutrition security of many families.

According to calculations by ECLAC (2020a), the COVID-19 pandemic in the region will translate to 45.5 million people falling into poverty and 28.5 million into extreme poverty. Some preliminary estimates point to a global increase in undernourishment amounting to between 83 and 132 million people for the year 2020 (FAO, IFAD, UNICEF, WFP and WHO, 2020).

The crisis hit more or less severely depending on the countries' socio-economic characteristics, as well as on characteristics of the food systems

present in each one (FAO, 2020d). Despite these differences, the fact is that most governments developed relatively similar initiatives.

In the first place, actions were implemented to facilitate food access for the most vulnerable populations, either through direct provision of food, or through monetary transfers to buy basic necessities. Community social safety nets, with support from churches, people's organizations, or the private sector, were also widely relied upon in many places, especially in urban or peri-urban settings.

Subsequently, in many countries with school feeding programmes that provide food to primary school children, and in certain cases to secondary school children, alternative schemes were developed to try to ensure the provision of food to students before the closing of school facilities.

With regard to policies and initiatives aimed at ensuring food access after the first weeks of the pandemic, several countries held intense debates about the quality of the products provided and their nutritional value. Although, as of this writing, the pandemic is still going, and the level of success of the policies and programmes implemented in the first part of the pandemic should be analysed with greater perspective, a few lessons can be learned from a consumption perspective:

- The scope of the emergency and the resulting number of families in need was unprecedented, so few governments had the ability to fully and adequately assist all those in need.
- Although many countries made significant budgetary efforts, these were usually insufficient, and public and private mechanisms were not technically and logistically prepared to address the scale of the problem.
- Countries with more developed social protection systems (with available registries of participants, advanced monitoring and follow-up instruments, logistical capacities, agreements with banks for monetary transfers, food delivery providers, etc.), were able to meet the demand with greater success.
- There were additional difficulties to ensure access to food for the most vulnerable populations and for those facing greater challenges during the pandemic (the elderly, children, families not participating in social programmes or with informal jobs, families in little-connected rural territories, etc.).
- It is important to include nutritional and healthy eating considerations into food aid programmes, to balance the provision of non-perishable products with fresh produce (vegetables, fruits, etc.), and provide information to ensure adequate consumption and nutritional literacy.
- A good physical and nutritional state helps maintain immune systems that are better prepared to face an eventual COVID-19 infection.
- Food consumption habits have shifted during the pandemic; more is consumed at home,

and families who can, acquire raw materials to prepare food at home and as a family.

From an offer perspective, there are also public and private actions that many countries undertook to ensure the provision of food, fresh if possible. From a general perspective, it could be said that, with some exceptions, the food system – from production, processing, and distribution – functioned relatively well. Most governments declared the agricultural and distribution sector as essential, facilitating its operation and transportation. It is true that at certain times there were issues derived from the shortages in labour and restrictions to stocking up on inputs, as well as to distribute food. There were also significant events related to COVID-19 outbreaks in food processing centres, supply centres and wholesale markets. Similarly, many points of sale where food is bought and consumed in Latin America and the Caribbean (produce fairs, local markets, restaurants, inns, street stalls, etc.) were closed, which, in short, altered food acquiring practices.

From an international food trade standpoint, there were several temporary phenomena that affected normal trade, including the depreciation of some currencies, the fall in the price of oil and the variation in the prices of certain commodities. Also, during the first weeks of applying health measures to prevent the spread of the virus, difficulties were encountered when adjusting food handling protocols in ports and distribution centres, or when verifying safety standards under the new health context. However, during the period between March and December 2020, the distortions experienced in international markets for agrifood products were reasonably overcome without significantly affecting most of the countries in the region.

Several lessons can also be pointed out from a supply perspective (FAO and ECLAC, 2020b):

- It is important that all companies and actors in the food system can carry out their tasks without interruptions. Therefore, financial support (credit and production subsidies) should be provided to agricultural companies, oriented mainly towards family farming.

- It was necessary to adjust health and sanitation protocols in production, transportation, and wholesale and retail markets, ensuring financing, technical assistance, and access to inputs and labour for farmers and artisanal fishermen.

- It is necessary to establish or maintain agile mechanisms for consultation and public-private coordination among all actors in the food system, covering the production, supply, distribution, and access to food.

- The fact that wholesale and retail markets and agro-industries closed or reduced their operations became very significant.

- It is necessary to support the policies that kept the world food trade open, especially those avoiding protectionist measures that increase food prices.

- Online food trade was accelerated, boosting marketing networks with fewer intermediaries and digital connectivity.

3.4 FINAL CONSIDERATIONS

We must acknowledge that shifts in eating patterns and consumption habits in Latin America and the Caribbean are occurring at an accelerated rate and in parallel with the rapid transformation of increasingly globalized food systems. It is crucial that public and academic decision-makers understand precisely how these phenomena are taking place, what incentives (or driving forces) determine the workings of current food systems, and what are their consequences on food, nutrition and health.

Why are the overweight and obesity rates growing much faster in Latin America and the Caribbean than in other regions is something that we need to understand. Likewise, we must try to understand how this affects middle class populations, especially women and vulnerable groups.

All the different forms of malnutrition are interrelated, and their solutions, although often specific, must take into account the consequences between each other. To develop a new wave of food policies that tackle all forms of malnutrition is crucial. These policies and programmes must necessarily include environmental and sustainability considerations, within a framework aimed at transformation, but also at economic feasibility. Such policies will need to increasingly address the causes, not so much the consequences.

Food systems mainly respond to the interests – fully legitimate in many cases – of private actors (from small producers, intermediaries, cooperatives, processors, sellers, multinationals, etc.). How can the states' obligation to protect the right to health and adequate food also help

these actors develop healthier, more inclusive, sustainable, and economically feasible food systems?

The COVID-19 pandemic is not over (as of the writing of this chapter), but we can already identify some of its lasting consequences on eating, nutrition and food systems. The best-prepared social protection systems have been the ones best able to face this unprecedented challenge, albeit one that could be repeated. Investing in innovation to strengthen records, operation and logistics mechanisms, monitoring, ad hoc regulations, etc., could help save many lives in the future.

So far, food systems have shown that they are able to ensure the food supply in times of pandemic. However, there is room for improvement regarding the health conditions of workers, day labourers and transporters. Above all, this crisis could leave many small and mid-size entrepreneurs out in the cold, who due to lack of funding and support, may not be able to recover.

We are now presented with an enormous opportunity to take advantage of this reality – in many cases positive – regarding new consumption habits, which include preparing food at home, online food sales, demand for fresh and more natural products, interest in traceability and quality, etc. It represents an immense space for innovation based on sustainability, price, time-efficiency, and health.

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4
THE ROLE OF INSTITUTIONAL, TECHNOLOGICAL AND FINANCIAL INNOVATION IN THE TRANSFORMATION OF FOOD SYSTEMS IN LATIN AMERICA AND THE CARIBBEAN, IN THE CONTEXT OF THE 2030 AGENDA AND THE COVID-19 PANDEMIC

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4.1 INTRODUCTION

The agrifood system[33] in Latin America and the Caribbean (LAC) carries significant weight in the region's gross domestic product (GDP), employment level and exports, as well as in its poverty and inequality dynamics. The region is also a significant player in a series of aspects relevant to the functioning of the global agrifood and environmental sectors: LAC is the main net exporter (i.e. exports minus imports) of food and agricultural products worldwide and, therefore, is key to the planet's food security, helping to stabilize the prices and quantities of these products in global markets. Furthermore, LAC plays a crucial role in different global environmental dimensions, providing carbon sinks and forest cover, stabilization of the oxygen cycle, renewable water sources (almost twice the world average), and biological diversity (6 of the top 10 countries with the greatest biodiversity, as well as the top two, are in LAC). For all this, whatever LAC does regarding productive and environmental sustainability is crucial for our entire planet (Díaz-Bonilla, 2019).[34]

[33] This system covers not only the primary agricultural components, but also all related activities, such as packaging, agro-industrial processing, transportation, wholesale and retail trade, and food services (from street vendors to formal restaurants), in addition to all the input and service industries related to these productive segments.

[34] For instance, a study by the Office of the Director of National Intelligence of the United States (ODNI, 2012) considers water scarcity as a major source of conflict and violence in different developing regions, with very negative global repercussions (wars, forced migrations, failed states and terrorist threats).

A related aspect is that the functioning of the agrifood system in LAC is key to achieving basically all the Sustainable Development Goals (SDGs), not only in the region, but globally (see Fan *et al*., 2018; and Díaz-Bonilla and Saravia-Matus, 2019).[35]

The COVID-19 crisis has emerged within this context and is having a devastating effect on the global economy. This is an unusual event akin to a supply shock, caused by closures, travel and movement restrictions, and physical distancing requirements. In turn, these factors are leading to a demand shock, caused by employment and income losses.

Governments have reacted to the COVID-19 pandemic with a series of health initiatives aimed at controlling the spread of the coronavirus (from restrictions on going outside, to bans on meetings, limitations on public transport, closing of schools and religious institutions, restrictions on restaurants, movie theatres and sporting events, and similar measures). At the same time, the treatment of affected populations has been reinforced (e.g. increase of virus diagnostic tests, expansion of health care facilities, equipment and personnel, research on treatments and vaccines, etc.).

Simultaneously, a series of economic and social policy initiatives have arisen to attempt to mitigate negative impacts on families and businesses. These initiatives relate to loss of income and employment (expanding programmes such as cash transfers, food aid and subsidies, unemployment compensation, and the like). Even so, it is expected that food and nutrition security, as well as human health, will be negatively affected, both by the direct and indirect effects of COVID-19. Additionally, all these issues can be worsened by significant bankruptcies in food value chains.

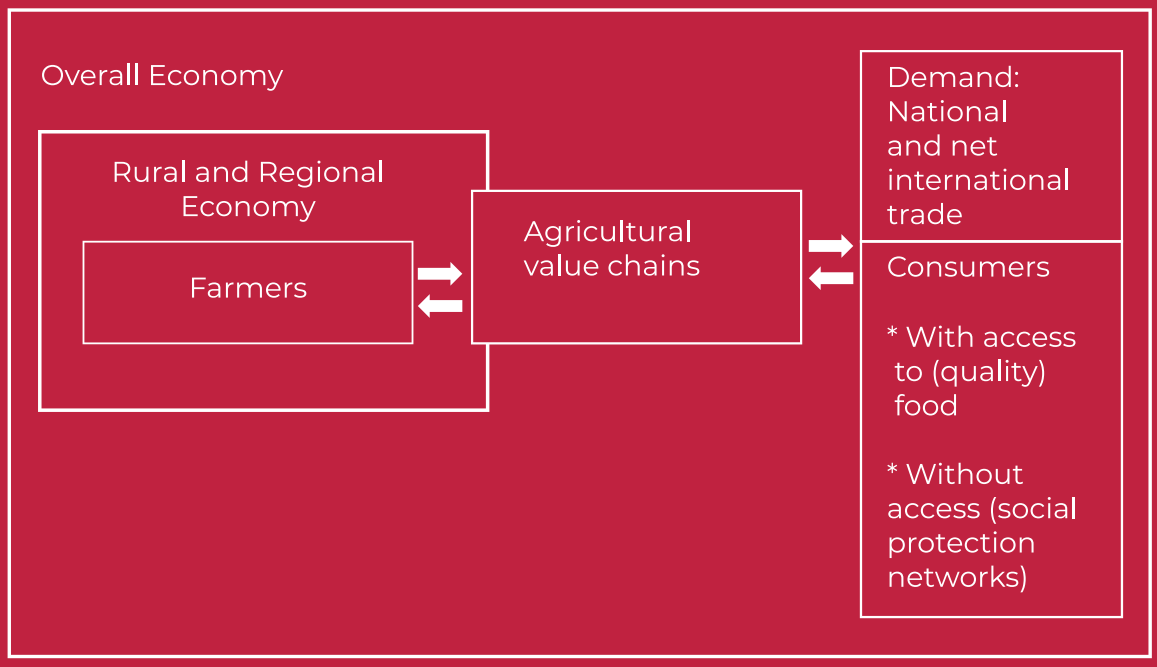
Prior to the pandemic, there was already growing concern that agrifood systems did not seem to be on a path that made them inclusive and fair (in terms of their production, employment, and consumption patterns), healthy (in terms of the diets they originate) and sustainable from an environmental standpoint. Now we have the additional challenge of rebuilding what the pandemic has affected, while making agrifood systems resistant to zoonoses and pandemics.

The transformation of agrifood systems, both to achieve the SDGs and to respond to the pandemic, requires a series of institutional, technological, financial, and other innovations. This is an enormously broad topic, so this chapter only covers a few aspects about innovations (existing or necessary) related to (a) approaches to public policy and institutional

[35] This is not only about SDG 2, which commits all countries to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture," but an extensive list of other SDGs in which agrifood systems are key to their achievement. These include ensuring "availability and sustainable management of water and sanitation for all" (SDG 6); ensuring "sustainable consumption and production patterns" (SDG 12); taking "urgent action to combat climate change and its impacts" (SDG 13); and to "promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" (SDG 15). In others, the rural space is where the main deficiencies appear and, therefore, achieving them will require a special focus on these spaces (such as SDG 1, "end poverty in all its forms everywhere" and several others). See discussion in Díaz-Bonilla and Saravia-Matus (2019).

Figure 4.1

Levels of Analysis for Agricultural Policies



Source: Adapted from Díaz-Bonilla (2015).

issues; (b) public policy instruments (separating those related to social and productive aspects and those related to food and health issues); (c) technological developments (covering two separate topics, the "third revolution" in biology and shifts in energy),[36] and (c) financing. Each of these topics is discussed in a separate section where, depending on the topic, particular considerations related to the COVID-19 pandemic are added. The chapter closes with a handful of final considerations.

[36] A very important aspect of technological change is the digitization of a wide series of activities related to agrifood systems. This topic will not be covered here because it is covered in Chapter 9.

4.2 INNOVATIONS IN CONCEPTUAL FRAMEWORKS AND INSTITUTIONAL ORGANIZATION

4.2.1 Considerations prior to the pandemic

The scope and reach of the policies related to the agricultural sector have expanded over time, with implications for institutional organization. For instance, a series of objectives have been proposed for the agricultural sector, which include at least the following (PIADAL, 2013):

- growth, employment and economic development in general,

- reduction of poverty and food insecurity (malnutrition due to lack of calories or hunger),
- food safety and improvements in nutrition and health (considering other aspects of malnutrition and not just hunger, as well as other human health issues related to food, including the spread of bacteria and viruses),
- environmental sustainability and protection of biodiversity,
- regional and territorial development.

Along with the series of objectives, the focus or level of policy analysis has been broadened. Figure 4.1 shows different levels: a) agricultural policies for primary producers, which in turn can be divided into subsistence, intermediate/family and commercial producers; b) rural/territorial development policies, considering the geographic space; c) policies for value chains, which consider inputs and services as well as processing and distribution; or d) policies for the agrifood system as a whole, which consider other aspects of the consumer and its environment.

Sector focus

The institutional organization of the "agricultural sector" has been changing, adding more objectives and levels of action, under a myriad of different models. Traditional Ministries of Agriculture and Livestock (MAL) continue providing their overall services (planning and statistics, research and extension, sanitary and phytosanitary aspects, irrigation, land management, trade infrastructure, and other related services).

Territorial and small producer approach

The approach of the comprehensive rural development programmes of the 1970s and 1980s (which combined emphasis on small producers under a territorial development approach with investments in infrastructure, health, education, and other aspects at the local scale) led to the creation of Comprehensive Rural Development Secretariats and such. In many instances, these new bodies depended on the country's Executive Body, or on some high authority able to convene and coordinate the different ministries and agencies that were supposed to work together for target groups and specific geographic areas.

Once emphasis shifted from products to types of producers, and in light of the clear segmentation of subsistence farmers with regards to more competitive and commercial family producers, other institutional innovations appeared, such as the creation of specialized ministries for small producers, on the one hand, and for the more commercial ones, on the other; the exemplary case is Brazil. Another option, at least theoretically, could be to transfer the care of subsistence producers to the Ministries of Social Development (MSD) or similar, and leave commercial and family producers to the traditional MAL. However, it is more common for subsistence farmer support functions to appear in both MAL and MSDs (which seems to be the current case in Argentina and Peru, for example). This dual assignment of tasks can lead to duplication of efforts.

Chain approach

A different debate has focused on whether agribusinesses should be regulated by MALs or by Ministries of Industry, with the emphasis on generating coordinated policies for the different value chains. A recent example of the inclusion of agribusiness in the MAL occurred in Argentina, during a period between 2016 and 2019. An alternative mechanism consists in structuring Competitiveness Councils by value chains, with participation of the relevant public organizations and productive private sector organizations. In theory, these councils could include workers and civil society representatives, such as consumers or environmental organizations, as well as members of academia. However, this expanded representation does not appear to have examples of its application. Additionally, and whatever the composition of these Councils may be, the question remains of who should coordinate them, the MAL, the Ministry of Industry, or some collegiate scheme.

Coordination of crosscutting themes

Another aspect of institutional stress has to do with how to handle environmental issues, especially regarding forestry, fishing, water management and conservation of natural resources and biodiversity. In some cases, the MALs have absorbed forestry, fishing and/or natural resource management issues, while in other cases it is the Ministries of Environment who have expanded their coverage to several of these issues.

Likewise, the issue of nutrition and health has become increasingly relevant. All this complexity in objectives and levels of intervention has led to the establishment of intersectoral coordination mechanisms, in which several of the aforementioned crosscutting issues are combined. A current example can be found in Mexico's Intersectoral Groups of Health, Food, Environment and Competitiveness (GISAMAC).

Programme and budget coordination

From the standpoint of institutional innovation there are several key points. First, in the face of complexity in objectives and activities, governments usually resort to changes in organizational charts. Second, in most cases these changes reflect power dynamics within the bureaucracy, the ruling political coalition, and private sector groups. Third, there is usually no "technical solution" that is better than other for designing these charts. Fourth, however responsibilities and tasks are assigned in the organizational chart, there will always be activities that cross more than one of the defined blocks.

Therefore, in a broad sense, institutional innovations that address the complexity of the agenda for the agrifood sector in LAC will need to go beyond approaches based only on organizational chart adjustments. They should also – and mainly – consider operational coordination mechanisms aimed programme goals and linked to the drafting and implementation of budgets.

Ideally, the agrifood sector's policies and institutional framework should consider at least four work blocks:

Figure 4.2
The Programming, Execution and Control (PEC) Cycle

Source: Prepared by the author.

a. General services by the Ministry of Agriculture and Livestock that provide crosscutting support to producers and products (safety, research and extension, irrigation, land, environment, etc.),
b. mechanisms for the development and integration of value chains (such as value chain competitiveness committees, with broad participation of private sector agents, but probably also needing to include other civil society players),
c. special rural/territorial development programmes focused on small producers with at least some productive potential,
d. differentiated service for subsistence farmers and poor rural populations with limited productive capacity.

Crosscutting services must cater to the different types of producers mentioned above. The value chain approach usually relates to commercial and family producers integrated in the markets and, as mentioned above, it should encompass other players along these chains. On the other hand, territorial-based rural development programmes emphasize on small producers, but with some productive viability, considering their geographic space. Finally, the case of subsistence farmers and poor rural populations with limited productive capabilities can be addressed with modified social programmes for the rural sector (this is addressed later on).

Whatever the organizational and institutional way of advancing the four levels of work, a programming and coordination mechanism geared towards action and outcomes is also required. Said mechanism will have to implement the Programming, Execution and Control (PEC) cycle in a disciplined manner based on the multiple objectives pursued (figure 4.2).

This implies strengthening the capabilities of the ministry, secretariat or coordinating group that drafts the budget, as well as the corresponding entities in the executing ministries. A mandatory action and outcome-oriented programming and coordination mechanism should be established (at least once a year), as well as an execution control mechanism (at least every six months). This coordinating/operations centre must establish, together with the executing ministries, the budgetary and operational programming. It must have concrete and verifiable targets, as well as a monitoring system for carrying out

Box 4.1

Topics and Sectors in a Comprehensive Pandemic Management Plan

	HEALTH			PRODUCTION AND EMPLOYMENT				SOCIAL PROTECTION	
	Tests and follow-up	Treatment	Vaccines	Medicines and equipment	Food	Other essential prod / serv.	Non-essential products and services	Contributory systems	Non-Contributory Systems
Poor and vulnerable households									
Non-poor households									
Essential formal businesses									
Non-essential formal businesses									
Informal businesses									
National and local government									

Source: Prepared by the author.

Notes: The sector ministry responsible for food and nutritional security issues should carry out its specific functions, but without ignoring the interrelations with the other aspects listed here.

scheduled activities that includes, in as many activities as possible, direct information from the participating population on the effective implementation of the activities.

4.2.2 Institutional aspects for managing the pandemic

In the short term, countries should consider policies and interventions related to the current pandemic as components within a **comprehensive approach**, with a **central coordinating office** at the highest level of the Executive Branch (working with legislatures, business associations, workers, and farmers, as well as civil society). It must have a comprehensive plan and differentiated timeframes (for instance, up to 3 months, 3 to 6 months, 6 to 12 months, and over 12 months) for post-pandemic reconstruction. Said plan should cover the topics and sectors identified in box 4.1.

The economic crisis cannot be fully resolved if the pandemic is not controlled in a coordinated manner. This implies that, until there is an effective vaccine, governments will have to put in place a comprehensive system of testing, contact tracking, case isolation, and treatment for patients.

4.3 INNOVATIONS IN PUBLIC POLICY INSTRUMENTS

In addition to institutional and operational innovations, there are policy instrument

innovations to consider. Only two are presented here: one related to social-rural policy, and another that points to nutrition and health issues.

4.3.1 Social protection, production and climate change

This innovation has to do with the redesign of conditional transfers for the rural sector. In many countries, two types of adjustments are needed. The first type of adjustment corresponds to resources allocated. In many cases, targeting must be improved and coverage expanded. Countries need to consider whether the necessary GDP percentage is being spent on social protection and, whatever that percentage is, determine how benefits are distributed between different income quintiles. Household survey data in the World Bank's ASPIRE database point to a variety of situations, with countries where a significant percentage of beneficiaries and benefits go to the two upper quintiles, which indicates targeting problems. The second type of adjustments to consider are at the operational level, with a redesign of the instrument that takes into account the conditions of rural areas.

In Latin America there is a debate going on about whether the right thing to do is to expand universal social services and programmes based on a rights-for-all approach, or if what is needed are targeted programmes. Obviously, the ideal would be a system of quality universal programmes and services for urban and rural populations, as well as for all economic levels without distinction. But, while work is done to expand and strengthen universal services, focused approaches can be improved in parallel, on the way to achieving quality universal rights-based schemes.

A second debate, related to social assistance programmes, such as conditional cash transfer schemes,[37] lies on whether there should be differences between urban and rural approaches. Some argue that, in many countries in the region, social assistance programmes in rural areas are simply a mechanical extension of the urban social protection system. Here, those with formal employment receive benefits within contributory systems, and those who are poor and with informal jobs are served with non-contributory schemes, to try to remedy labour and income distribution issues ex post (see FAO, 2016a).

This discussion is leading us to consider the development of specific social protection models that consider the specific characteristics of peasants, small producers, and informal workers in rural areas (see Winder, 2018; De la O Campos *et al*., 2018; FAO, 2016a, 2017 and 2018).

Conditional cash transfer programmes should be adapted to rural areas, maintaining the social assistance aspects, but also expanding their focus towards productive and technological areas that can help improve the economic and environmental sustainability of participating families. An instrument for rural areas could combine monetary aid that considers social,

[37] Conditional cash transfer programmes originated in Latin America and the Caribbean, beginning with initiatives in Mexico and Brazil. A key objective is to break the poverty cycle through direct monetary transfers to families, with the condition that their children go to school, that they access certain basic health benefits, and comply with other aspects related to adequate nutrition.

productive, and environmental aspects. For instance, one component could relate to poverty levels, another one could cover the additional cost of implementing sustainable adaptation and mitigation technologies, and a third one could subsidize environmental, forest, biodiversity, and ecosystem protection/restoration services. This instrument should include other forms of productive, organizational, and commercial support for low-income producers.

An instrument with these characteristics would be useful to address a whole series of economic and social aspects for the development of rural peoples, with a focus on reinforcing assets (human, financial, technological, natural, physical, social, political, etc.). This new instrument must consider the diversity of rural productive activities (including forestry and fishing, as well as agricultural and livestock production, along with other non-primary rural activities), their characteristics, potential and specific vulnerabilities, and how they are inserted into the survival strategies of poor and vulnerable individuals and families (see Winder, 2018 and FAO, 2018b).

The design must take into account other aspects such as seasonality, geographic dispersion and/or remoteness, the operation of labour markets (informality, insecurity, etc.), aspects related to the participation of women, ethnic groups and youth, and issues such as violence and migration. The pandemic, by creating "new poor individuals," is driving these instruments to expand their social coverage, which in turn will require an increase in public spending (see section 4.5 on financing issues).

4.3.2 Innovations in food and health aspects[38]

The world is suffering the triple burden of malnutrition: (i) ongoing malnutrition due to lack of calories ("hunger"), (ii) lack of minerals, vitamins and other essential nutrients (what has been deemed "hidden hunger"), and (iii) the increase of overweight and obesity, with associated non-communicable diseases (diabetes, cardiovascular disease, and even cancer). There are no precise estimates on the incidence of each of these issues, but overall, it is estimated that around 43 million people suffer from malnutrition in Latin America and the Caribbean, and almost a quarter of the population (that is, more than 150 million) suffer from obesity (FAO, PAHO, UNICEF and WFP, 2019). Figure 4.3 shows that LAC is one of the regions with the highest combined rate of overweight and obesity.

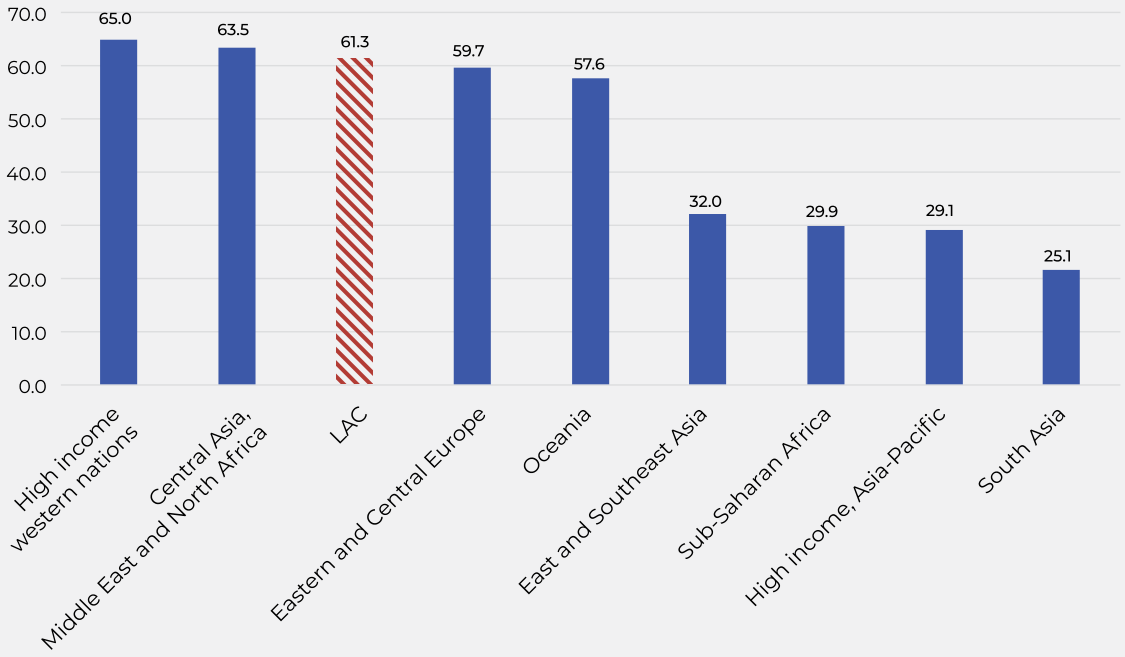
Obesity has costs both in terms of treating noncommunicable diseases and in other aspects that affect intellectual capacity and work productivity. For this reason, several countries in the region have introduced measures to reverse the current situation. The initial question when addressing the issue is how this obesity situation originated. Is it due to consumer behaviour (not exercising enough and eating too much of everything), government inaction (not offering infrastructure, public spaces, and programmes

[38] A very broad aspect that is not addressed here pertains to economic access to healthy diets, which implies considering all aspects of malnutrition. This involves policies and innovations related to wage negotiations for living wages that consider the real cost of healthy basic food baskets, taxes and/or elimination of subsidies for unhealthy food products, subsidies and support for production of healthy foods, subsidies to vulnerable populations so they can access healthy diets, and other related measures (see Díaz-Bonilla *et al.*, forthcoming).

Figure 4.3

Overweight and Obesity by Geographic Region, 2016

(percent of adult population)



Source: Prepared by the author based on data from the Global Nutrition Report Database.

to facilitate physical exercise, and not raising awareness on proper nutritional habits), and/or the private food sector (which produces and promotes, through intense advertising campaigns and marketing strategies, unhealthy products)? The answer is that there are converging factors.

Several governments in the region have developed or are developing comprehensive programmes to address the situation. For instance, consumers in some countries are being encouraged to exercise more, while the government contributes with adequate infrastructure and public spaces, as well as offering better nutritional information. But emphasis is also being placed on diets, their composition and volume. For this reason, regulations and taxes are also being applied in the region, so that the industry reformulates some products, stops using prohibited ingredients (such as trans fats) and limits the use of others (such as salt), and offers consumers clear information about the health implications of consuming certain products.

Food labelling innovations are worth noting here. Initially, countries in the region such as Ecuador applied "traffic light" approaches: red, yellow or green labels for a series of nutritional considerations. However, it has been argued that consumers can get confused when interpreting different combinations of colours (for instance, what does it mean for a product to have one red label, two yellow and one green? Should s/he buy it or not?). On the other hand, the kind

Figure 4.4
Example of Chilean Food Labelling (translated into English)

Source: MINSAL (2019c).

of labelling preferred by the food industry (with numerical values for different nutritional components) can be even more difficult for consumers to analyze and understand. Perhaps the most discussed innovation regarding product labelling is that of Chile (see figure 4.4; also, Chapter 5 of this book focuses on the Chilean Law on Food Labelling).

The black octagons indicate that the product is exceeding the healthy threshold in terms of calories, sugar, saturated fats, and/or salt. Assessments indicate that the labelling is working, as consumers are more aware of products' nutritional conditions, which has led them to modify their purchasing habits. Therefore, the private sector has had to reformulate many of its products (Taillie *et al*., 2020). Other countries in the region are considering similar measures, although the thresholds considered healthy for different components may vary from those considered in Chile.

The debate includes other topics such as: (a) the treatment of claims about a product's virtues (for instance, advertising the content of vitamins and minerals, fibre, or others) to compensate for other clearly negative characteristics; (b) not using misleading labels and packaging, such as pictures of natural fruits, when the product contains few fresh ingredients; (c) not using images of famous people, cartoon characters and the like on products with unhealthy nutritional content, especially when aimed at children, and (d) other restrictions regarding advertisements targeted at children and the availability of unhealthy food and drinks in or near schools.

Putting all of the above in perspective, Latin America and the Caribbean is the developing region that has experimented the most with public policy instruments related to obesity and overweight. This will continue, and it may serve as background for other regions that are in the early stages of the nutritional transition that LAC is experiencing. The issue of obesity is even more important in the context of the current pandemic, since it has been proven that it is a significant factor that increases the risk of contracting COVID-19, and of dying once contracted (Popkin *et al*., 2020).

4.4 TECHNOLOGICAL INNOVATIONS

This is also a very broad area. We will briefly focus on just two topics: (a) what has transpired in the so-called "third revolution" in biology and (b) changes in energy sources.

4.4.1 The "Third Revolution" in biology

This third revolution combines the first one, at the molecular level (the hardware), with the second one, at the genome level (the software), plus all the advances in information technology, materials, images, nanotechnology, optics and quantum physics, big data, modelling, and simulation (MIT, 2011). The revolution holds significant promise for a number of sectors, such as agricultural production, ecosystem management, food processing, transportation and storage, energy sources, and human health.

Here it is worth noting what relates to precision agriculture. This concept combines advances in biology, chemistry, physics, gene editing, "omics" (genomics, proteomics, metabolomics), hydrology and the water cycle, soil science, ecology, climatology, new materials (sensors), improvements in engineering and imaging (drones), improvements in computing (supercomputers, quantum computing), modelling of complex systems, and other aspects (National Academy of Sciences, 2019).

In order to make the best of this third revolution, our countries require greater investments in science and technology (more than 1% of the agricultural GDP) and infrastructure (such as communications and the internet), as well as good policies and regulations (such as data governance). Unfortunately, national spending in agricultural R+D+i in the region is relatively low. Box 4.2 shows total public spending on agricultural R+D+i as a percentage of the agricultural sector GDP for LAC. It should be noted that several countries in LAC, as well as developing countries in general, are below the minimum 1% suggested by international organizations, not to mention the 3-4% that developed countries invest.

Additional investment is necessary not only to improve productivity and develop the needed technologies for climate change adaptation and mitigation, but also, as the pandemic has dramatically shown, to make food value chains resilient to health crises. Along with this, it would be important to strengthen financial support for the CGIAR system at the international level, in order to expand work on the necessary technologies to transform agrifood systems and strengthen the integration of such work into national systems.

The "third revolution" has manifestations that go beyond primary production. Such manifestations include precision and personalized nutrition, the development of alternative proteins, new packaging materials, and other similar topics, which we will not address here.

4.4.2 Energy

There have always been important direct and indirect links between agriculture and energy. Energy is an input for agricultural production, linked to mechanization, irrigation, fertilization, and the drying, storage and/or refrigeration of

Box 4.2

Public Expenditure on R&D as a Percentage of Agricultural GDP, 2010s average

1% or more		0.5-0.9%		Less than 0.5%	
Brazil	1.9	Bolivia (Plurinational State of)	0.9	Nicaragua	0.4
				Peru	0.4
Chile	1.7	Jamaica	0.9	Dominican Republic	0.3
Uruguay	1.4	Panama	0.8	Paraguay	0.3
Argentina	1.2	Belize	0.7	Venezuela (Bol. Rep. of)	0.3
Mexico	1.1	Colombia	0.7	Ecuador	0.2
Costa Rica	1.0			Honduras	0.2
				Guatemala	0.1
Developing countries worldwide (in ASTI database)					
Average	0.9	Median	0.5		

Source: Prepared by the author based on ASTI data (IFPRI, 2021).

products. Agro-industrial processing and trade also require energy for transforming, packaging, transporting, storing, and refrigerating. In turn, activities related to retail also use energy to place agrifood products in the hands of consumers. Consumers then use different forms of energy to preserve, store, prepare and cook food. At the macroeconomic level, energy costs affect the population's the disposable income and the demand for other goods and services, including agricultural products. Sudden increases in the price of oil have been important factors in several global recessions since the 1970s. Thus, oil and agri-food product prices have historically been closely correlated, as shown in figure 4.5.

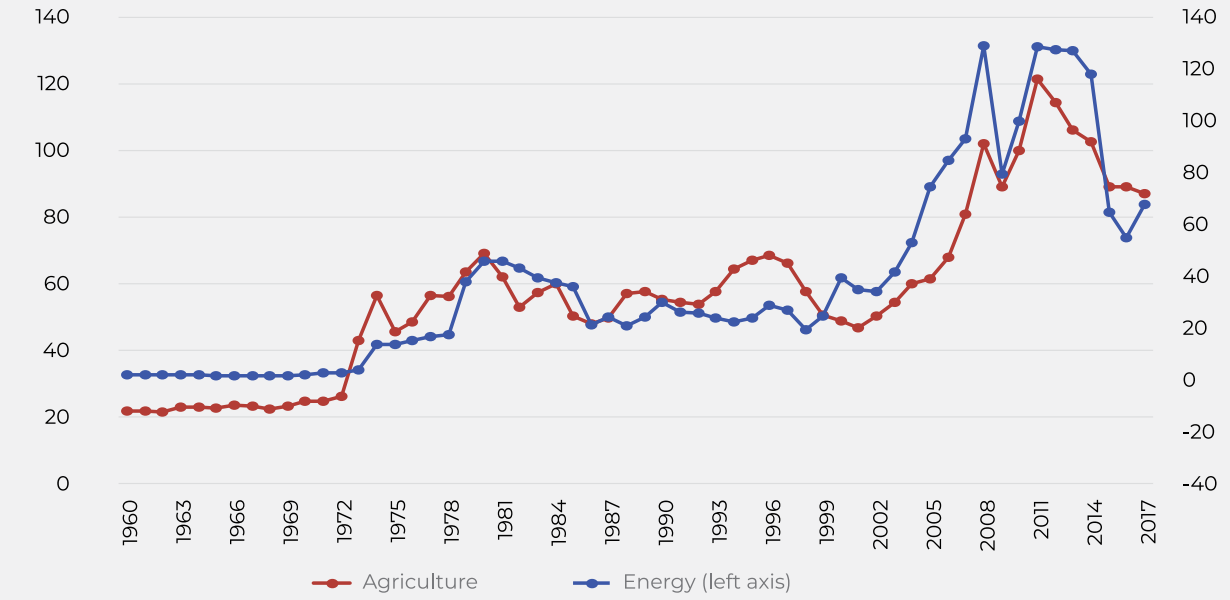
More recently, the relationship between energy and agriculture has expanded due to at least two additional factors. One of them has to do with the long-term effects that climate change will have on agriculture, as well as climate variability in the short-term, both associated with the emission of greenhouse gases from the use of fossil fuels. The other aspect is the expansion of mandates for the inclusion of biofuels in fuel blends. This increase in demand for agricultural products as raw material for fuels has been one of the causes of the rise in agricultural prices in recent years.

Figure 4.6 shows the increase in biofuel production in terms of tonnes of oil equivalent, both globally and in the three main producers (the United States of America, Brazil and the European Union, which together accounted for slightly less than 80 percent of the global production of biofuels in 2018).

Biofuel mandate policies have received criticism due to their contribution to high food prices, their significant cost to taxpayers and consumers, their limited contribution to reducing greenhouse gases (which may even be counterproductive in some cases, if indirect land

Figure 4.5

Nominal Energy and Agrifood Product Price Indices, annual world average, 1960-2017

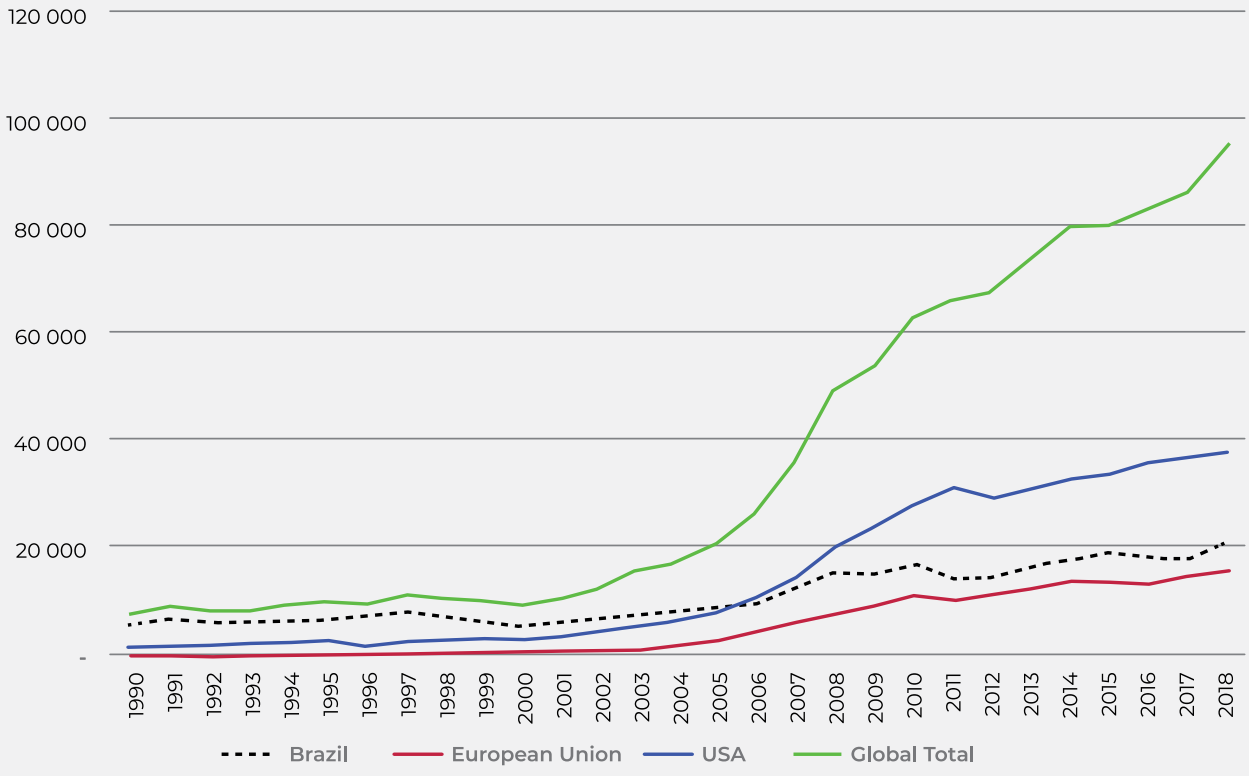


Source: Prepared by the author based on World Bank data.

Figure 4.6

Biofuel production

(tonnes of oil equivalent)



Source: Prepared by the author based on data from British Petroleum.

use changes are considered), and their reduced contribution to energy independence with current technologies. This has led to stabilization of the cut-off percentages in the mandates for the use of biofuels. All of which, coupled with falling oil prices, have stopped or significantly reduced the explosive growth of biofuel production in the United States of America and European Union markets, originating further international trade conflicts for access to those markets.

Changes in biofuel policies and energy prices have had significant impacts on corn, soybeans, and sugar. The latest data from FAO (going up to 2013) indicate that "other uses" (i.e. not food for humans or animals) reached 20% for corn, almost 41% for soybean oil, and almost 8% for sugar (2010-2013 average).

Another key aspect in the relationship between agricultural products and energy is the significant technological shift in the latter. Increased oil and gas production from shale has driven down oil prices. The most recent episode of low prices (2008-2011) seems to have several similarities to the one that occurred in the 1980s, when technological advances in energy (such as those now related to shale gas and unconventional oil) and low global economic growth led to lower energy prices.

It is also very important to note the significant drops in the price of energy produced by alternative sources such as solar and wind. Particularly, the price per kilowatt hour of solar energy in the United States of America in 2018 was less than a quarter of its value in 2010; in the case of wind generation technologies, the price drop has been less rapid, but still very significant. As a result, the cost of electricity produced by these sources within integrated systems is now competing in the United States of America – without subsidies – with the natural gas combined cycle, which is the most conventional generation option in that country (IRENA, 2019).

Offshore drilling technology enabled North Sea oil production in the late 1970s – contributing to the collapse of oil and agricultural prices in the mid-1980s –, and shale gas and unconventional oil have transformed the United States of America into a net exporter of gas, cutting its oil imports by nearly half. Potential changes in renewable technologies, especially solar, coupled with the advancement of electric vehicles, may bring even more revolutionary changes. The LAC countries must try to join the energy transition that is underway and that, as in the past with other technological shifts in energy, is going to have significant impacts on the agricultural sector. Furthermore, this energy transition is being accelerated by the current pandemic, which is driving an increase in remote work and in the use of digital channels to buy and sell products.

4.5 INNOVATIONS IN FINANCING

In a previous section, the financing of agricultural R+D+i and the need for the countries in the region to allocate greater resources to it were mentioned. Aside from technology development efforts, additional spending and investments are needed for such technologies to be disseminated and used at the scale that is necessary. This requires considering

different sources of financing for the necessary investments that can lead to the creation of agrifood systems that are environmentally sustainable, generate income and decent jobs, as well as healthy diets and, as the pandemic has shown, are resistant to new health crises. Within these sources it is important to consider at least three: public spending, domestic credit, and private sector financing.[39]

In terms of total public budget, LAC spent an average of approximately USD 1.75 trillion annually during the 2010s (or about 30 percent of its total GDP in that period). On the other hand, total credit to the private sector from banking and financial brokers[40] in the region was approximately USD 2.2 trillion annually on average during the 2010s (Díaz-Bonilla and Saravia-Matus, 2019).

Of these totals, only a minor portion has been allocated to the agricultural sector in general. In this sense, a more relevant indicator is the Agriculture Orientation Index (AOI) of spending and credit, calculated as the percentage of agricultural spending over total spending (or agricultural credit over total credit), and divided by the percentage of agricultural GDP over total GDP. Thus, a value of 1 indicates that the agricultural sector receives the same percentage of public spending (or credit) as its percentage in total GDP (if it were less than 1, it receives less than its percentage in the GDP, and vice versa).

Figure 4.7 shows the data for the 2010s in LAC, using the AOI's average and median. Clearly, LAC countries spend on – and finance with credit for – the agricultural sector percentages that are less than what corresponds to it in term of its contribution to GDP: 0.35 (average) and 0.25 (median) with regards to public spending, and 0.76 (average) and 0.66 (median) with regards to agricultural credit. As a reference, the figures for these indicators in developed countries are 1.25 and 0.55 for public spending, and 1.95 and 1.47 for credit (Díaz-Bonilla, 2018a).

4.5.1 Budget expenditure analysis

Certainly, it is not only a matter of expanding fiscal or credit resources for the sector and for building agrifood systems that make it possible to achieve the Sustainable Development Goals (SDGs). An important part of achieving these goals consists in appropriately allocating available public resources, analysing the levels, composition, effectiveness, and equity of spending. This requires an analysis of public spending with a focus on the SDGs and, especially from this chapter's standpoint, with regards to agri-food systems. Although there have been several isolated attempts, there have been no integrated analytical efforts that cover these aspects; therefore, an analysis of public spending based on the expanded SDG 2 should be promoted (Díaz-Bonilla and Callaway, 2018; Díaz-Bonilla, 2019).

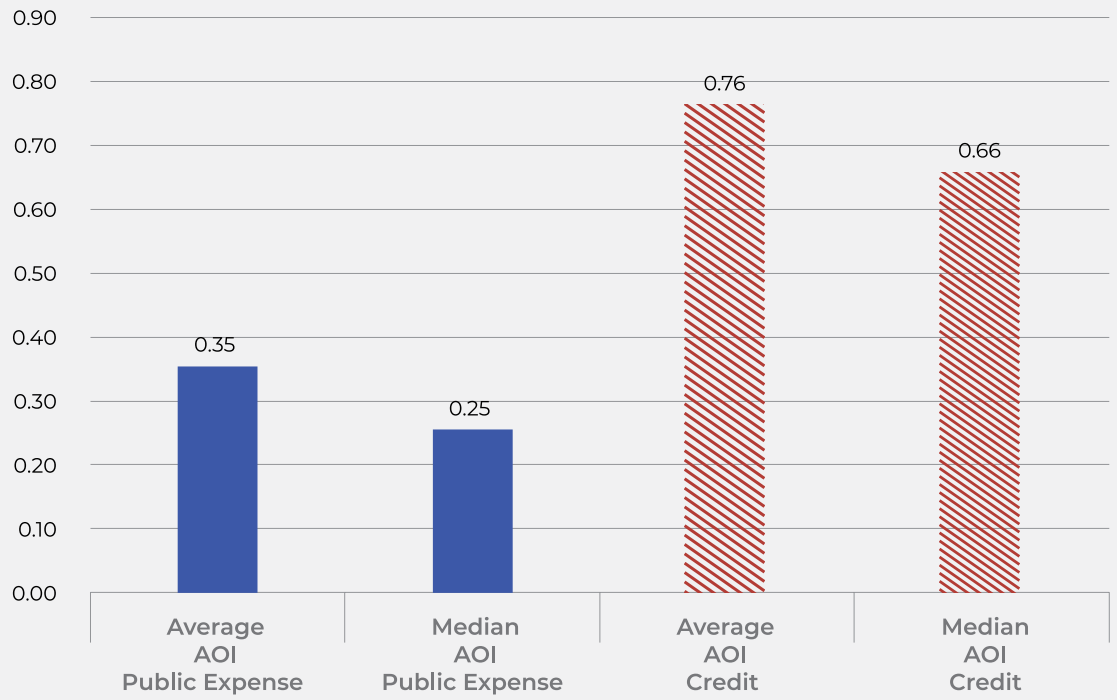
With regard to public spending, the pandemic has forced governments to implement a variety of policies and investments in health (including care facilities, equipment and personnel), social protection (expanding cash transfer programmes,

[39] There are other sources, such as bilateral and multilateral credit organizations, but their volumes of financing are much smaller than the three sources mentioned in the chapter (see discussion in Díaz-Bonilla, 2018b).

[40] This category includes private and public banks in the countries of the region, including national development banks, for the different sectors.

Figure 4.7

Agriculture Orientation Index (AOI) of Public Spending and Credit in the Agricultural Sector, LAC region, 2010s



Source: Prepared by the author based on data from FAOSTAT.

aid and food subsidies), employment (unemployment compensation and similar), and production (tax cuts, credit expansion). All this has required a variety of unconventional monetary and fiscal instruments. A long period of normalization of public finances and monetary programmes will be required, which in turn will require strong support from international financing organizations.[41]

4.5.2 Banking and financial aspects

Achieving the SDGs requires, above all, a significant effort from the private sector, from small agricultural producers to large commercial companies. Central to this is the banking and financial system. Different studies of financial markets and the rural sector in developing countries were carried out in the 1980s and 1990s. However, since then there have not been any similar efforts. It would be important to return to this line of analysis, with concrete studies and works, to improve macroeconomic, regulatory, and institutional policies that lead to financial inclusion and to overcome the limitations that restrict financing for food and nutrition security, as well as for achieving the SDGs (Díaz-Bonilla and Saravia-Matus, 2019).

[41] A discussion of these issues can be found in Díaz-Bonilla (2020), as well as a broader analysis of fiscal and monetary aspects in Díaz-Bonilla (2015).

There are several issues that must be considered in this review of banking and financial aspects. The first one is the origin and uses of the funds that are intermediated. These can be (1) budget allocations by the government; (2) monetary sources related to the money supply (such as rediscounts by the monetary authorities or the reduction of minimum reserves required when a bank lends to certain specific sectors); (3) regulatory mandates, such as bank loans coming from a certain percentage of deposits mandatorily directed to the agricultural sector, and (4) financing from the rest of the world, such as loans from international organizations that are then directed to farmers, usually through public sector banks (Díaz-Bonilla and Fernández-Arias, 2019). Each mechanism has advantages and disadvantages that must be analysed. Particularly, updated versions of the unconventional monetary policies that underpinned agri-food development in the 1960s and 1970s should be considered – what was deemed as "developmental central banks". But unlike that period, today the expansion of credit for the agrifood system must be firmly articulated with the overall monetary programme (Díaz-Bonilla, 2015).

A second aspect to consider lies in the type of banking and financial institutions, given the great variety of formal and informal operators that give credit, manage savings, and offer other financial services to rural populations and to the agrifood system in general. Each type of financial institution has its own logic for doing this, with its advantages and limitations.

Within this context, it is recommended to reconsider the role of public agricultural development banks. These can be powerful instruments, but they require overcoming the issues of the past (from not mobilizing rural savings and not offering other rural financial services, to issues such as inefficiency, corruption and capture by private interests). There are regional experiences (such as the case of BNDES in Brazil or FIRA in Mexico) and international development banks that can provide new ideas for a modern redesign. Likewise, it is necessary to reinforce the operations of cooperative, communal, and microcredit banks, while considering other options, such as in Chile, where experiments with public venture capital funds are taking place, which in turn leverage private funds (Díaz-Bonilla *et al*., 2019).

The third aspect to consider is that of financial instruments. Many times, the emphasis of the analysis is placed on credit (usually finding that it has an anti-agricultural bias) and on the short term, as opposed to the longer-term credit that is needed. Some of these problems are due to objective issues such as customer dispersion and low volume, as well as the presence of covariant risks (weather, prices, pests, seasonality of production, etc.). But there are other reasons as well, including regulations designed for the urban sector and for activities with more regular cash flows than in the agricultural sector. In this sense, attempts should be made to continue innovating with more flexible disbursement and payment schemes, and in line with the rhythms of agricultural activity (as appears to be the case in the Uruguayan livestock loan scheme). Likewise, those successful payment in-kind schemes should be reviewed (such as an insurance scheme implemented in Argentina where producers can pay in soybeans), as well

as the failures that some of these schemes have suffered in the region (Díaz-Bonilla *et al*., 2019).

Finally, the development of credit for long-term investment would require funding from public fiscal or monetary sources, or intermediation in the capital market. Likewise, there is a lack of other financial products and services for the rural population. On the financing side, other instruments should be supported, such as leasing, warrants, product pledges, loans to value chains, loans to input suppliers, reassignment of sale contracts and invoice discount, among others. Each one requires adapting regulations and operating mechanisms (Díaz-Bonilla *et al*., 2019).

On the side of saving and financial inclusion instruments, there is also work to be done. There are cases where bank accounts are opened for families that receive government transfers, as well as other mechanisms to make it easier for populations to access bank accounts, but their functioning is not always analysed. Families that receive conditional transfers use savings accounts only to receive the money that comes in, and which is immediately withdrawn. Other support is needed, such as financial education to be able to read financial statements, draft budgets and use ATMs, which can help these accounts also be used to increase productivity (Díaz-Bonilla *et al*., 2019).

It is noteworthy that in all these cases, the possibilities brought forth by digital technology (internet, cell phones, mobile agencies, and others) can lower transaction costs and generate more information about potential clients (thus reducing risk). For all this, investments in infrastructure, greater access of potential clients to computers and telephones, and financial education are necessary (Díaz-Bonilla *et al*., 2019).

4.5.3 Mobilization of private investors

The third source of financing comes from private investors, especially the so-called "impact investors" and socially oriented investors. Different analysts have noted that investors worldwide have a lot of liquidity, but what is lacking are specific projects or financial assets for investment, with the right balance of risk and return to attract such funds.[42]

Box 4.3 presents figures for global private wealth and for stocks and flows of investment operations with social, environmental, or governance motivations. Only in "green bonds" there were almost USD 170 billion emitted in 2018, while global projections by the Climate Bonds Initiative suggest that these emissions will continue to grow.[43]

Although there are different estimates of how much the fight against climate change will cost globally,[44] it is clear that it is one of the most sizeable components in terms of financing needs for the 2030 Agenda. This also applies to a large extent to the necessary food system transformations to achieve the associated SDGs, now with the additional requirements of confronting the pandemic and its consequences.

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[42] See comments from the World Bank's IFC Vice President of Blended Finance and Partnerships in World Economic Forum (2017).
[43] https://www.climatebonds.net/about
[44] See UNESCO (2017).

Box 4.3

Global Private Wealth, Stocks and Flows
(USD)

Total Wealth of Families (2015)	250 trillion
ESG Investments (2015)*	12.9 trillion
Impact Investors†	
Under Administration (2017)	228 billion
Cash flow from operations (2017)	35.5 billion
Green bonds (2018 issuance)	167.6 billion

Sources: Prepared by the author.

Notes:
* ESG Investments are those that have Environmental (E), Social (S) and/or Governance (G) considerations.
† "Under administration" is the stock of investments (accumulated over time until the end of 2017), and "Cash flow from operations" is the value of projects approved only in 2017.

In this context, the issue lies in how to mobilize resources for investments that support these goals, and particularly in rural areas in LAC. A possible innovation for these investments could be to extend the approach to sustainable infrastructure presented by the Argentine G-20 presidency during 2018, which proposed "develop infrastructure as an asset class by improving project preparation, addressing data gaps on their financial performance, improving the instruments designed to fund infrastructure projects, and seeking greater homogeneity among them." (University of Toronto, 2017).

The possibility of using the same approach to develop the necessary financial mechanisms and structures that can attract private and public financing in support of building efficient and sustainable food systems, as well as achieving the SDGs, and in which private investments play a major role, should be explored. This could include small irrigation and water management systems, as well as other aspects of climate-smart agriculture practices, such as afforestation and reforestation, and proper management of natural resources (Díaz-Bonilla *et al.*, 2018). Similar ideas could be applied to other sectors with potential growth in rural areas, such as renewable energy or biodiversity and ecosystem conservation.

A concrete mechanism may lie in the creation of a Fund for the Preparation, Incubation and Acceleration of Projects (hereinafter, FPIAP) that helps develop a portfolio of projects related to building sustainable, equitable, and healthy food systems (see Díaz-Bonilla *et al*., 2018). This fund could be managed jointly by FAO and CGIAR,[45] and have four main functions: (a) identify and prepare projects and possible investments, working with small and family producers and their communities, as well as with the corresponding national authorities; (b) identify possible sources of international investment and financing, both private and public; (c) define the financial engineering, legal and regulatory structures, and operational aspects that should be addressed and resolved for the projects' economic, social and environmental sustainability, and (d) provide support for monitoring and evaluation activities.

The size of the FPIAP will depend on the desired increase in investment to meet the objectives sought in LAC. The FPIAP could be structured as a revolving fund in which preparation costs are reimbursed by the appropriate private and/or public partner, after project implementation.[46] With this mechanism, the FPIAP could end up mobilizing funds for specific investments that would be much higher than the values mentioned above.

4.6 FINAL CONSIDERATIONS

Achieving a sustainable food future requires building food systems that, in accordance with the Sustainable Development Goals (SDGs), support growth and employment, ensure social inclusion and equity, promote climate resilience and environmental sustainability, protect biodiversity, and create healthy diets for all. COVID-19 has posed even greater challenges in terms of food system robustness in the face of pandemics.

Many political, institutional, technological and investment innovations are going to be necessary for this task. Some of these innovations have been briefly reviewed in this chapter. Different organizational options were suggested at the **institutional** level, but, above all, is the need to formalize a mechanism for programming, implementation, and control around the budget cycle. Regarding the current pandemic, the importance of having a centralized programmatic and operational coordination centre was mentioned, one that articulates health aspects, those related to the economy and employment, and social protection issues.

Regarding **instruments**, two were highlighted among the many which are possible: (a) new conditional transfer schemes, which combine support for poverty issues with productive aspects and environmental services, and (b) frontal food labelling with clear indicators to combat overweight and obesity. With regards to

[45] Sadler *et al*. (2016) propose different measures to increase investment, such as to "design innovative mechanisms and adapt others to leverage additional sources of both public and private capital that can be directed toward climate-smart investments in agriculture," and "designing and piloting new investment vehicles that can attract additional capital by diversifying, managing and rebalancing the risk return profiles of individual investors".

[46] The Camdessus Report (Winpenny, 2003) also proposes a revolving fund for project preparation, in this case related to water, and especially in irrigation, considering that they are complex and difficult to structure (especially when trying to involve private investors with reasonable rates of return and acceptable risk profiles).

technology, the need to substantially increase investments in R+D+i was mentioned, to realize the benefits of the "third revolution" in biology and join the accelerated energy technology transition.

Finally, given the importance of mobilizing funds on a much larger scale for the necessary transformations, the section on **financing** analysed three points: (a) the need to conduct more in-depth reviews of public spending taking a sustainable agri-food systems approach (or based on the related SDGs), to realign priorities and spending; (b) review of rural financial markets and value chain financing to remove the obstacles that prevent financing the necessary changes in food systems and achieve social inclusion (this section presented a few ideas on funding sources, institutions, financial instruments, and the importance of digitization, and (c) the idea of creating a fund for the preparation, incubation and acceleration of investment projects and alternatives for association with private investors, in order to mobilize the significant international liquid assets (Díaz-Bonilla *et al*., 2018).

Whatever LAC does with regards to building an agrifood system that is fair and sustainable from an environmental and ecosystem standpoint, has and will have deep repercussions, not only for its population, but for the world as a whole. The future of the region and the world depends on us becoming aware of the enormous challenges we face and acting accordingly. ■


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5
THE CHILEAN FOOD LABELLING LAW: A FIRST STEP AGAINST A SILENCED PANDEMIC

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5.1 BACKGROUND

To face the COVID-19 pandemic, governments, societies, and resources have been mobilized in an effort to avoid greater loss of life and damage to the population, with substantive modifications in economic and social relations at a global level. Obesity, a pandemic that causes the loss of 4 million lives directly and is associated with 41 million deaths from other chronic diseases annually – 112 thousand deaths per day – is also a critical factor in the most severe cases of the novel coronavirus, but has not been subject the same urgent care and management.

Seventy percent of the world's obese individuals are in low and middle-income countries, affected mainly by the consumption of ultra-processed products that have become a cheaper alternative to healthy foods, amplifying the double burden of malnutrition (undernutrition/obesity) (Shekar & Popkin, 2020). Facing this obesity pandemic requires – in our experience – an alliance between science and politics for the implementation of regulations and public measures in accordance with the urgency of the required changes. These should address, from a human rights perspective, effective access to information and healthy diets, in systems that protect the most vulnerable areas. For this, we must assume that this serious health problem is, in fact, *transmissible*: it is contagious through cultural and commercial practices as a result of transnational business models, with increasingly effective advertising as a vehicle for contagion.

Chile's Law on Food Nutritional Composition and its amendment relating to Advertising, came to fruition only because the science, led by Dr. Ricardo Uauy, did its homework by delivering, time and again, the unquestionable arguments with which politics – sustained by an attentive public opinion – established the pre-eminence of the right to know and the protection of children's rights, preventing its manipulation through marketing and advertising. It was necessary to confront powerful junk food transnationals, which, even now, wield arguments that go

against all evidence and are only part of a neoliberal ecosystem that is responsible for this *Syndemic* that is affecting the entire planet (Swinburn *et al*., 2019).

In global terms, it is unacceptable that food is an agent of health damage in a double dimension: it damages the health of people and the planet. Poorly conceived agri-food systems generate 8 percent of greenhouse gas emissions, contribute to pressure deforestation, the consumption of water – a scarce commodity –, the application of pesticides, the use of fossil fuel for transport and agrochemicals, etc.

As not only businesses but also their problems globalize, we require global initiatives that are in tune with the set of challenges posed today for building sustainable food systems. Today we know that, in addition to damaging people's health, obesity has huge hidden costs, including healthcare. These health costs are projected at USD 1.3 trillion by 2030 if we do not move towards a healthy diet, in addition to the 1.7 trillion in social costs relating to climate change due to greenhouse effect emissions associated with current dietary patterns (FAO, IFAD, UNICEF, WFP and WHO, 2020).[47]

However, while we accumulate information and knowledge, our data, behaviours, and emotions are also exposed to various technologies that do not work in our favour, but rather increase the asymmetry of information between sellers and consumers, prompting us to resemble each other more, to want the same things and to compete for them. With this logic, more and more people are losing and fewer are winning.

5.2 THE SILENCED PANDEMIC

Obesity causes 4 million deaths worldwide annually and is increasing the risk of morbidity in all age groups. Furthermore, more than 2 billion people in the world are overweight, a risk factor for the 41 million people who die each year from chronic non-communicable diseases (CNCDs).[48]

Obesity and overweight advance rapidly in all ages and in all corners of the planet. Half of the world's population is at risk of being obese by 2050, with the serious consequences that this implies for their health, health systems and public spending in countries.

Globally, between 2000 and 2016 alone, obesity in children and adolescents has more than doubled, with an increasingly accelerating trend among schoolchildren, particularly in Asia (FAO, IFAD, UNICEF, WFP and WHO, 2019). This is serious not only because of our responsibility towards the most vulnerable people in our society, but also because obesity works, by age, like an inverted pyramid: the more obese children today, the greater the proportion of obese adults tomorrow.

Obesity increasingly affects low and middle-income countries, and although it used to

[47] This multi-crisis translates not only into an unsustainable food model, but also into the spread of threats of zoonotic origin that further increase the risk of death of obese people, such as COVID-19.

[48] It is estimated that annually CNCDs cause the loss of the equivalent of about 120 million years of full health due to illness or disability, or disability-adjusted life years (DALY).

be concentrated in urban areas, it is now experiencing a substantial increase in rural areas as well. Latin America and the Caribbean is no exception: for every person who suffers from hunger, there are more than six overweight or obese. There are 12 million obese children in the region (15%), a figure that tripled between 1990 and 2016. The same has happened with adolescents, who almost quadrupled, from 3 to 11 million, in the same period. Non-communicable diseases (mostly associated with obesity) are responsible for more than 50% of deaths in Latin America; in the Caribbean, Mexico, Chile, and Uruguay, they cause at least 80%.

In relation to economic costs, people with obesity represent between 25 and 50% of the expenses for medical treatments, which in developed countries would represent up to 7% of the total health spending. According to ECLAC, in 2014, Chile, Ecuador and Mexico spent up to 4.3% of their GDP dealing with the double burden of malnutrition (FAO, PAHO, WFP and UNICEF, 2019).

However, despite being the most serious disease in the world, causing more deaths than wars, accidents and any other disease, there seems to be a general lack of awareness around obesity and NCDs. They have been normalized, and instead of adopting urgent measures to stop them, we have implemented permanent care programmes for chronically ill patients, which increase year after year.

Addressing this task involves facing powerful transnational interests that seek to sustain a situation that produces millions of patients, most of whom seem focused on not seeking a cure, but lifelong treatments that alleviate their symptoms. According to studies carried out in the United States of America, consultations with chronic patients tend to concentrate on prescriptions and drug adjustments, in most cases with two, and in some cases five, pharmaceutical products.

Various investigations show that, in 2015, treating chronic diseases arising from obesity corresponded to 59 percent of the global profits of pharmaceutical industries, in a global market that amounts to USD 1 171 trillion annually. Anti-diabetes drugs accounted for more than 85 trillion dollars in profits for these companies during 2017, followed by antivirals and those that treat hypertension (Business Research Company, The, 2018). All this is part of a neoliberal ecosystem, in which rights – such as the right to health – are traded in a worse than imperfect market, characterized in many areas by the asymmetry of information between irresponsible producers and consumers who can be manipulated, by not having all the background information that the industry has.

The consequences of the lack of actions aimed at effectively addressing the causes of obesity are increased by the appearance of the novel coronavirus. Studies that indicate that, regardless of the presence of other comorbidities, obesity relates to a higher frequency of hospitalization, invasive mechanical ventilation, critical conditions, and death, in people infected with COVID-19, particularly among patients under 60 years of age (Petrova *et al*., 2020). According to the OpenSafely study, based on more than 17 million clinical records from the United Kingdom of Great Britain and Northern Ireland,

the relative risk of critical illness from COVID-19 increases by 44 percent for overweight people, and increases almost double for the obese. Likewise, the risk of dying from COVID-19 increases by 27 percent in overweight cases and almost double in obesity cases (Tan *et al*., 2020).

The British Prime Minister changed his attitude towards taking measures against obesity, after being admitted to intensive care for COVID-19, noting that he was too fat. He who had defined himself as a "libertarian" when explaining his opposition to public policies, changed his mind after the experience and announced a set of measures such as a ban on advertising for foods high on critical nutrients, a ban on offers such as "buy one and get one free" for these types of products, the obligation to report calories on restaurant menus, and a campaign to encourage British people to lose weight, be physically active and eat better (Schaverien, 2020; Pym, 2020; Department of Health and Social Care, 2020).

All this happened in the United Kingdom of Great Britain and Northern Ireland after the alarm generated by COVID-19 in its Prime Minister. We ask ourselves, do authorities have to personally suffer the consequences of a problem before they decide to address it? Fortunately, in Chile, the Parliament made progress on this type of measures before, based on scientific evidence, and not on the individual experience of senators and representatives.

5.2.1 Obesity deepens inequalities

As it spreads around the world, obesity not only increasingly affects lower-income countries, but it has begun to increasingly affect the poorest populations in each country, making them more vulnerable to a series of health problems. Every year, 15 million premature deaths from CNCD occur worldwide, 85 percent of which occur in low and middle-income countries. These areas of the world register 75 percent of the total deaths from these diseases (32 million) worldwide (Shekar & Popkin, 2020).

The poorest communities face economic difficulties accessing food, and this is exacerbated when it comes to healthy nutritious food. In Chile, it was estimated that a quality food basket, based on recommendations of the healthy food guidelines made by the Ministry of Health, was 36.1 percent more expensive than the basic food basket, which would mean that 27 percent of the population simply could not afford it (Cuadrado and García, 2015).

Recently, in the global analysis presented in the SOFI report[49] on the state of food security and nutrition in the world, it was identified that a healthy diet – with the recommended intake of different food groups – can cost up to 5 times more than a carbohydrate-based diet (starchy foods) that provides the minimum amount of energy (FAO, IFAD, UNICEF, WFP and WHO, 2020).

Additionally, faced with elements such as lack of time for the preparation of traditional foods, in a world where more people work longer hours, and with increasingly longer travel times, the consumption of processed products and fast-

[49] FAO, IFAD, UNICEF, WFP and WHO. 2020. The State of Food Security and Nutrition in the World 2020. Rome (available at: http://www.fao.org/publications/sofi/2020).

food increases. This is no longer a phenomenon limited to high-income groups, but has moved to lower socioeconomic levels, because ultra-processed products – high in critical nutrients and empty calories – are cheaper.

In Chile, socioeconomic level is directly associated with years of schooling. The 2017 National Health Survey showed statistically significant differences between obesity in the population with less than 8 years of studies (43.2% obesity) and people with more education (29.8%, between 8 and 12 years, and 27% in people over 12 years of studies). This type of inequality is replicated with respect to the risk of diabetes and arterial hypertension, for example (MINSAL, 2017).

The Nutritional Map by the National Board of School Aid and Scholarships (JUNAEB), prepared on information corresponding to 86% of Chilean educational establishments, indicates that 52% of Chilean students are overweight or obese. This map also shows the unequal impact of the obesity pandemic, with up to 13.8% less prevalence of overweight in students from high-income districts compared to the poorest students. Students in the lowest income quintile are 38% more likely to be obese than those in the highest income quintile (JUNAEB, 2020).

All these differences have implications that range from the lower capacity of obese children to perform adequately in the school context, to the probability of suffering from other chronic diseases and the consequent deterioration in quality of life and risk of premature death.

5.2.2 Bad products should not be considered food

Unhealthy consumption patterns have been globalized, affecting traditional healthy diets – such as Mexican diets or those in important parts of Asia –, and increased the intake of ultra-processed products, high in calories, fat, and sodium, and without protein, which are distributed and packaged with massive advertising. We applaud the increase in food availability, which has helped reduce hunger. But we have not paid the same attention to the even more acute proliferation of products that have negative effects on the population who – unknowingly – consumes them.

The industry insists that "there are no good or bad foods", and that personal decisions determine consumption, focusing instead on sedentary lifestyles (which have also been globalized) as the sole drivers of obesity. This is the way of the libertarian argument, the same one wielded by the British Prime Minister, Boris Johnson, which he modified after spending a few days in Intensive Care due to his overweight problem when he was infected with COVID-19. This argument maintains that the problem is not the caloric intake, but the population's reduced energy expenditure and lack of physical activity.

Junk food producers introduce an approach that makes it difficult to advance substantive public policies to curb the epidemic. By holding that people – that is, their decisions – are responsible for obesity, they look away from the fact that there are obesogenic environments that must be addressed.

The taste of salt and sugar are socially acquired. Our body presents an evolutionary response to these components, which involves the release of dopamine after their consumption, which provides short-term pleasure and encourages us to repeat the action. The excessive consumption of salt, fats and sugar can reach addictive levels, generating states of temporary happiness and immediate gratification from an easily accessible consumption.

Ultimately, manufacturing junk food has a similar logic to manufacturing drugs. Food is ultra-processed to release a greater amount of dopamine and transform the consumer into an addict. They remove fibre, protein, and water from the food, and add fats and refined carbohydrates. In other words, they decrease their nutritional quality to satisfy cravings, causing compulsive consumption, despite harming health.

Immediately, one wonders: Why, if they act in a similar way, is the drug industry illegal and persecuted, but the ultra-processed food industry operates freely? The answer is that the latter has better publicity, by protecting its actions in an area that is not only neutral, but essential for human life, such as food.

The big problem with the libertarian argument is that it assumes that people can make informed decisions, that the market works without a tremendous asymmetry of information between producers and consumers, and that there is transparency. But transnational food companies, on many occasions, falsify reality, reduce the information about the characteristics of their products to a maximum, and induce the purchase with misleading advertising, even financing "scientific" research that reaches absurd conclusions in defence of the industry's economic interests.

Ultra-processed products contain an excessive amount of fat, saturated fat, sugar and/or salt. Of them, almost 75 percent have at least two of these ingredients in excess. Additionally, on average they provide 600 mg of sodium per person per day, exceeding the daily recommendation (FAO, PAHO, WFP and UNICEF, 2019).

In the case of cereals – a food that should be good and healthy – producers add sugar, fat, and salt to accentuate the flavour. This increases the sales of a product that, once processed, becomes harmful to our health. For decades, many parents fed their children Kellogg's and Nestlé cereals, not knowing that they had up to 50 percent sugar and more than 600 mg of salt. Ultra-processed products with an excess of critical nutrients cannot be called "food", since they are responsible for the largest global pandemic, tied to a high prevalence of chronic disease, hospital bed-use, medical hours, and medications.

The negative impact of ultra-processed products is exacerbated in critical situations such as the one produced by the COVID-19 pandemic. The low price and high preservation of ultra-processed products, added to panic purchases in a scenario in which many households have seen their income reduced, threatens to increase their purchase and consumption. But for many transnationals, even a coronavirus pandemic is a marketing opportunity to encourage the consumption of empty calories. For example, some have permeated the British National

Health Service, offering 500 000 donuts to health workers (Tan *et al*., 2020).

It is important to note that the impact of these products is not only reduced to a high individual caloric intake. There are other impacts that become visible as science progresses. Here are some of them.

Biomes

Science has advanced to a new frontier, determining that living things are complex ecosystems, which have more viruses and bacteria than cells. This poses challenges for medicine, since each human being has his or her own biome, with only 1% of genes that are "human" (99% are bacterial), and where 40% of the molecules that are in our blood are produced by bacteria in interaction with the different systems and organs of our body.

This individual biome, unique as a fingerprint, influences our entire physiology, assists in the development and regulation of the immune system, and aids in food digestion. Its alteration causes disease.

Food plays a fundamental role in the preservation or changes of the biome, and several studies have shown its relationship with the prevalence of obesity, diabetes and cancers, as well as with behavioural changes, stress, depressive states and autism. Along with antibiotics, the main cause of alteration of the bacterial populations in our body are foods high in fat, salt, and sugar, which favour the appearance of bacteria that affect our health.

Epigenetics

In the new study field of epigenetics, analyses how environmental conditions produce modifications that are transmitted to future generations. Obesity can alter the genetic information encoded in the chromosomes of each cell.[50] This means the placing of genetic conditions that increase the probability of suffering from chronic diseases, in addition to doubling the risk of complications and death from COVID-19, with the aggravation that this does not only affect the individual, but also their descendants, that is, future generations.

5.2.3. Obesity as a culturally communicable chronic disease

Probably, one of the main explanations for the proliferation of the obesity pandemic and other chronic diseases that today cause the greatest damage to the health of the population is their classification as CNCD, that is, non-contagious and non-communicable. This way, it is intended to differentiate them from infectious diseases that receive more powerful responses from the global health system, as has happened with COVID-19. This constitutes one of the greatest achievements of the ultra-processed products industry, along with installing the argument of individual responsibility in decision-making regarding food and physical activity.

[50] This alteration occurs by phosphorylation and methylation of protein histones around which DNA wraps to form chromatin. Additionally, malnutrition produces "thrifty genes" that, present in generations with greater food availability, produce obesity.

The demand for harmful products, such as tobacco, alcoholic beverages, and ultra-processed foods, is induced through marketing, which originates and sustains different levels of addiction, together with the placing of cultural patterns, already globalized, that threaten a healthy lifestyle. In the Global school-based student health survey, 70 percent of the countries reported that at least half of their students ate fast food every week; in 27 countries, two out of 10 students ate fast food a minimum of three times a week, and more than half of the countries indicated that half of their students consume sugary drinks daily. The term "food swamps" is now being used to identify environments of choice that strongly stimulate the consumption of ultra-processed products, and where immediate gratification is encouraged (FAO, IFAD, UNICEF, WFP and WHO, 2019).

Thus, CNCDs are an externality of the capitalist development model that globalized consumption and imposed market logic over health. They are spread and transmitted through the ingestion of products that are promoted as ways to achieve freedom, meaning of life, empathy, and aspirational desire. They are disseminated through memes – units of cultural transmission – as informational constructs that specify behaviours. This is a new way of spreading ideas, similar to what an organism uses to spread its genes, but which is part of an incessant load of information that we are subject to on a daily basis, mainly through the web.

To prevent these diseases, we must cut the chain of transmission. This means, in the first place, avoiding exposure to advertising. But this has become increasingly difficult. Every day, progress is being made in learning the ways in which certain memetic units are installed in the brain, which are then sustained permanently, altering the receiver and converting it into the transmitter of the idea. It is a cultural virus associated with company names, product types, lifestyles and global aspirations, and new technologies make it even more transmissible. Currently, exposure to advertising is almost inevitable, particularly in the digital world, in which a massive collection of data has also been developed on the way in which people see, react and act in front of digital advertising.

Companies like Acxiom and Oracle manage unique identities that allow advertisers to control in detail people's intentions, wishes and actions. This means personalized, segmented, relevant, and effective advertising at levels we have never seen before, and where data analysis from different platforms allows reaching the same customer repeatedly (Axciom, 2017).

Furthermore, neuromarketing has advanced in knowledge of the physiological reaction of individuals towards different stimuli, measuring areas of the brain responsible for emotions that will guide the choice of one product over another. They also measure the emotional impact of one or another communication action and approach to the consumer, even using infrared rays to determine where people direct their gaze while being exposed to a message.

Together with Rafael Yuste, director of the Human Brain Project worldwide, a first bill on neuro-rights was drafted in Chile. The purpose of this law would be to protect people from an emerging behavioural economy, where all

aspects of our lives are transformed into desired merchandise. We are facing a true industry of life that, together with the internet of things, will generate a tsunami of data.

Documentaries such as *The Social Dilemma* (Netflix, 2020) show the voracity of the way in which our data is captured, under a business model that has raised critical voices, even among its creators, due to the evident violation of people's rights to privacy in the pursuit of profits. We are vulnerable to being intervened at a pre-reflexive level, efficiently modelling our consumptions and lifestyles, living inexorably with an algorithmic companion in our lives at the mercy of a permanent neuro-linguistic programming of our brains, moving the cultural and political battle to the field of algorithms and artificial intelligence. It is not science fiction. Elon Musk's company Neuralink is developing devices for direct brain-to-brain or brain-machine interfaces, which will make us vulnerable to sophisticated technologies, in a potential attack on our freedom.

5.2.4 Violation of children's rights

Far from approaching the goals regarding the prevalence of overweight in children under the age of 5, it has increased from 5.3% in 2012 to 5.6% in 2019, reaching 38.3 million children worldwide (UNICEF *et al*., 2020). Children and adolescents are, in general, a priority audience for advertising campaigns, because their naivety and credibility facilitate the impact of the message, they lead household purchases in a relevant way, and because it has also been shown that brand loyalties that last a lifetime are built during childhood and youth. This is a particularly vulnerable group to advertising that does not have the criteria or knowledge necessary to discriminate against misleading advertising. This group has been used in an unacceptable way by the junk food industry to produce substantive changes in the traditional diet, through toys, cartoons, attractive characters, colours, stickers, and various strategies that hook them on products that are harmful to their health.

The direct relationship between exposure to junk food advertising and childhood obesity is well established. Chile made a pioneering effort to block the exposure of children under 14 years of age to junk food advertising during daytime hours. This is a way to cut the chain of transmission of obesity and its consequences. But the various advances are lagging with the rapid evolution of technology. Junk food marketing now includes internet games (*advergames*) and promotes going viral with rewards for inviting other participants.

At this point, in the face of powerful industries and trends that seem to escape all control, it is essential to empower ourselves and face the urgent need to take measures based on the most universal International Convention which is incorporated into more countries' own legislation: the Convention on the Rights of the Child. In its article 17, the convention obliges us to "encourage the development of appropriate guidelines for the protection of the child from information and material injurious to his or her well-being" (UNICEF, 1989). Furthermore, in its Article 3, the Convention makes urgent action unavoidable, putting minors, their needs, and

their protection at the centre, by asserting that the primary consideration that public bodies of all kinds shall attend, should be the best interests of the child.

In this perspective, the actions of junk food transnationals take on a particular seriousness. They, knowing better than anyone the components of their products, and despite all the evidence of the harmful consequences for children and for the states, persist in their behaviour, trying to sustain an addictive offer and manipulating through advertising.

5.3 THE CHILEAN LAW: HEALTH OVER ECONOMIC INTERESTS

Who could publicly oppose adopting measures aimed at solving a health problem that is on the rise, which generates serious diseases? Who could find it wrong to warn the public about products that are dangerous to their health? Who could refuse to protect children from a deception that puts them at risk, or to create safe and food-safe school environments? In principle, no one.

For this reason, in March 2007, I presented the bill on the Nutritional Composition of Foods and its Advertising, signed by all senators of the Upper House's Health Commission (representatives of the national political spectrum). The project had 11 articles that regulated certain central criteria (Biblioteca del Congreso Nacional, 2011), among these:

- Food producers and marketers must ensure their safety, promote rational consumption, inform about the composition of their products and respond to the harm they cause consumers.
- There are nutrients that are indicators of a quality diet (whose excessive or insufficient content is a risk factor for people's health, even in the long term), which must be labelled on the packaging, such as total fats, saturated fats, trans fats, sugar, sodium, fibre and calcium.
- Foods that have high amounts of a nutrient whose excess would be dangerous to our health should be visibly labelled (a traffic light-type system was proposed).
- Educational establishments should teach healthy eating habits and warn about the harmful effects of excessive consumption of risky nutrients.
- Schools must also be safe spaces, so foods with excess nutrients cannot be sold inside or within 100 metres of their access points, nor given to children under 18 years of age.
- For this reason, advertising of these products should not be directed to minors, nor should their consumption be induced through strategies such as gifts, games, or contests.
- We should promote an increase in hours of effective physical activity over the course of lengthy school hours.

From a political standpoint, with a rights perspective, the conviction to address two central topics was present, aiming to revert – or at least flatten – the curve of the obesity pandemic that led Chile to a sad first place in childhood obesity among the OECD countries:

a. People have the right to know what they are going to consume and to be clearly informed about possible risks.

b. Children have rights that must be protected from advertising manipulation.

We knew about the behaviour of the junk food industry and its persistent blocking of initiatives that revealed its harmful impact on the health of the population, through pressure on decision makers, threats in the field of international trade, and massive marketing and advertising deployments to mislead public opinion. But we had the unwavering commitment of national science, led by the internationally recognized expert in nutrition, Ricardo Uauy, and previous actions to report health threats by the junk food industry that had alerted public opinion.

5.3.1 The legislative debate

The legislative process in Chile's two-chamber Congress is complex, and the Presidency of the Republic has various powers to block it. The thematic committees of parliamentarians provide reports before the vote, covering both general and specific topics, and if there are differences between the Senate and the House, additional steps are taken. There are initiatives that do not survive the first process and others that get stuck in one of the steps.

Additionally, due to its political composition, achieving progress in the approval of a bill requires consensus and the task of advancing in the construction of majorities in the face of each discrepancy. Hence the importance of having the evidence that makes it publicly essential to legislate.

The beginning of the discussion was powerful, with the delivery of scientific information, in a country where concern about obesity was already established, particularly about the sharp upward trend in its prevalence among children. We saw that the average consumption of salt in Chile was double the historical average of human consumption recommended by the WHO (5 grams), and that 80% of that consumption came from ultra-processed foods. Just reducing salt intake would help prevent 70% of strokes and colon cancer cases, also avoiding 80% of coronary heart disease in Chile. An active population, with an appropriate body mass index, would prevent 90% of type 2 diabetes cases.

In short, there were plenty of reasons to legislate, but the Executive had doubts about the political viability of the project, due to the economic interests that have historically slowed down this type of initiatives worldwide. From the beginning, the ultra-processed products industry put forward the arguments that they would use to try to stop the norm, then its implementation and, even now, its validity, in a tireless defence of its own profits over any other precedent:

- The producers grouped in ChileAlimentos made themselves heard as the second largest exporting force in the country (after copper), arguing that regulations such as the one under discussion would substantially affect the terms and results of international trade.
- They also used the transnational discourse of the industry, pointing out that people were responsible for obesity, because they ate more calories than they burn, and not food, "which is neither good nor bad."
- Finally, the producers argued each person should have the right to choose the product they wanted.

They intentionally left out of the discussion the effects of advertising and the asymmetry of information between producers, who know what they are selling, and buyers, who could not distinguish between harmful products.

Without the right to know, without all the information, with misleading advertising and various strategies to hook children, there is no true "freedom to choose".

The fact that 75 percent of Chileans wanted new nutritional labelling was not an obstacle for the emblematic companies Nestlé and McDonald's to appear before the Senate Health Commission and express their objections against increased regulation. These interventions diluted the initial broad agreement, tilting right-wing parliamentarians against the norm and, as would occur consistently in a decade of debate, the power of science supported the policy.

The Summit on Nutrition and Health - Chile 2008, which we organized at the National Congress, with the participation of Pekka Puska, among other renowned experts, who managed to reduce cardiovascular diseases in Finland by 75 percent, had two relevant effects:

a. The Executive committed to the bill (Segunda, La, 2008) and, as food transnationals were alerted, they withdrew from the event in rejection of the legislation and a frontal labelling with a "traffic light" design (Diario Financiero, 2008).
b. The Soft Drink Association (AMBER), which represents Coca-Cola, among others, was the first to propose the use of Guideline Daily Amounts or GDA, a labelling that indicates the approximate amount of critical nutrients of a product and its percentage contribution to a recommended daily total, as opposed to the established limits and the clear warning contained in the bill.

Consequently, ChileAlimentos, the industry reference in the country, turned the GDA into its resistance strategy. These quickly appeared on the packaging of transnational products, with significant dissemination in the media. With this, they said, legislation would be unnecessary.

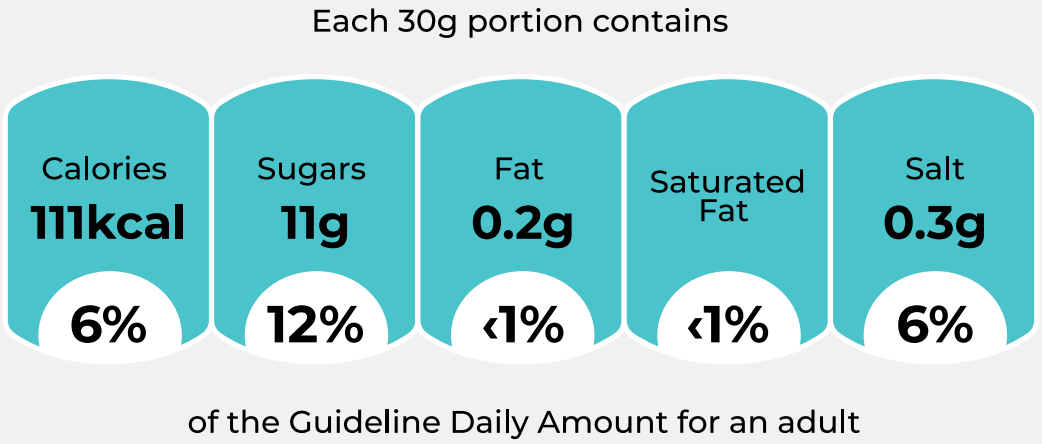
To help the project move forward, the government of Michelle Bachelet announced some indications. Among them, that the specific limits to critical nutrients and the specific format of frontal "traffic light" type labelling would not be in the law and should be addressed with subsequent modifications in the Food Safety Regulations.

As the creator of the project, I wanted everything to be settled in the law. However, it was necessary to give in to allow the bill to move forward, which would set critical thresholds and alert the population when a product was harmful, also protecting children from addiction, limiting their exposure to advertising and manipulation, and creating healthy environments.

In parallel, we started working with the Ministry of Health to study the best frontal labelling that could alert the population about harmful products because they are high in critical nutrients. Thus, we identified criteria to respond to the information requirements of Chileans, which were clearly not resolved by

Figure 5.1

Example of Guideline Daily Amounts (GDA) labelling



Source: Adapted from Alianza por la Salud Alimentaria, 2014.

the GDA. Our conviction is that this labelling is deliberately done so that people do not understand it and have no way of knowing what is inside a container (which looks healthy).

The norm was approved in the Senate, but then the right wing managed to place Sebastián Piñera in the Presidency, reducing the Executive's support for the initiative. Fortunately, it was my responsibility to assume the presidency of the Senate at the same time, which allowed the supporters of the norm to somewhat resist the decision to avoid advances in regulation by the right-wing caucus.

The new government sent instructions that relaxed the regulations, accepted the GDA and allowed advertising, including promotions aimed at children. In parallel, the food industry launched a communication campaign entitled "Informed, you eat well", which explained the GDA, implemented "voluntarily" less than a year and a half ago in 2 300 products (40 percent of the market) (Mercurio, El, 2010).

Science and politics joined forces, and with Dr. Uauy and other specialists we denounce that, *de facto*, the Ministry of Health allowed companies to define which was the best labelling, thus renouncing their role as the Health Authority. And with his answer, the Minister of Health, Jaime Mañalich, demonstrated it: "Today, labelling has to follow international standards" (Tercera, La, 2010a).

"As president of the international commission that examined the recommendations for diet and physical activity to prevent chronic heart diseases, I can say in a responsible way that what ChileAlimentos is publishing as international guidelines does not correspond to the WHO recommendations," replied doctor Uauy (Tercera, La, 2010b). And he was right. The following day, the Ministry of Health was forced to file a claim with the Council of Self-Regulation and Advertising Ethics to withdraw the nutritional labelling launched by the food industry (Tercera, La, 2010c). Science won, and then politics would win when the Chamber of

Deputies rejected the bulk of the modifications proposed by the President of the Republic and the right-wing parliamentarians, which distorted the initiative.

It was then up to the Senate to deal with the bill again, where the right-wing parliamentarian, Evelyn Matthei, "denounced" – as if it were a bad thing – that "a bill like the one that Senator Girardi is defending has never been established in any part of the world. Never!"

The rejection in the Upper House to President Piñera's ideas led the initiative to a new procedure, in which a Mixed Commission, of senators and deputies, managed to return the wording of the norm to what was proposed by the government of Michelle Bachelet. According to our legislative system, it then had to be ratified by a vote in the Senate and then by the Chamber of Deputies.

Faced with this defeat, the Chilean right manifested itself through the director of its main think tank, the Freedom and Development Institute, accusing us of trying to make parents renounce the duty of educating their children and reduce their individual freedoms. Specifically, it called on the Executive to use its veto power "to prevent the State from committing the cruelty of taking candy from a child" (Larrín, 2011).

Without taking responsibility for the fact that two out of three Chileans die from obesity and its consequences, the right wing insisted on deregulation with fallacious arguments. For which we had to answer, with Dr. Ricardo Uauy: on the contrary, the norm establishes the people's right to know which foods are bad so that parents (and children) can make informed decisions, and also promotes freedom for children, avoiding their manipulation through advertising. To achieve this, individual decisions are not enough, but it is up to the State to guarantee the rights involved through the regulation of private entities that affect collective goods, generating, for example, obesogenic environments (Girardi and Uauy, 2011).

It was not only the law that was at stake, but a way of understanding society. The rejection of the business community was total. The highest Chilean industrial organization, the Manufacturers' Association (Sofofa) assured that the approval of the initiative would generate "negative effects on the industry, such as plants closing, job losses and decreased investment in Chile, limiting, in addition, the importing and exporting of products" (Diario Financiero, 2011).

On the same day, the Ministry of Health withdrew its support of the initiative, and the Minister, Jaime Mañalich, described the project as "absurd and completely inapplicable" (Mercurio, El, 2011). The Minister of Economy, Juan Andrés Fontaine, entered the debate by arguing that the proposed legislation would affect "competitiveness and employment," adding that "it may be incompatible with our free trade commitments, it can be considered that this is a limitation and may put obstacles to our exports, affecting the employment of the seafood and agriculture exporting industry" (Segunda, La, 2011).

Brutally, the food industry had exercised all its power and forced the Government to act against

all the arguments of science, threatening to withdraw funding for the Telethon and sports activities. But this created rejection among citizens and drew public attention which, in short, allowed the lobbying industry to be confronted, leading even the anti-regulation senators to support the project.

Thus, the law that upholds the consumers right to know was approved, establishing frontal labelling requirements to identify foods "high in", and prohibits both their advertising and "hooks" (toys, stickers, games, etc.), as well as their sale in schools. But after being defeated in the Senate, the Government decided to veto the law, a recourse in the Chilean legislative system in which the president can eliminate aspects of a project that s/he opposes, even when they have already been approved in Congress.

To confront it, we mobilized. A group of parliamentarians protested for several days in front of the governmental palace, with signs saying that the president had handed over children's health to transnational corporations. On the third day of the protest – and before the imminent arrival of the then president-elect of Peru, Ollanta Humala, at the Governmental Palace – we were unexpectedly received by the Minister Secretary General of the Presidency, Cristián Larroulet, who coordinated a meeting that I held the following day with President Piñera (Mostrador, El, 2011).

At that meeting we agreed that the original front label wording – not the DGA – would be maintained, and that two complementary initiatives would be sent as bills for immediate discussion: one related to the mandatory increase in physical activity hours, and another on advertising restrictions. By presidential intention, the sponsorship of sporting and artistic-cultural events from abroad was excluded from the application of the norm, restricting it only to national events. [51]

Finally, on June 6, 2011, Law 20 606 on Nutritional Composition of Foods was enacted. Then, on November 6, 2015, its amendment, Law 20 869 on Food Advertising, was published.[52]

These were years of intense efforts to provide Chile with a pioneering law in the world, one that clearly established that there are bad products for our health, and that the population should be adequately alerted of this. And, it took even more years to protect children from the manipulation and abuse of their naivety through advertising.

But the junk food industry had not given up. There was still a long struggle so that the law would not become a dead letter and was implemented according to the spirit that inspired us as legislators.

5.3.2 The regulation battle: Limits, portions, warnings, and enforcement

In many cases, to put a law into practice, we require the administrative directive of a

[51] The Executive Branch took 7 months to send the Food Advertising Bill. The initiative that increased physical education hours remained in a simple declaration of intentions of the then Minister of Education.

[52] Law 20 606 on Nutritional Composition of Foods and its Advertising is available at: https://www.bcn.cl/leychile/navegar?idNorma=1041570. Law 20 869 on Food Advertising is available at: https://www.bcn.cl/leychile/navegar?idNorma=1083792.

regulation, a power that the President of the Republic has in Chile. In the case of Law 20 606 on Nutritional Composition of Foods, it was determined that it would be up to the Ministry of Health to define some relevant dimensions, such as the specific limits above which a product would be considered "high in" critical nutrients, as well as the specific characteristics of the frontal warning with which products with excess energy, sugar, salt and/or fats must be labelled.

The industry thought it would have a new opportunity to avoid the regulation, and the Piñera government spent a year and a half trying to create and validate a regulation that violated the new legislation. The Ministry of Health regulation established a threshold of critical nutrients per serving only for 20 food groups, proposing the idea of a single warning – which could be presented in different colours, in tune with the packaging – to include one or various critical nutrients that the product contained in excess. Additionally, that version of the regulation excluded fast food from its application, and products labelled before the publication of the law would not be required to include the warning.

It was "a tailored suit" for the industry, but once again science joined our position, questioning even the weak limits on critical nutrients in the Ministry's regulation. For example, they accepted that soft drinks could have 12.5 grams of sugar per 100 ml. (a figure that is above the 11 grams per 100 ml. that they had at that time), and cereals could have 0.5 grams of salt per 100 grams, when children should eat a maximum of 1 gram of salt per day (Mercurio, El, 2013).

The Government had hired technical and scientific studies on the matter, but – as their own authors denounced – they simply did not have them at hand at the time of making the regulations. This forced us to carry out new demonstrations in front of the Government Palace to prevent deliberation by the Comptroller's office.

On March 11, 2014, Michelle Bachelet assumed again the Presidency of the Republic of Chile. The first thing we requested was the withdrawal of Piñera's regulation from the Comptroller's Office, so that we could draft one that did comply with the spirit of the law.
Junk food producers decided to create the Association of Food and Beverage of Chile (AB Chile), a new model, leaving ChileAlimentos in the past. Its purpose was to create a more active resistance front to the new legislation and the Tax Reform project that we promoted, which included an additional tax on sugary drinks (Diario Financiero, 2014a).

At our request, the Bachelet administration formed a Committee, this time made up of experts, with a declaration of interests and representatives of the scientific world – among them, Dr. Ricardo Uauy, who added to his international recognition the National Science Award –, to create the new regulation in accordance with the spirit of the Nutritional Composition of Foods Law. Those of us who were part of it were entering unprecedented terrain. How to determine, with scientific evidence, what were the limits on which to consider that a product is "high in" a critical nutrient?

The answer was simple: if for centuries humanity subsisted healthily on the natural contents of food, then processed products should not exceed those limits. Still, it was a huge scientific task: establishing thresholds, for both liquids and solids, based on their natural composition, using a single metric for all types of food. Therefore, we used standard units of measure (100 grams for solids) and (100 millilitres for liquids), thus avoiding artificial manipulation of "portions". The only foods excluded were raw materials that exceeded the norm (such as oils, flour, sugar, rice, or salt).

In mid-2014, we presented the new regulations, with strict limits (which were soon endorsed by an independent PAHO study). The regulation also reached fast food: processed products that exceeded the limits were obligated to be labelled in the front with the warning stamp "high in" (black octagons, also called black discs, similar to the Stop sign, displayed in figure 4.4 of this book), and were also unable to do any type of promotion aimed at children.

With the conviction that the "traffic light" approach – which uses colour-coding to identify critical nutrients concentrations – was the best type of front labelling, focus groups were carried out throughout Chile, because we wanted to be sure that that even 6-year-olds could clearly identify the warnings. To our surprise, the results of the study determined that the black discs were the most clearly and quickly understood.

When we made the decision to select this image for front labelling, we received an industry visit. The same people who in 2008 managed to veto the "traffic light" system, asked us to replace it. At the time, ironically, we thanked the producers for resisting when they did because otherwise, we would not have come to recognize the power of black disc labelling.

AB Chile's complaint was immediate. They created a powerful lobby at a national level demanding that the warning be modified, that the limits be raised, that the idea of "portions" returned to the table (instead of the 100 g/ml units) – because by manipulating the size of the products they could try to avoid the discs, and that they be given more time (Diario Financiero, 2014b).

In parallel, the National Association of Advertisers (ANDA Chile) questioned the Food Advertising Law, which, among other things, prohibited the use of attractive images for children in their packaging, claiming that some companies would have to change their business model and restructure their products or target audience. For the marketing world this was a problem, but for those of us who promoted the law it was a demonstration of its usefulness.

Advertisers were the first to bring up a new form of industry resistance around intellectual property rights. Their argument was that food companies have intellectual property on their brands, images and any creative element of consumption. Therefore, that gives them the right to control how the public sees them, and this law would restrict the way the public perceived them.

Against all the evidence gathered by the WHO, the CEO of the World Federation of Advertisers, Stephan Loerke, would go further, stating

that "there is no direct relationship between advertising and obesity." Meanwhile, Roco Rinaldi, Secretary General of the International Food and Beverage Alliance, which groups 11 of the main food brands in the world, warned that norms of this nature would distance them from self-regulation commitments (Diario Financiero, 2014c).

These complaints found ears in a sector of the Government. The Undersecretary of Economy of the Government of Bachelet, Katia Trusich, surprised us by having the same discourse as the industry, stating that "if the shelves are all black and all the products exceed the critical nutrients, the consumer will have no options", showing her willingness to return to the idea of "portions", and opening a new dialogue with producers about the regulation (Diario Financiero, 2014d).

At that time, November 2014, I was invited to participate in the Second International Conference on Nutrition, organized by FAO and WHO in Rome, to share the Chilean experience with the innovative Law on Nutritional Composition of Food and Food Advertising. Transnationals are fully aware of the impact of their business model on millions of children in the world, condemning them to a life of illness and premature death, generating addictions and taking advantage of their naivety. This constitutes a violation of the essential rights of children, so, without euphemisms, in front of 500 attendees, in the presence of the Pope, and of companies such as Nestlé, Kellogg's, McDonald's, and Coca Cola, I described them as the "paedophiles of the 21st century", for their abuse and violation of children's rights with misleading advertising.

In Chile, faced with the industry's campaign of terror, the Executive began to hesitate, and I stated that setbacks in the Regulations would mean my withdrawal from the government alliance. This triggered a conversation with the president, Michelle Bachelet, who, as a paediatrician and former Minister of Health, shared the vision of our regulation. In the end, Bachelet chose not to compromise the objectives, granting only more time to the industry, in a gradual four-year adaptation process.

On June 26, 2015, the Official Gazette published the regulation that established decreasing thresholds for the critical nutrients that a product could have, until finally reaching in 4 years those that we scientifically established. Its most relevant aspects are detailed in box 5.1.

But the approval of this regulation did not mean the surrender of the junk food companies, who continued to try and nullify the norm, legally and in practice. In an unusual manner, the Santiago Chamber of Commerce requested foreign diplomatic representatives to intercede with Chilean health authorities to amend regulations (Diario Financiero, 2015).

The Italian company, Ferrero, threatened to take Chile before the World Trade Organization, in its struggle to continue marketing the Kinder Surprise product, an egg-shaped chocolate with a toy inside. If they wanted to sell the product, Ferrero had to reformulate the chocolate, because the law expressly prohibits "hooks" – like the toy – on any product with a "high in" stamp. Faced with the complaint threat to the WHO, our response was clear: we launched a campaign against its flagship product, Nutella, accusing

Box 5.1

Relevant Aspects of the Regulation for the Law on Nutritional Composition of Foods and its Advertising

A. Thresholds

The definition of thresholds to determine the products that contain an excess in critical nutrients has two purposes, (1) to identify the "bad" products that exceed those limits, by means of warnings that discourage their consumption, and (2) getting the industry to reformulate their products. For this, we provided intermediate requirements that, after 4 years, would reach:

THRESHOLDS	Energy kcal/100g	Sodium mg/100g	Total Sugars g/100	Saturated Fats g/100g
Solid foods	275	400	10	4
Liquid foods	70	100	5	3

B. Warnings

The regulation establishes that products to which sodium, sugars or saturated fats have been added, and their content exceeds the limits established for critical nutrients or the maximum energy limit, must be labelled with the warnings "high in" (black octagons that emulate a Stop sign, figure 4.4).

C. Advertising

The regulation specifies that advertising directed to minors under 14 years of age of any "high in" product cannot be carried out, regardless of the place where it is carried out. Advertising is considered to be aimed at this age group if it uses children's characters or figures, animations, cartoons, toys, children's music; or if it has the presence of people or animals that attract the interest of children under 14 years of age; or if it contains fantastic statements or arguments about the product or its effects, children's voices, children's language or expressions, or situations that represent their daily life, such as school, recess or children's games.

Additionally, in the advertising of these foods, interactive applications, games, contests, or other similar elements aimed at children under 14 years of age cannot be used, nor may they be present on websites whose visitors are more than 20 percent children. In turn, these products cannot be offered or given for free to children under 14 years of age, nor use commercial hooks directed at them, such as: toys, accessories, stickers, incentives, or similar. Furthermore, they cannot be sold, marketed, promoted or advertised within kindergarten, basic or secondary education establishments.

Source: Adapted from MINSAL (2019a).

it of damaging the environment and promoting global warming, as well as contributing to obesity. Soon after, Ferrero gave up.

Transnational corporations and food companies began to split. Some, who understood that regulation was here to stay and surrendered to the evidence that their permanence in the market would depend on adapting to more demanding consumers – who would now have all the information – opted to initiate reformulation processes of their products, reducing critical nutrients to avoid the discs. This is the case of Soprole, who modified its products to levels that allowed them not to have warning stamps and turned this fact into an advertising asset.

McDonald's decided to continue marketing its Happy Meal (with toy included) and the Public Health Institute (ISP) detected sodium beyond the limits in one of its stores, so they opened a health summary that prohibited the use of the "hook". The measure applied only to that location, and samples in many locations would be required to extrapolate it to the entire junk food chain (Mercurio, El, 2016). McDonald's main competitor, the Burger King chain, decided to withdraw the toy from its products aimed at children, as well as to advertise this fact, setting the standard for fast food franchises.

AB Chile charged against the regulation and the warning through advertising spots that ridiculed the norm in absurd situations carried out by well-known actors and athletes (who were paid for this). This led us to gather a powerful front of politicians, experts, scientific societies, deans of medical schools, health unions and international entities, which accused the industry of lying and trying to sabotage public policies (Mercurio, El, 2016). In addition to public rejection, the impact of the response was devastating (see section 5.3.3).

Coca-Cola belonged to AB Chile but had chosen to reformulate several of its products to preserve its place in the market. Publicly, the beverage transnational said that it rejected AB Chile's campaign during their discussion within the group (Diario Financiero, 2016). Those who did choose to resist the legislation began a legal battle over brand issues. The industry tried to justify the advertising aimed at children by arguing that the objected images aimed at capturing the attention of children were duly registered with the National Institute of Industrial Property (INAPI), so their use could not be questioned.

Nestlé, for example, argued that the use of characters in their cereal boxes "high in" critical nutrients is associated solely and exclusively with the trademark registration, and they have been used for years, fulfilling the important role of allowing their products to be distinguished in the market (Nation, La, 2016). The transnational PepsiCo sued the Chilean treasury arguing that the animal cartoons in their products were protected as intellectual property, so that in Chilean legislation this constituted an "expropriation" (Mostrador, El, 2017). Carozzi litigated a failed protection appeal to the Supreme Court with the same justification, maintaining that the right to intellectual property was guaranteed in the Constitution of the Republic; this company insists, to this date, on trying to overturn the law and its regulations.

We believe that it is necessary to recognize those who have opted for best business practices, adapting to full compliance with the law. These organizations realize the importance of business practices that effectively respond to social responsibility.

5.3.3 Impact of the norm in Chile

In July 2019, even though the regulation had just entered into full force with its final thresholds on critical nutrients, the Ministry of Health assessed the main impacts since the law on Nutritional Composition of Foods was passed. These include the following (MINSAL, 2019b):

- Compliance with the regulation – labelling food with warning stamps, restricting

advertising of "high in" foods, and prohibiting their sale in educational establishments – reached an average of 75% between June 2016 and December 2017, and exceeded 80% during 2018, according to the 2 600 audits carried out that year.

- The high regard and understanding of the policy are evidenced by citizen ratings of 5.7 and 6.2, respectively, on a scale of 7.
- Among people surveyed, 92.9% stated that they understood the information provided by the stamps; 48.1% considered the presence/absence of warning stamps when shopping, and among those who bought the products, 79.1% indicated that the stamps had influence on their purchase.

External and independent evaluations on the law's results carried out by national academic groups led by the Institute of Nutrition and Food Technology (INTA) of the University of Chile, in conjunction with the Diego Portales University and the University of North Carolina showed that, in the first year of the law's implementation (Mercurio, El, 2019a):

- The purchase of breakfast cereals decreased (14%), sugary drinks 23.7%, and packaged desserts 17%;
- An average reduction between 46 and 62% in in praeschoolers and adolescent's exposure to food advertising.

A survey by the CADEM consultancy firm carried out in January 2019 revealed that 63% of consumers looked at labels before choosing a product; 50% chose to stop buying products with stamps, and the critical nutrient most avoided was sugar (44%) (Mercurio, El, 2019b).

In September 2019, the third "Chile eats healthy" survey showed that the association between the concepts "home cooking" and "healthy eating" grew significantly, from 23% in 2017 to 39% in 2019. Ninety one percent of Chileans say they are aware of the changes they should make in their diet to eat healthier (GFK-Adimark, 2019).

A recently published study points out that, in the first year of the regulation, the rate of products "high in" any given critical nutrient fell from 51 to 44%. The frequency of "high in" sugar products for several food categories (beverages, milk, cereals, sweet pastries, jams, and salty spreads) was reduced from 80 to 60%. Among "high in" sodium products, the frequency decreased from 74 to 27% (salty spreads, cheese, ready meals, soups, and cold meats). Among "high in" saturated fat products, only the salty spreads category decreased in frequency and, of the "high in" energy products, only breakfast cereals decreased in frequency (Reyes *et al*., 2020).

5.3.4 Impact of the norm internationally

The Chilean labelling initiative has had an influence in different countries, thanks to our active work with the Pan American Health Organization and FAO. With them, we have carried out workshops, seminars and activities that have managed to spread the need for frontal labelling and restrictions on food advertising.

In the case of Ecuador, President Lenin Moreno received a copy of our original initiative – which contained the "traffic light" labelling approach –, thus contributing to the discussion in that country. It served also as a contribution to the

discussion that Congressman Jaime Delgado held in Peru, with whom we collaborated extensively to help the legislative process in that country. The Chilean idea was later adopted in Israel, Mexico, and Uruguay. In Canada, Brazil, and Guatemala it is being studied. Likewise, we have maintained a permanent support agenda for dissemination of the norm, participating in collaboration meetings in various countries in Asia, Africa, Europe, and Latin America.

The Pan American Health Organization declared front labelling systems as an effective measure to warn the population about excess sodium, sugar and /or fat content in processed and ultra-processed products – along with the regulation of advertising –, providing technical cooperation for the implementation of these actions in different countries. The anti-obesity "Chilean model" has also been recognized for generating non-obesogenic environments in children, specifically regarding two key aspects: (a) eliminating exposure of minors to advertising and (b) prohibiting the sale of "high in" critical nutrients products inside schools.

In recognition of this initiative, FAO appointed me as a motivational agent in the fight against all forms of malnutrition, and awarded me the Jacques Diouf Award (which was donated to research initiatives in Chilean universities). The InterAmerican Heart Foundation also granted me the Science of Peace Award. I accepted them on behalf of those who accomplished the daunting task of pushing through this legislation, but it was not merely an achievement by people – although it did require an unthinkable amount of patience and perseverance –, but the product of a permanent alliance between science and politics, in opposition to powerful transnational companies who tried to prioritize their benefits over people's health.

I want to thank PAHO, FAO and its director, José Graziano, for having been great promoters of the Chilean legislation worldwide. I also thank them for having instituted an innovative strategy of political-technical collaboration in the Parliamentary Fronts against Hunger, a key instrument to carry forward the discussion of initiatives like ours in various places.

5.4 A GLOBAL CHALLENGE

Undoubtedly, our experience with this law allowed us not only to advance in trying to stop the rising obesity curve, but also to establish that, even under a neoliberal model that seeks to avoid regulation, there are issues that must be regulated and are more important than any economic consideration.

Regarding obesity, our next challenge relates to the application of specific taxes on the consumption of foods with critical nutrients. In 2016, the Chilean Ministry of Finance brought together an interdisciplinary group of experts, who in their report calculated taxes that would allow, in an ideal scenario, to reduce the excessive consumption of salt, sugar, saturated fat and, thus, obesity among the population. The authors indicate that if we apply them together, we will be able to reduce cases of arterial hypertension by 63.7%, cardiovascular accidents by 43%, and heart attacks by 22%. Furthermore, if excess weight is reduced this way, we can prevent 58% of new diabetes cases (Agostini *et al*., 2018).

Additionally, less than 20 percent of the Chilean population consumes the recommended amounts of fruits and vegetables. For this reason, we have proposed free access to fruits and vegetables at produce fairs – through green cards exclusive for this purpose— for people with lower incomes, in parallel with subsidies for healthy eating, making it more affordable for the entire population.

We continue to promote an increase in physical activity at schools, through a norm that mandates at least one hour per day, and provides that children can go in sportswear to their educational establishment.

Fortunately, the closing of schools because of the COVID-19 pandemic has not affected the School Meal Plans, for which the daily rations were replaced by monthly boxes of products to prepare at home. Six months after the appearance of coronavirus cases in Chile, about 12 million baskets have been delivered to children from vulnerable households.

With the aim of promoting access to water in sufficient quantity and quality, we are promoting a legislative initiative that obliges restaurants to provide it free of charge, also demanding that drinking water fountains be installed in public places, also free of charge.

Nevertheless, we are concerned that this new pandemic has increased the massive use of fast-food delivery systems, panic purchases when confinement measures are announced or replaced, and the acquisition of ultra-processed foods that, being synthetic, have greater durability.

As a result of COVID-19, about 20 percent of jobs in Chile have been lost, with tremendous consequences on family income, especially on the poorest. But when faced with the need to get our economies back on track, we must not lose the ability to change them. We cannot go back to greater job insecurity or give priority to the usual "pro-growth" business criterion at the expense of the interaction of more actors in different production processes, who put human beings at the centre of their work and are in accordance with the demands imposed by the planet and its conservation.

And even if we manage to move forward within the reality of each country, with innovative or harsh measures, the obesity pandemic is the result of an extreme neoliberal model, where the gains of a few are imposed on measures for the common good, for solidarity and reasonability.

The *Global Syndemic* (undernutrition/obesity/climate change) demands urgent changes at a global scale. COVID-19 makes the ecological multi-crisis that we face even more apparent – and will exacerbate it in many ways. Now more than ever, it is essential to put a stop to the industrial food model that has been installed and nurtured by neoliberal globalization, without giving in to the ideological use of crises as an excuse to allow greater environmental and social abuse by those who enrich themselves against the common good, and against the future, harming first – but not exclusively – the most vulnerable populations.

The pharmaceutical business regarding chronic diseases impacts other health areas, making it unprofitable, for example, to conduct research

on antibiotics against ultra-resistant bacteria that are beginning to reach hospitals more and more frequently. Where do these bacteria come from? Some come from food production – such as the gigantic salmon farms that use excessive antibiotics –, which we are currently trying to limit through a bill that is pending in Chile.

Today we know that, in addition to the tremendous damage to human health, the neoliberal food system is causing unprecedented environmental damage. This system contributes up to 37 percent of human-generated greenhouse gas emissions, also causing deforestation, soil degradation, and loss of biodiversity.

According to a report by the United Nations Environment Programme (UNEP), 90 percent of countries have ignored two of the most effective strategies to combat climate change in their action plans: reducing meat consumption and decreasing food waste (Quiñonez, 2020).

Due to their negative effects on people's health, junk food and bad foods should be considered as waste, because they do not meet nutritional goals and put pressure on the planet. But, even without considering that, this poorly conceived system results in the loss of a third of the food that is produced.

The health of the planet is the health of people and vice versa. Climate change is one of the causes of zoonoses that affect us today. At the same time, it reduces our ability to produce food, both in quantity and quality. This has been warned by FAO director José Graziano, in relation to the production of cereals and the decrease in their protein content.

In terms of food consumption, neoliberalism uses libertarian discourses, holding that consumption patterns respond to people's decisions, omitting the fact that the patterns are not accidental, but generated by commercial interests that manipulate people in the search for status and immediate gratification. The obesity pandemic is not the result of the sum of individual decisions, but rather reflects the impact of advertising, supermarket promotions, etc. People's responsibility is inhibited by actions designed to encourage harmful behaviour.

In the same way, the damage that the planet has suffered is not the result of isolated decisions, nor of specific situations that are adopted in a country or in a productive sector, but of an economic model that damages and pushes economies towards immediate approaches that jeopardize the future. A sustainable food system – without deforestation, without pollution, without waste, without ultra-processed products, without alteration of zoonoses or human genetics – requires a series of global public policies that cannot wait for world leaders to be personally affected to become aware.

As long as initiatives are isolated and we fail to collectively make decisions to tackle underlying issues, as long as the causes of the problems are silenced and the voices willing to confront large transnational companies in defence of the rights of people are not united – while neoliberalism puts money above people's lives and the future of the planet –, humanity will continue to generate more problems than it can solve. ■

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6
ANALYSIS OF THE MAIN TRENDS IN FOOD REGULATIONS AND POLICIES IN LATIN AMERICA AND THE CARIBBEAN. Brazil Case Study

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6.1 INTRODUCTION

This chapter highlights recent developments in Brazilian public policies centred on healthy eating, with special emphasis on initiatives to regulate healthy food production and commercialization. Events are presented in chronological order, so the reader may get a clear picture of the progress, difficulties, outcomes, and future challenges regarding these public policies.

In 2020, Brazil's Consumer Protection Code (CDC) turned 30 years old, an important achievement for the consumer movement in the country, which recognized consumers' vulnerability in the food market and, therefore, the need to implement government actions to effectively protect the weakest link in the food chain. These 30 years have seen significant social and institutional changes. Among retailers, supermarket chains have solidified their position as the main food suppliers. The National Health Surveillance Agency (ANVISA), a regulatory agency for health surveillance, was created in 1999, and the *Fome Zero* (Zero Hunger) Programme, an unprecedented effort to guarantee food and nutrition security, began in 2003.

In the field of public health, the chronic malnutrition of the previous decades has been replaced by poor diets, reflected in the alarming rates of overweight and obesity. This new face for food and nutrition insecurity lit a "red light" within the country's health teams, who then allied with consumer movements and launched an unprecedented campaign to promote food quality. On the other side of the chain, the food industry defends itself by resorting to courts and parliamentary forums.

In the economic sphere, after years of continuous reduction in poverty and food insecurity rates, a political and economic crisis that began in 2015 caused a reversal of trends, associated with an unemployment rate not seen in recent history.

The 2020 pandemic hit when the country was taking its first steps towards economic recovery, which posed new challenges for public managers and Brazilian society.

The first case of COVID-19 was registered on February 26, 2020. By October, the disease was already present in 99.9% of Brazilian municipalities, with more than 5 million people infected and more than 160 thousand registered as deceased nationwide (Brazilian Ministry of Health, 2020).

In addition to the health tragedy, the pandemic affected the population's food supply, causing the prices of basic food products to increase significantly. Another major impact on household food security was the closing of primary and secondary schools. In Brazil, more than 40 million children receive meals daily at school, with the support from the Federal Government's National School Feeding Programme (PNAE). In many poorer regions, school meals are the main source of nutrition for thousands of children. Regional and municipal governments are responsible for implementing school meal programmes, and their response to the plight of those most in need differed widely. In several cities, food was distributed in the form of a basic basket,[53] while in others, e-cards were implemented to electronically transfer monetary resources.[54] But, in a large number of cities, especially among those poorest, either nothing was done, or the measures came months after schools closed.[55]

On the food supply side, the closing of street markets and traditional food distribution points affected the supply of millions of family farmers, with associated losses of perishable food, financial losses, and many uncertainties about the future (Rocha, 2020). The few farmers with access to the internet and social networks managed to recover part of the lost market (G1 Paraná RPC, 2020), but for most of them were outside of these possibilities (Colussi, 2020).

This chapter provides the regulatory frameworks around food systems and notes their recent evolution and current developments. The text also analyses new contemporary challenges and how different social actors have positioned themselves to defend their interests. To conclude, it highlights several impacts of the COVID-19 pandemic, which is threatening to deepen the public health crisis due to poor nutrition.

6.2 FOOD POLICY IMPROVEMENTS

6.2.1 The Fome Zero Programme (2003-2010)

To understand the current dynamics of the Brazilian food and nutrition security system, it is necessary to go back in time, precisely to the start of President Lula Da Silva's Government, in 2003, and the *Fome Zero* (Zero Hunger) Programme, a great effort to eradicate hunger in

[53] See G1 Sul de Minas (2020), available at: https://g1.globo.com/mg/sul-de-minas/noticia/2020/04/02/prefeituras-doam-alimentos-da-merenda-para-alunos-carentes-apos-suspensao-de-aulas-em-mg.ghtml.

[54] See the Food Card (Agência Brasil, 2020), available at: https://agenciabrasil.ebc.com.br/educacao/noticia/2020-07/sp-estende-cartao-alimentacao-todos-os-alunos-da-rede-municipal.

[55] See Rede Brasil Atual (2020).

the countryside. This programme did not consist of a specific type of action, nor was it focused on a particular target population, rather it was a holistic public action strategy. The *Fome Zero* strategy was universal in nature and involved programmes and actions carried out from 2003 to 2010. It combined more immediate social policies with structural actions in the economic sphere, such as job creation, minimum wage increases, and economic growth.

During this period, the Food Acquisition Programme (PAA) was created, which simultaneously served two groups of disadvantaged people: (a) family farmers with difficulties marketing their surpluses and (b) hungry people in the cities. The programme would buy food from local farmers at fair prices and donated it to food-insecure families.

The PAA's model came to influence the institutional purchases of the National School Food Programme (PNAE), which serves more than 40 million students from municipal and regional schools, and allocates part of the resources to local purchases of family farm products. After lengthy discussions with the education system and school communities, a 2009 law was passed requiring that at least 30% of the food purchased for school meals come from local family farming.

Public food and nutrition facilities were installed in large urban centres: popular restaurants, community kitchens, and a food bank. In 2010, more than 122 thousand meals were served daily in 89 popular restaurants in 73 major Brazilian cities, in addition to 642 community kitchens that received government support (Presidency of the Republic of Brazil, 2010).

In order to articulate, mobilize and manage *Fome Zero*, the National Council for Food and Nutrition Security (CONSEA) was recreated, as well as dozens of regional and municipal councils for food and nutrition security. One third of CONSEA was made up of government representatives, and two thirds of civil society representatives. The councils' performance was effective, with broad participation of business and community leaders, who helped complement and manage government actions (Belik and Siliprandi, 2010).

Although not directly linked to the *Fome Zero* Programme, several other Federal Government actions converged to guarantee the food and nutrition security of the population. Among these we have (a) the progressive valuation of the minimum wage, which guides the base of the minimum wage for salaried workers and social security benefits (with a real increase of 88% during the period in question), and (b) inflation control (which went from 12.5% in 2002 to 3.1% in 2006, and ended at 5.9% in 2010).

Results during the *Fome Zero* period were impressive. The poverty rate in Brazil dropped considerably: from 35% in 2003 to less than 20% in 2010. More than 28 million Brazilians rose out of poverty and 36 million entered the middle class during this period (Presidency of the Republic of Brazil, 2010), especially due to growing income from work and jobs (Cortes Neri, 2008). This is a period that saw "pro-poor" economic growth, that is, more benefits to the poorest populations.

6.2.2 National food and nutrition policy

In 2003, the National Food and Nutrition Policy (PNAN), initiated in 1999 by the Ministry of Health, was updated within the institutional context of *Fome Zero*. It included:

> "The series of government policies aimed at the realization of the universal human right to adequate food and nutrition. This Policy aims to guarantee food quality for consumption in the country, promote healthy eating practices and the prevention and control of nutritional disorders, as well as promote intersectoral actions that provide universal access to food" (Brazilian Ministry of Health, 2003, p.17).

In this 2003 update of the PNAN there were already warnings of an epidemiological transition, in which obesity was becoming more frequent than childhood malnutrition:

> "Initiatives shall be implemented to allow the follow-up and monitoring of the market under the criteria and interests of an effectively healthy life. In this sense, issues related to overweight and its implications will be objects of interest" (Brazilian Ministry of Health, 2003, p. 23).

The National Food and Nutrition Policy was updated again in 2006. In this update, the supply of healthy food by family farming was included, while regulating food advertising:

> "c) intersectoral articulation regarding food security councils, so that credit and financing for family farming includes actions to promote the production of fruits and vegetables to increase the supply and the subsequent increase in consumption of these foods nationwide, in a safe and sustainable fashion, associated with income-generating actions; […]
>
> "f) intersectoral articulation and mobilization for the proposal and preparation of regulatory measures that aim to promote healthy eating and reduce the risk of chronic NCDs (non-communicable diseases), with special emphasis on the regulation of food advertising" (Brazilian Ministry of Health, 2006b, p. 30).

The last update of the PNAN was made in 2012, which addressed even more directly the supply of healthy foods:

> "The list of health strategies aimed at promoting an adequate and healthy diet implies that food and nutrition education is added to food regulation strategies – and this includes labelling and information, advertising and improvement of the foods' nutritional profile – and encourages the creation of institutional environments that promote adequate and healthy eating, with a focus on offering healthy food in schools and workplaces. The supply of healthy food should also be stimulated between small food shops and meals deemed as 'street food'" (Brazilian Ministry of Health, 2013, p. 32-33).

6.2.3 National food and nutrition security system

Another important milestone reached in this period was the creation of the National Food and Nutrition Security System (SISAN) in 2006, which indivisibly associates the human right to food security with the right to adequate nutrition:

> "Art. 1 This Law establishes the definitions, principles, guidelines, objectives and composition of the National Food and Nutrition Security System (SISAN), through which the authorities, with the participation of organized civil society,

shall formulate and implement policies, plans, programmes and actions to ensure the human right to adequate nutrition.

"Art. 2 Adequate nutrition is a basic human right, inherent to a person's dignity and indispensable for the realization of the rights enshrined in the Federal Constitution, and the public power must adopt the necessary policies and actions to promote and ensure food security and nutritional value for the population" (Brazilian Ministry of Health, 2006a).

6.2.4 The dietary guidelines

As part of the series of initiatives aimed at food and nutritional security, in 2006 the Federal Government, through the Ministry of Health, published the *Dietary Guidelines for the Brazilian population: promoting healthy eating*. Inspired by the 2002 *Dietary Guidelines for Children Under 2 Years of Age*, this publication contains dietary guidelines for broad dissemination among the general population.

While the guidelines promoted the consumption of fruits and vegetables, they also warned about the need to work with the food industries to lower the content of sugars, fats, and salt in processed products. Additionally, they pointed out, in an unprecedented way, the need for government regulation of processed food advertising:

"*Guideline 6: fats, sugars and salt*
Government and food production sector:
- invest in the development of technology that complies with the principles of healthy eating;
- the substantial reduction in the consumption of salt, sugars and fats requires immediate changes in food industrialization practices; [...]
- regulate the commercial, advertising and marketing strategies of energy-dense foods (high in fats and sugars) and with high levels of salt." (Brazilian Ministry of Health, 2006a).

The guidelines were updated in 2014 and a new term was added:

"Due to their ingredients, ultra-processed foods, such as cookies with filling, 'bagged' snacks, sodas and 'instant' pasta, have a nutritional imbalance. Due to their formulation and presentation, they are usually consumed in excess and replace *fresh* or minimally processed foods.

"**Hyper-flavour**: With the 'help' of sugars, fats, salt and various additives, ultra-processed foods are formulated to be extremely tasty, if not to induce habits or even create addiction. Advertising for these products commonly draws attention, with good reason, to the fact that they are 'irresistible'" (Brazilian Ministry of Health, 2014b, p. 39).

Diagnoses pointed to a loss of space for food systems based on family farming, as well as short commercialization circuits of raw foods, in favour of food systems that are intensive in commodities to supply the food industry. This industry, in turn, offers consumers processed foods at cheaper prices, which often leads to unbalanced diets. The high cost of raw foods, the high demand for fast foods – with unhealthy options –, and the intense exposure to advertising, lead a large part of the population to the excessive consumption of unhealthy foods.

The new version of the guidelines dedicated a special section to address the advertising of these poorly nutritious foods, which dominate the media, transmitting a false image of nutritional superiority and reaching especially children and teens (Brazilian Ministry of Health, 2014b, p. 118). In the end, the guidelines highlight not only the benefits of opting for raw or minimally processed foods, but, mainly, the need for consumers to adopt a critical attitude with regards to the content of advertising messages.

Despite wide support from health professionals, the Ministry of Agriculture, Livestock and Supply (MAPA) and the Brazilian Association of Food Industries (ABIA) managed to challenge it and request its review. This especially with regards to the classification that uses the term "ultra-processed" (MAPA, 2020), stating that linking processed foods and chronic non-communicable diseases is inaccurate (Conteúdo, 2020).

6.2.5 From industrial agreements to regulation

Under the guidance of the dietary guidelines and the Strategic Action Plan for Confronting Chronic Noncommunicable Diseases (Brazilian Ministry of Health, 2011), the Ministry of Health took the initiative to seek the food industry to agree on production targets for healthier food. The first voluntary agreement, in 2008, sought to reduce trans fats (Extra.globo.com, 2008), and then the reduction of sodium, starting in 2011,[56] and sugar in 2018. The food sector was represented by the Brazilian Association of Food Industries (ABIA), by the Brazilian Association of Soft Drinks and Non-Alcoholic Beverages (ABIR), the Brazilian Manufacturers Association of Biscuit, Pasta and Industrialized Bread & Cakes (ABIMAPI) and the Brazilian Association of Dairy Products (VIVA LÁCTEOS).

Despite being an important step, these agreements contained timid objectives to address public health problems, as well as a difficult follow-up mechanism (IDEC, 2014). Faced with this scenario, ANVISA took the initiative and decided to gradually reduce the presence of trans fats in industrial foods (ANVISA, 2019); it began by imposing temporary thresholds of up to 2 percent, until the ban on trans fats goes into effect in 2023.

6.2.6 Food labelling

Starting in 2001, ANVISA imposed labelling to indicate foods' nutritional content, in accordance with the guidelines in FAO's *Codex Alimentarius* (International Food Standards).[57] In 2003, this labelling was harmonized with Mercosur standards (ANVISA, 2003), and providing information on sodium, trans and saturated fat content became a requirement.

However, the regulation was criticized for its excessively technical and difficult to understand information. To remedy this deficiency, the 2013 National Food and Nutrition Policy (PNAN)

[56] Commitment Term No. 004/2011, signed between the Ministry of Health and the industrial associations.

[57] The Codex Alimentarius, or "Food Code", is a collection of international standards, guidelines and codes of practice to protect the health of consumers and ensure fair practices in the food trade. See: http://www.fao.org/fao-who-codexalimentarius.

established the use of labels that are more understandable to consumers.

In 2014, ANVISA launched a discussion about food labelling. In 2019 it conducted a public consultation of a proposed magnifying glass figure on packaged foods' front labels to indicate those with excessive content of sugars, fats, and sodium (above the thresholds defined by health agencies).

Consumer protection agencies questioned the magnifying glass model and proposed triangular shapes to attract more attention (IDEC, 2019). Once the technical work was completed by the agency, the issue was not expected to be regulated in the short term. This lack of definition led the consumer protection entities to submit a request to the Federal Supreme Court, the highest level of hierarchy in the Brazilian Judicial Power, for ANVISA to deliberate on the matter; the Court granted the request. Thus, in October 2020, ANVISA approved a new nutritional food labelling standard, using the frontal warning with the magnifying glass model (figure 6.1). On the back of the packaging, the nutritional information tables are to have black letters and white background to improve readability, and contain the energy and nutritional value per 100 g or 100 ml, in order to allow comparisons between products.

The deadline to comply with the standard is 24 months, extendable for another 12 months for non-alcoholic beverages in returnable containers. For smaller companies, the deadline for them to adapt to the new standard is 24 months, extendable for another 24 months.

6.2.7 Identifying transgenic ingredients

In 2003, when discussing the release or not of transgenic plants for cultivation in the national territory, an Executive action demanded the identification of transgenic substances in all products marketed in the country.[58] At the time, there was a heated debate about the possible health consequences of consuming transgenic foods. The consensus was to release the transgenic crop in the country, but alerting consumers about the presence of this type of product with phrases such as: "May contain transgenic soy", or "may contain ingredients produced from transgenic soy". The phrase would go tied to a triangle-shaped symbol with a yellow background and the letter "T" in black (figure 6.2). Presently, the National Congress is discussing this indication on food labels, and there is even a proposal to eliminate the symbol.

6.2.8 Food advertising

The 2011 update of the National Food and Nutrition Policy (PNAN) already provided for more effective actions to limit the promotion of unhealthy foods. In 2014, a document from the Interministerial Chamber of Food and Nutrition Security (CAISAN)[59] also pointed out the need for legislative measures to limit the advertising of unhealthy foods, especially those that feature children's characters or celebrities to promote their consumption (Brazil Ministry of Health, 2014a).

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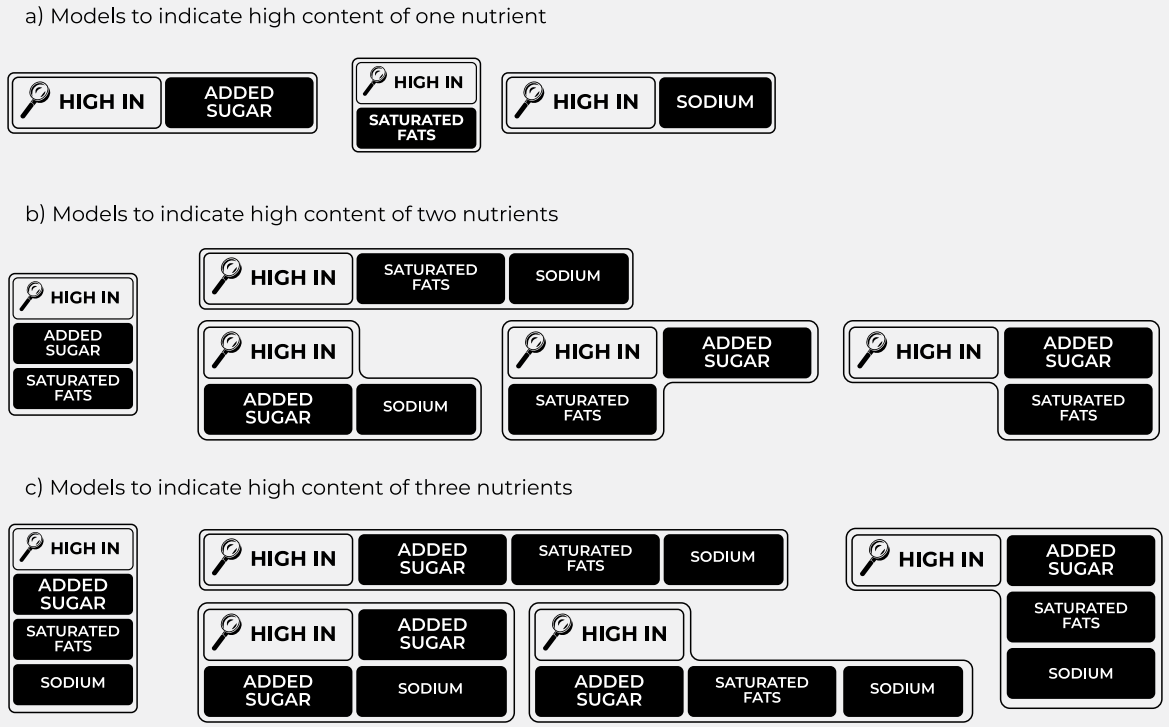
[58] Decree No. 4 680, of April 24, 2003.

[59] It gathered 20 ministries, the National Council for Food and Nutrition Security (CONSEA) and the Pan American Health Organization / World Health Organization (PAHO / WHO).

Figure 6.1

Models of Front Food Labelling in Brazil



Source: Adapted from ANVISA (2020).

Regulation of food advertising had already been the subject of public consultation by the National Health Surveillance Agency (ANVISA) since 2006 (ANVISA, 2006). After several failed attempts, in 2010, ANVISA published the first standard (ANVISA, 2010) to regulate food advertising, but it was suspended a few months later in response to a lawsuit filed by industry representatives (Baird, 2016). Another important action was a 2014 resolution by the National Council for the Rights of Children and Adolescents, which provided for the abuse of advertising directed at children and adolescents (CONANDA, 2014), but it has been ineffective so far, again due to its judicial questioning.

6.2.9 Food in schools

The subject of school meals has undergone intense debates in municipal and regional entities, with the aim of regulating the sale of food in these settings. The discussion centres on whether there should be food for sale in school cafeterias and, if so, what types of food can be sold. Many school leaders argue that the cafeterias are a source of income to cover school expenses.

So far, the results of these debates are mixed. In the state of Rio de Janeiro, the sale of products that contribute to childhood obesity is prohibited. In São Paulo, the sale of foods with

Figure 6.2
Symbol Indicating the Presence of Transgenic Foods in Brazilian Packaging

Source: Brazilian Ministry of Justice (2003).

excess saturated fat, trans fat, calories, sodium, and sugar has been prohibited since 2009 (Izabela Hendrix Methodist University Centre, 2015). In the Federal District, the sale of foods rich in sugars and fats has been prohibited since 2015, and the inclusion of these foods in student meals has recently been prohibited. In Santa Catarina, the sale of industrialized sweets is prohibited since 2001.

Like these, dozens of other initiatives are already in force in many Brazilian locations. There are several projects being discussed in the National Congress, with a focus on legislation to unify understanding about the food that will be offered in school cafeterias. The aim is to achieve healthy diets in schools and ban the sale of several types of products, but still there is no agreement or no vote.

6.3 NEGATIVE TRENDS IN RECENT YEARS

6.3.1 The 2015-2016 crisis

After several years of growth, an economic and political crisis befell the country, triggering a sharp drop in GDP for 2015 and 2016 (figure 6.3). As a consequence, poverty rates, which had been falling since *Fome Zero* – reaching a low point of 2.7 percent in 2014 –, increased again in the following years (figure 6.4).

Due to a series of factors, the president, Dilma Rousseff (2010-2016), underwent an impeachment process in her second term, and her vice president, Michel Temer (2016-2018), took office on August 31 of 2016. Temer implemented a fiscal austerity agenda, and one of his first measures was to issue Amendment number 95 to the Federal Constitution. This establishes ceilings for public spending at the same levels of 2016, for a period of 20 years (adjusted annually for inflation). This measure severely limited the State's ability to drive and implement public policies.

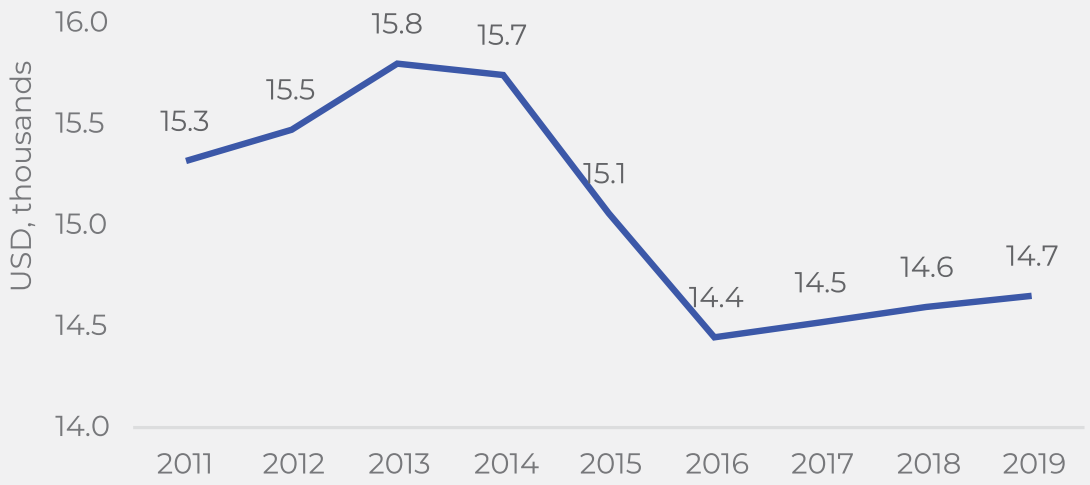
6.3.2 Food and nutrition insecurity

It is in this context of crisis that, between 2017 and 2018, the national statistical agency (IBGE) conducted the Family Budget Survey (POF). In addition to providing details on family spending, the survey applied the Brazilian Food Insecurity Scale (EBIA), which measures different levels of food security.

The results indicated that there were close to 10.3 million people living with severe food insecurity, with food deprivation. Regarding those who suffer some degree of food insecurity, the number of people reached 84.9 million in 2017-18 (Cabral, 2020a). Most notable for the period was the rise in the number of people reporting mild (24%) and moderate (8.1%) food insecurity. This

Figure 6.3

GDP *per capita* in Brazil (PPP), 2011 to 2019
(USD, thousands)



Source: Prepared by the author based on World Bank data.

means that almost 30 million people began to consume poorer quality food (figure 6.5).

Social inequalities become more evident when looking at food insecurity: half of severely insecure households were headed by women, most of them among black or mestizo populations (IBGE, 2020b). The survey also indicated that the poorest populations spend 22% of their budget on food. Another highlight was the increase in spending on meals away from home among rural residents, which rose from 13.1% of the family budget in 2008-2009 to 24% in 2017-18. In urban areas, this type of spending remained stable at 33% (Loschi, 2019).

6.3.3 Overweight and obesity

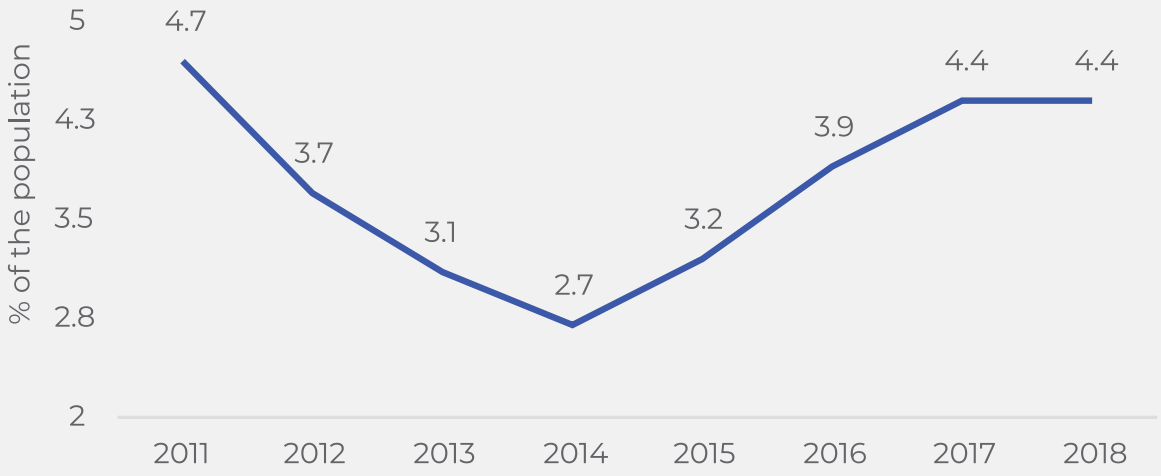
Another important survey is the National Health Survey. IBGE conducted the last one in 2019, and the results showed that an alarming 25.9% of the adult population (about 41 million people) was obese. If we add overweight people, the rate rises to 60.3% of the population (around 96 million people) (Cabral, 2020b). These overweight and obesity rates have been increasing continuously (figure 6.6), and already exceed world averages (estimated at 40% and 13.2% of the world population, respectively) (WHO, 2016).

In the most recent period (between 2013 and 2019), 11 million Brazilians entered into obesity (at a rate of 5.4% per year). This practically coincides with the period in which 30 million people began to have mild or moderate levels of food insecurity (from 2013 to 2017-18, at a rate of 12% per year).

Unfortunately, the administrative reform of the Federal Government installed in 2019 eliminated the National Council for Food and Nutrition Safety (CONSEA), an important forum where the causes of problems such as obesity were discussed. The council was an important space

Figure 6.4

Poverty Rate in Brazil, 2011 to 2018
(percent of the population)

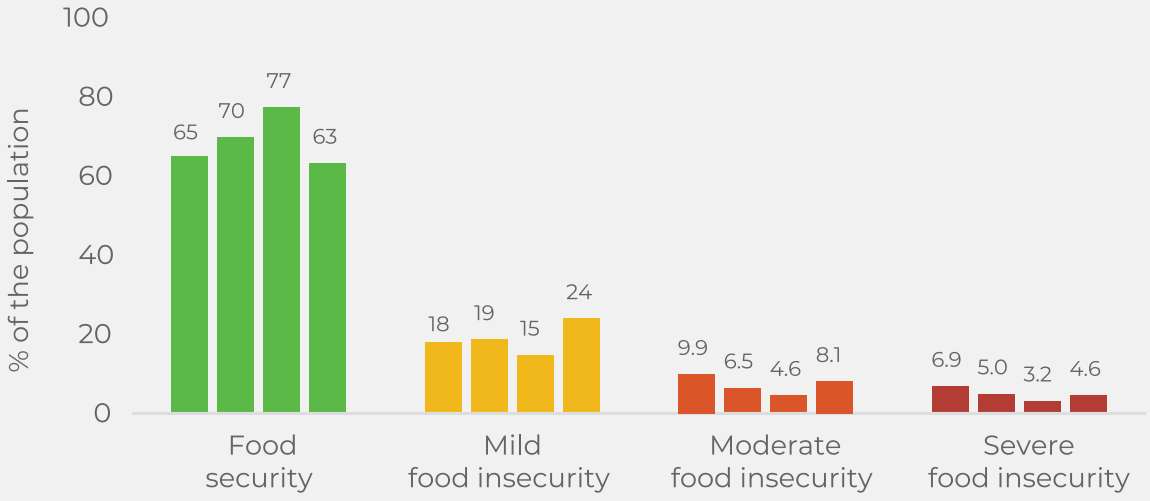


Source: Prepared by the author based on World Bank data.

Notes: The poverty rate is calculated on the basis of USD 1.90 per day (based on purchasing power parity, PPP).

Figure 6.5

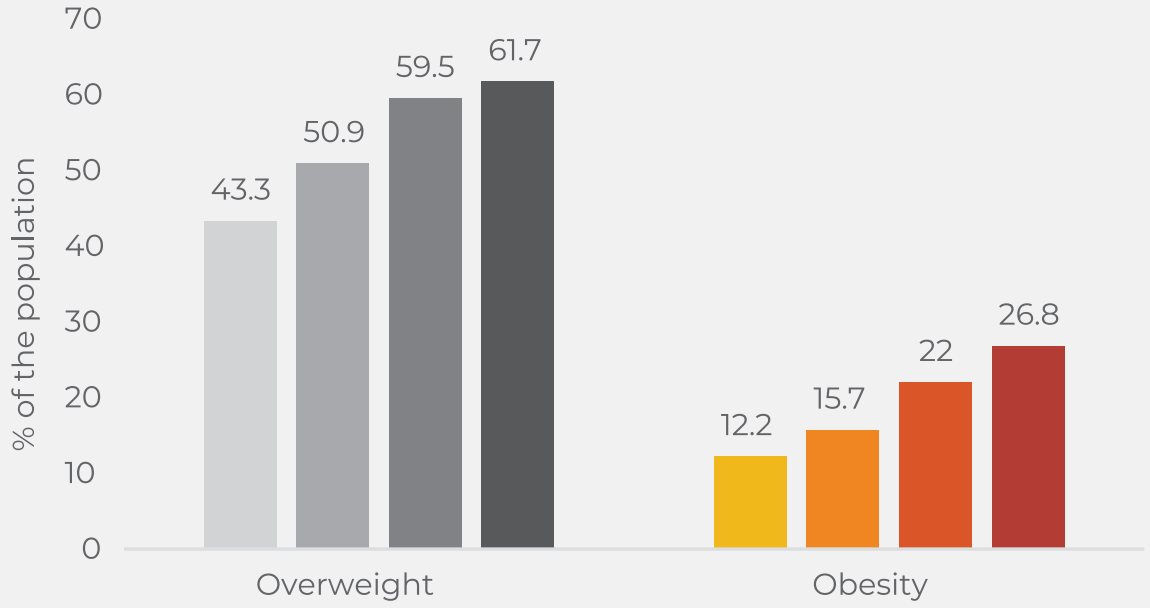
Prevalence of Mild, Moderate and Severe Food Security and Insecurity in Brazil, 2004, 2009, 2013 and 2017-18
(percent of the population)



Source: Prepared by the author based on IBGE data.

Figure 6.6

Overweight and Obesity Rates among Brazil's Adult Population, 2002-03, 2008-09, 2013 and 2019
(percent of the population)



Source: Prepared by the author based on IBGE data.

for consensus between different stakeholders involved.

6.3.4 Impact of the COVID-19 pandemic on the economy and labour market

Beyond its health impact, the COVID-19 pandemic had side effects on the economy. The first gross domestic product (GDP) estimates for the second quarter of 2020 point to the greatest retraction in economic activity since the historical series began in 1996. The drop in GDP compared to the same quarter of 2019 was 11.4%, and 9.7% compared to the first quarter of 2020 (Cavalcanti *et al.*, 2020). The economic recession has caused the unemployment of millions of workers. In May 2020 there were 9.7 million unpaid workers in the economy (Gomes, 2020). Between June and August 2020, the unemployment rate[60] reached 14.4% (IBGE, 2020c), the highest since the start of the series in 2012, which roughly equals 13.8 million people. Considering the underemployed[61] and those with the potential for work,[62] the labour underutilization rate reached 30.6% (equivalent to 33.3 million Brazilians).

[60] Unemployment: people aged 14 or over, without work (without generating income) in the reference week, and who took some effective action to obtain employment within 30 days, being available to assume it immediately or in the following days.

[61] Underemployment: people aged 14 or over who work less than 40 hours a week and want more working hours.

[62] Potential for work: people aged 14 or over who did not actually look for work, but would like to work, or even looked for work, but were not available to work in the reference week.

Most prominent within this group are discouraged workers,[63] numbering 5.9 million.

In May 2020, 33% of Brazilian families experienced some reduction in their usual income, especially in metropolitan areas (36% of families) (Del Grossi, 2020b). But the crisis also affected rural areas, where the income drop reached 50% of family farmers in June, with an average reduction in family income of 35%. The number of unemployed family farmers reached 1.1 million, and among rural salaried workers it reached close to 1 million people (Del Grossi, 2020a).

The agricultural export sector also felt the effects of the pandemic. One of the noteworthy cases was the suspension of Brazilian meat imports by the Chinese government, on suspicion of traces of the novel coronavirus in a sample of frozen and boneless meat from a Brazilian company.[64]

Faced with this serious economic crisis, the Federal Government instituted emergency aid, consisting of the transfer of 600 Brazilian reais per month, initially for three months, as a complement to *Bolsa Família*.[65] Subsequently, the government announced the transfer of four additional instalments of 300 reais, until the end of 2020.

In June 2020, the government reported that 63.5 million Brazilians had already received part of the emergency aid (Presidency of the Republic of Brazil, 2020). Among beneficiaries, 6.5 percent of households survived only with the resources provided by this aid (Sacchet de Carvalho, 2020).

In an attempt to stimulate the economy, the government reduced the economy's basic annual interest rate 2%,[66] the lowest since 1994. It has also been implementing an expansionary monetary policy, through the supply of credit, which is already reaching 51% of GDP (Souza Júnior *et al*., 2020).

Fortunately, the Brazilian Economic Activity Index (IBC-Br), calculated by the Central Bank to measure the level of economic activity over time, points to a V-shaped curve, with a minimum in April 2020, followed by economic recovery in the following months (figure 6.7).

6.3.5 Food inflation

Food inflation is another important effect the pandemic has had in the country. Despite the fact that Brazil is an important food producer, its liberal trade policy made it possible to export most of the cereals from the 2019-2020 harvest, stimulated by a favourable exchange rate for exports. The result was that private stocks remained at minimum levels (Vasconcellos, 2020).

[63] Discouraged workers: people aged 14 or over, outside the workforce, who were available to work in the reference week, but did not take the necessary steps to get a job in the 30-day reference period, either because they did not obtain an adequate job, did not have experience or professional qualifications, there was no work available where they live, or did not find work because they were considered too young or too old.

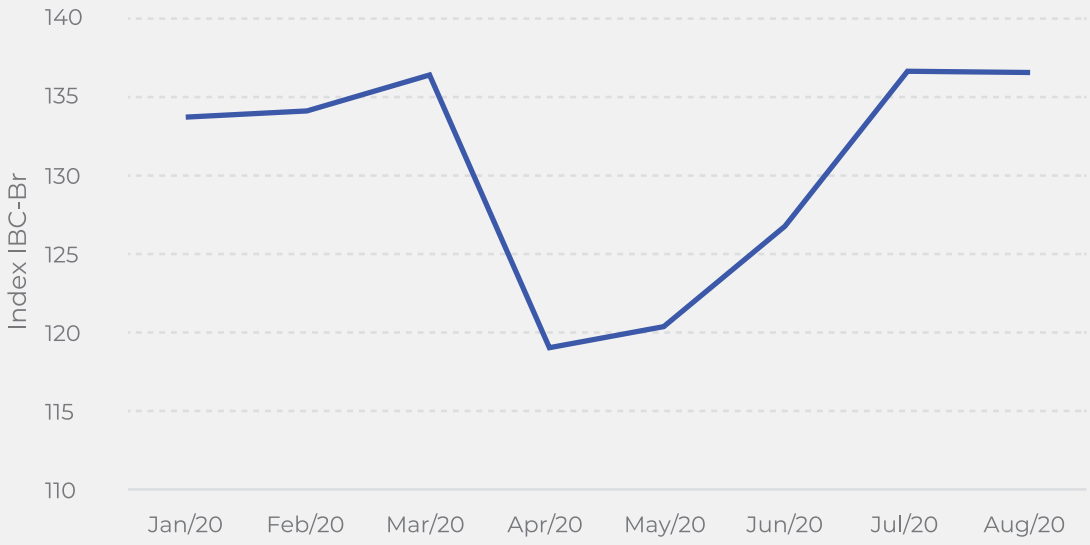
[64] For more details, see Araújo (2020), available at: https://economia.uol.com.br/colunas/carla-araujo/2020/10/09/inspecao-china-carne-brasileira-minerva-covid-suspeita-suspensao.htm?cmpid=copiaecola.

[65] Established in 2004, Bolsa Família is a direct income transfer programme aimed at families living in poverty and extreme poverty throughout the country.

[66] The Selic Rate represents the average federal bond financing.

Figure 6.7

Brazilian Economic Activity Index (IBC-Br), January to August 2020



Source: Prepared by the author based on data from the Central Bank of Brazil.

On the side of public stocks, these are almost insufficient to ensure food security. For instance, corn, which reached 7 million tons in 1987, currently has less than 200 thousand tons (CONAB, 2020d), equal to a day and a half of national consumption (Sampaio, 2020). Rice reached 5 million tons in 1988; it currently has around 21 thousand tons in storage, which represents less than a day of consumption in the country. Beans, an important component in Brazilian diets, reached 180 thousand tons in 1988, but public stocks are currently at zero.

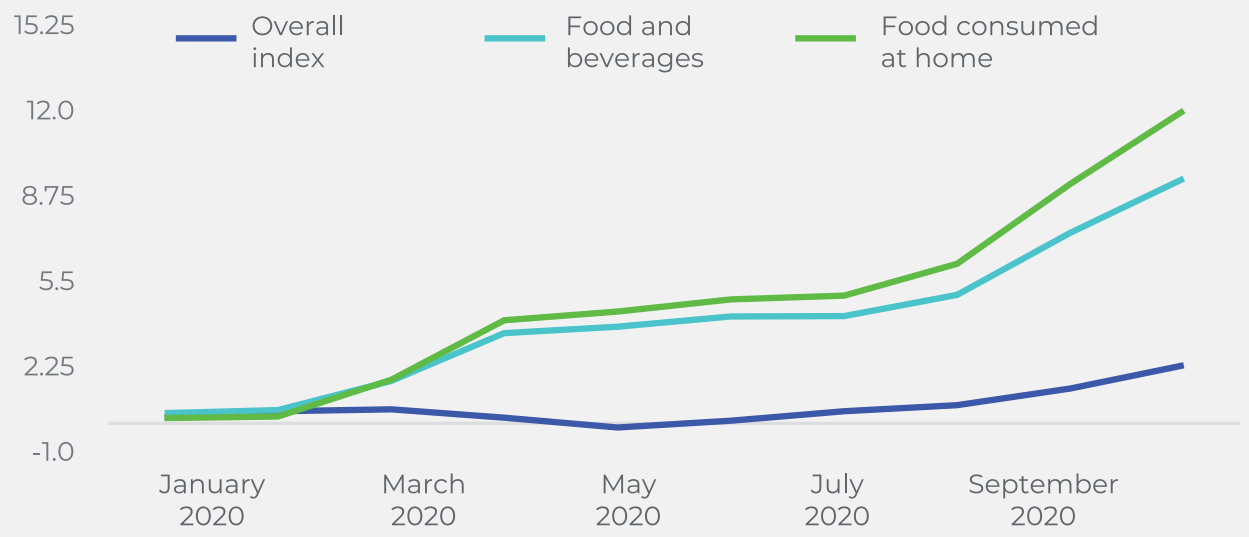
With measures restricting circulation, the temporary closing of many retailers has affected the food supply. This, along with the closing of schools, which provide food for millions of children, resulted in a sharp increase of consumption at home as the primary source of food. The unexpected increase in demand for food to cook at home subsequently triggered a consumer price increase. While the overall cumulative inflation reached 1.34% in September 2020, the cumulative inflation for food and beverages reached 7.3%. Taking into account only the expenses due to increased food consumption at home, cumulative inflation reached 9.17% in the first nine months of the year (figure 6.8).

Due to the weight that food carries in the budget of the poorest families, inflation of these items particularly affects them. These families saw an overall inflation rate already reaching 2.5%, while for the richest families it was only 0.2% during the same period (Parente, 2020).

The emblematic case is the consumer price of rice, present in 76% of Brazilian dishes (IBGE, 2020d). After a slight price increase in the months of April to June 2020, rice prices rose drastically in the months of August and September, reaching an average 53% inflation rate nationwide, as

Figure 6.8

Cumulative Rate of Overall and Food Inflation in Brazil, January to September 2020



Source: Prepared by the author based on IBGE data.

well as 49% in the State of São Paulo (figure 6.9); cumulative inflation in the period was only 1.34%.

Much of the rise in consumer rice prices is due to how attractive exports have become, driven by a very favourable exchange rate for sales overseas. At the beginning of 2020, the exchange rate for USD 1 was 4.02 Brazilian reais; in the following months, the United States Dollar's value increased sharply, reaching 5.74 reais on October 31. This equals a depreciation of 43 percent for the national currency in 10 months.

In September 2020, the government reduced rice import tariffs to zero (Vilela, 2020), but the measure's effect remains ineffective. The attractive exchange rate and good external prices have also boosted exports of beef, pork and chicken (Kreter, Servo *et al*., 2020).

Another important factor regarding the country's food supply is the strong presence of supermarkets, which account for 92.9% of food distribution. Only 7.1% of food is bought in street markets, butcher shops or greengrocers (Belik, 2020). Besides, supermarkets went through a concentration process in the past,[67] and currently the large chains are in a position where they can establish the standards, prices and type of foods that will be offered to the population.

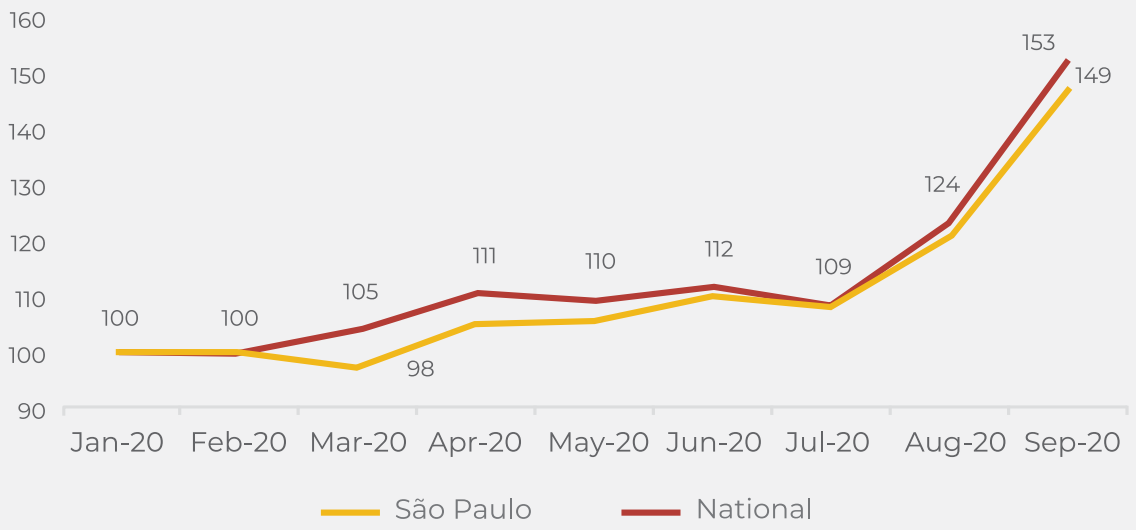
6.4 FINAL CONSIDERATIONS

In the early 2000s, Brazil stood out on the international stage for assuming the firm goal of eradicating hunger and all forms of malnutrition. The positive outcomes of the series of actions

[67] The three largest chains account for 41.7 percent of supermarket sales (Belik, 2020, p. 51).

Figure 6.9

Relative Prices of Rice Sold at Retail in Brazil, January to September 2020
(percent, January = 100)



Source: Prepared by the author based on IBGE data.

undertaken were reflected in several indicators, one of which was the country's exit from the FAO hunger map in 2014.

Besides ensuring the minimum energy requirements, many actions aimed at improving the population's diets were initiated during the period of the *Fome Zero* programme. These included the publication of the Dietary Guidelines and the purchasing of family farming products for school meals. However, other actions have been proposed over the years – such as regulating food labels and sugar, fat, and sodium content in foods, which have met with limited success.

The difficulties of reaching an understanding between the Brazilian food industry and the institutions aligned with the defence of healthy eating shall continue in the coming years. Immersed in a serious political crisis, attempts to regulate industrial foods run into a lack of consensus, and thus end up in court, with no short-term definition in sight.

Meanwhile, the obesity and overweight epidemic is spreading among the Brazilian population – silently, but with considerable impact on the health system – hand in hand with the increase in non-communicable chronic diseases, such as *diabetes mellitus*, high blood pressure and cardiovascular disease. The COVID-19 pandemic has only aggravated this public health crisis, which has lasted for decades and directly affects those who are most vulnerable.

The coronavirus crisis in 2020 also aggravated the economic crisis of previous years, driving unemployment rates and labour underutilization to record highs nationwide, and increasing

the poverty rate of a considerable part of the population. The disruption of public food security reserves laid the groundwork for food inflation to return to worrisome levels, particularly affecting the poorest populations.

On the demand side, millions of consumers are increasingly looking for lower priced foods, albeit with lower nutritional value. On the supply side, millions of farmers have suffered losses due to mobility restrictions, especially with the closing of street markets and small shops that supply food.

The paths towards healthy eating go through an active government role, which articulates the different public policies, agreed upon with the Executive, Legislative and Judicial powers, industrial sectors, and representatives of consumers and organized civil society. These policies must act on three simultaneous action fronts:

1. **Reducing the cost of nutritious food for the poor:** promoting agroecological family farming, urban agriculture, investments in research and rural extension, and public food reserves, among others.
2. **Supporting consumers in accessing healthy food:** establishing closer links between producers and consumers through fairs, modern digital communities, income transfer programmes, subsidies for healthy eating (food coupons, public restaurants, etc.), school meals and institutional purchases of local organic food, among others.
3. **Implementing complementary policies:** food and nutrition education, labelling, increased tax burden, control of unhealthy food advertising, and an active industrial policy to promote healthy eating, among others.

The simultaneous implementation of this series of initiatives can enable the governance of a healthy food system. In the recent past, Brazil showed that it can be a nation without hunger. Action must be taken urgently, but now with a more concrete challenge: ensuring a *healthy* diet for its population. This story has yet to be written. ■

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7
TERRITORIES, CITIES AND FOOD SYSTEMS: A STRATEGIC VISION
Mexico Case Study

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7.1 INTRODUCTION

Chapter seven attempts to locate regional food systems within a territorial strategy that considers the role of small cities within Mexico's new and changing territorial configuration, where rural and urban areas are increasingly less differentiated. This will be its main contribution. This evidently methodological chapter takes into account the spread of the COVID-19 zoonosis throughout the territory, and although it provides concrete suggestions in this regard, it does not refer primarily to this pandemic.

In Mexico, as in Latin America, the global COVID-19 pandemic spread rapidly, triggering a crisis of magnitude and severity not known in almost a century. It is still impossible to ascertain the definitive scope and impact of this double crisis – health and economic –, but it is already evident that poverty and food insecurity are spreading rapidly. These exceptional circumstances call for urgent and far-reaching actions all throughout the country's food system, in its different regional dimensions and expressions, especially those that have to do with small cities and regions in the urban-rural interface.

Consequently, this chapter's main purpose is to address the direct challenges to food security, especially their impact on small and medium-sized cities,[68] with special emphasis on understanding the role of food systems at the local scale. Likewise, it seeks to make a few proposals for public action, while considering the impacts of the crises triggered by the current pandemic.

[68] The definitions of "small city" and "medium-sized city" are somewhat arbitrary; in the case of Mexico's urban system, a small city is generally one that ranges from 10-12 thousand to 50-60 thousand inhabitants, but these are no definitive thresholds.

After a brief analysis of the COVID-19 pandemic's impact to date, we will first refer to urban-rural links, their nature, and characteristics, at a time of great transformations in the Mexican rural environment, which is increasingly less isolated and more functionally linked to urban areas. In a second section, we will focus on food systems in their most local expression or dimension: the link that develops between cities with a greater "rural" vocation, which are generally small, with the territory that surrounds them; we will also analyze activities that are mainly agricultural and those that support local food systems, whether logistical, complementary or of other nature. Once the concept and functioning of food systems at the local or regional scale has been analysed in greater detail, a third section will review the role that small rural cities can play as nodal points and articulators of food systems within an eminently territorial vision. Finally, a fourth section will provide general recommendations for strategic lines of action, which consider the current pandemic in various ways, but without losing sight of the underlying substrate: the need for food systems to help promote production, as well as to overcome poverty and food insecurity.

These recommended actions, which are very broad, are linked with the Sustainable Development Goals (SDGs). Most relevant in this case are eradicating poverty (SDG 1) and achieving "zero hunger" (SDG 2), which must be reviewed from a systemic perspective to provide more assurances for food security, as we shall see later. Also, this aspiration is closely linked to health (SDG 3), which must now be viewed from a global perspective and take into account the reality of zoonoses, as well as SDG 6, focused on access to clean water and sanitation. All these goals converge in the need for access to adequate and sufficient nutrition – in other words, to full food security. This, basically, would force us to rethink the very concept of development, its global scope, its links with nature, and even the very concept of sustainability;[69] but delving into these issues in due detail is beyond the purpose and scope of this work.

7.2 THE PANDEMIC'S IMPACT ON THE FOOD SYSTEM

Throughout 2020 and early 2021, the pandemic's impact on food supply has been, fortunately, quite limited. Food availability and accumulated stocks have been sufficient to meet demand. Mexico's agricultural sector has grown in recent years at rates higher than the national GDP, exceeding 3 percent annually. Harvests have been sufficient, and despite abundant food imports, exports have been far higher, resulting in a considerable surplus in the agrifood trade balance of close to USD 10 billion. In these last few years, Mexico has become a major net food exporter.

Before the pandemic and the "double crisis", around 43.6 percent of the Mexican population was living in poverty (according to 2016 data). This percentage decreased compared to 2014 (46.2%) and 2010 (46.1%), showing a clear downward trend. In terms of extreme poverty, 2016 figures were at 7.6%, lower than the 9.5% registered in 2014 and the 11.3% in 2010.

[69] See Luiselli (2020).

In terms of population, these figures corresponded to 9.4 million people in 2016, 11.4 million in 2014, and 13 million in 2010 (CONEVAL, 2020). Now, without a doubt, a new trend reversal is expected, and one of considerable proportions.

However, beyond the ample food supply, the shock brought on by this double crisis originated a drastic drop in GDP (around -8.7 percent), and is having immediate negative effects on employment and household income – especially those in urban settings –, increasing poverty and immediately affecting food security and other basic needs. At the time of this writing, there is still no definitive information for 2020, which saw very sharp drops in employment and economic activity starting in April, although a slight recovery could be seen in the following months.

Preliminary reports indicate that some 3.9 million people fell below the poverty line in 2020 due to the pandemic's impact (Medina and Vargas, 2020). Furthermore, it is estimated that 20% of the population (24.9 million people) was not able to fully afford the Basic Food Basket in 2020,[70] and unemployment is expected to affect 11.7% of the Economically Active Population (EAP); informal employment is falling by 47.7%, primarily in urban settings, but this is driven by unemployment (ILO, 2020).

The greatest impact on poverty and nutrition has been observed among urban slum populations. The main difference regarding rural areas is that, in cities, the poor are net consumers of food, while in rural areas, populations tend to be both producers and consumers. Faced with the crisis, the latter can resort to subsistence farming.

Unfortunately, the government's response to the effects of the COVID-19 pandemic on employment, poverty and food has been quite limited. Direct transfers of resources through pre-existing social programmes have increased slightly, mainly due to the increase in populations in need, but not with additional resources. The government has maintained its priorities regarding austerity and cost containment. No federal programmes have been created *ad hoc* to deal with the increasing food insecurity. The International Monetary Fund, in a comparative analysis of fiscal actions regarding public spending in Latin America and the Caribbean, indicates that the region spent on average around 2.5% of GDP on direct aid to households (IMF, 2020b), while in Mexico this expense was practically nil. If direct aid to companies (especially MSMEs) is considered, aid in LAC reaches almost 5% of GDP; Mexico's is below 0.5%. The contrast is sharper when compared to Brazil, where direct aid to households is close to 5% and aid overall is higher than 8%. Along these lines, an in-depth analysis by Nora Lustig and other authors compares the largest economies in the region: Argentina, Brazil, Colombia, and Mexico. The results indicate that social aid programmes have had a clear compensatory effect in Argentina and Brazil, less in Colombia, and practically nil in Mexico (Lustig *et al*., 2020).

The problem is most acute in the country's South-Southeast region, as is often the case. In

[70] As defined by the National Evaluation Council (CONEVAL).

2016, the states with the highest rates regarding poverty and food shortages were, in descending order: Chiapas, Oaxaca, Guerrero, Veracruz, and Puebla. Looking at the urban-rural division in that same year, 58.2% of the rural population lived under the poverty line (17.4% with extreme poverty); among the urban population, the poverty rate was estimated at 39.2% (4.7% for extreme poverty). The case of indigenous populations is particularly worrying, since the figures for that same year were at 71.9 and 28.5%, respectively (CONEVAL, 2016).

Clearly, as poverty increases, food insecurity will become more severe. The level of household income is being altered, and with it the levels and patterns of consumption. This is particularly serious in households that are close to the poverty line, since their spending on food accounts for a significant portion of their total family income. Thus, if for now the agricultural and food situation in Mexico has remained reasonably stable, with the same critical areas prior to the pandemic, concern is on the demand side and on the shifts in consumption levels and patterns among populations living in poverty.

7.3 REDEFINING URBAN-RURAL LINKS IN THE FACE OF A NEW RURALITY

Currently, there is talk in Mexico of a "new rurality",[71] given that the Mexican territory has undergone notable transformations in the last three decades. The natural setting or territory where agrifood activities take place has been transforming very rapidly due to two basic factors:

- Increasing urbanization, which has greatly concentrated the population. Today, almost 80 percent of the population is urban. This means that around 100 million Mexicans live in just over four hundred cities of different sizes, making up a vast urban system.[72]
- Eighty five percent of the rural population now lives less than an hour from a given city. The "deep rurality" of small, isolated communities far away from urban centres is steadily decreasing. It is now basically limited to indigenous communities in mountainous areas, living in conditions of acute poverty.

Furthermore, the countryside is becoming increasingly more "urbanized". Borders between what is strictly rural and strictly urban are blurred, among other things due to the availability of better communications, greater access to the Internet, and greater service availability of all kinds. Notably, peasant families no longer derive their income solely from agricultural activities, but from a broad set of activities. There is a growing non-agricultural rural economy deserving more attention.

Not surprisingly, a new territorial element has also arisen in the Mexican scenario: the peri-urban environment, or one of "diffuse urbanization", as it is also called, and its role in small and medium-sized cities. The peri-urbanization phenomenon is actually a part

[71] In the process of understanding the rural transformation in Mexico, it is essential to include the pioneering studies and research of Kirsten Appendini into the theme of the "new rurality".

[72] Mexico's so-called National Urban System (SUN), due to its number of cities, is the seventh in the world.

of this rural transformation. There is still little understanding of the subject, and very little inclusion of it in public policies, regarding both agricultural and rural development, as well as urban development.

The peri-urban is the area where the urban-rural dichotomy is connected – and somehow becomes dissolves –, transforming into "rururban" or peri-urban spaces. During the last decades, the urban boom, arising from migrations from the countryside, has also found another type of expansion: migration within cities themselves, generating much more complex patterns of territorial occupation, incorporating, among other things, small cities in multiple or polycentric social and productive arrangements.[73] This has also meant the invasion and transformation of large, originally agricultural, spaces into new types of peri-urban territories (Aguilar and López, 2014). It is a new, very heterogeneous territorial arrangement, where it is also possible to observe how rural features are being diluted. In short, we have a new territorial pattern with a network of rural interstices and small urban nuclei: a pattern of urban occupation with great dispersion and waste of space and resources.

Berdegué and Proctor (2014) provide a useful and accurate definition of the current rural transformation. This is:

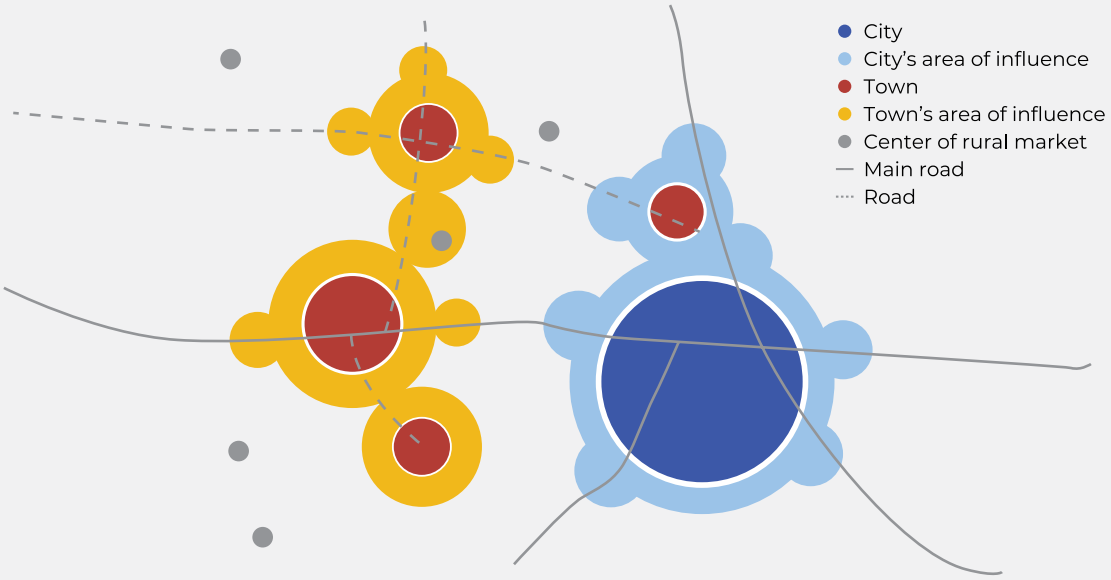
> "…a process of comprehensive societal change whereby rural societies diversify their economies and reduce their reliance on agriculture; become dependent on distant places to trade and to acquire goods, services, and ideas; [people] move from dispersed villages to towns and small and medium cities; and become culturally more similar to large urban agglomerations." (Berdegué and Proctor, 2014).

A large part of the population lives in territories that share typical rural elements, but also exhibit urban features. Many times, the place where people live is only a basic reference, but the *locus* of education, health, work, commerce, culture, or entertainment may well be another place, within a broader "functional territory". This has important implications for food systems and for the governance and administrative and jurisdictional aspects of what today is still mechanically referred to as the "rural" or the "urban" environment.

Also, now it is essential to consider attributes of the Mexican territory that were previously hardly thought of when doing rural or agricultural planning. We will deal with this issue later in this chapter. For the time bine, it will suffice to point out that we must consider not only the areas to be cultivated, but also the pressing need to conserve Mexico's enormous and rich biodiversity, expressed in forests, jungles, deserts, savannas, mangroves and, more precisely, in the territories where we find the ancestral knowledge of local communities, which must be respected and taken into consideration for any intended development strategy. This is particularly important with regards to Mexico's primordial food and crop: corn, and its more than 64 live varieties distributed throughout the

[73] Consider, for example, the areas surrounding Cuernavaca, such as Temixco or Metepec, within the Toluca area; or Ecatepec in the Mexico City Metropolitan Area; or in Papel de Los Reyes, in the growing conurbation between Tlaxcala and Puebla, etc.

Figure 7.1
Conceptual Visualization of Urban-Rural Systems



Source: Adapted from FAO (2017a).

territory. But the same can be said for other crops and elements of ecosystems and landscapes. Biodiversity must not only be cared for and respected, but it is an integral part of a new vision for our rural environment and territory.

Definition of urban-rural systems

A methodology has been developed to better understand local food systems linked to the "new rurality", one that looks at **urban-rural units or systems** as a single unit of analysis and programming: "basic spatial units of territorial ordering, which group together urban centres, rural settlements and non-urbanized areas that are functionally linked" (Government of Mexico, 2020). Furthermore, there is also the relatively recent approach and analysis of agriculture in the cross-cutting framework of food systems. This was reflected in a recent work conducted on Mexico's National Strategy for Territorial Planning (ENOT), where 20 rural-urban systems were defined in the Mexican territory. Overall, the *sectoral approach*, which has been most used in the design of public policies and aid programmes for rural producers or families, is beginning to shift and focus more on local territories. Additionally, the targets of these policies have been mainly groups of producers or families from certain regions or settlements, regardless of their geographic or territorial environment, as well as of the biomes where they are located. On the other hand, the *territorial approach*[74] comprehensively or systemically includes the physical and geographical environment, and deems it a substantial part of the productive

[74] In this respect, see Berdegué and Favareto (2019), as well as various works by Berdegué and Alexandre Schejtman, and research conducted by the Latin American Centre for Rural Development (RIMISP).

network (or even the consumption network) that is the subject of certain public development policies.

This is important, since it is becoming more and more evident that, in the new rurality, there is a productive and mobility nexus between agricultural production units and the cities where they are located. It is not just about the traditional concept of hinterland, but about dense networks of multiple economic and commercial activities that reciprocally occur at local or regional scales. Rural cities – generally small or medium-sized – are an important productive link in the food systems of local economies (and their respective regions). In this sense, a systemic analysis is very useful, since it allows us to understand more clearly how local or nearby value chains, more commonly called "short chains", are configured.

Territories, whatever they may be, include a remarkable diversity of geographies, climates, and ecosystems. But they have, above all, peculiar characteristics economically and culturally. Here, without denying the foregoing, we centre on the agrifood aspects of these characteristics. Given the variety and large number of territories in Mexico, it is not easy to find a generally applicable model to represent them. However, it is crucial to know how the population is laid out in the territory being considered. What settlements are present in it and how large are they? What is the dominant economic activity, or is there an agricultural "base" of activity? In our case, it is also important to know if the local diet is already being shaped or transformed by urban diets, typically richer in protein and more diverse. This is important because the supply demands for local agrifood systems or chains will arise from there. We must also consider that, as urban income increases, diets change, and other dynamics also occur, such as more employment opportunities for women. All this can trigger virtuous dynamics in local food systems, with incentives for agribusiness, storage processes and related services of different natures (FAO, 2018a).

7.4 TERRITORIAL FOOD SYSTEM-BASED APPROACH

In numerous studies on the workings and design of public agricultural or agri-food policies, the cross-cutting, inclusive, and complex concept of *food system* is being increasingly used.[75] Essentially, because it captures better than other analytical approaches the complexity and interrelationships around food and agriculture – and even nutrition –, as well as the specific considerations of the regions and territories where it operates. In this sense, FAO provides a broad definition of food system, which should be kept in mind.[76] We can complement this definition as follows:

> "… [it is about the] *sum* of all activities related to food and the *environment* in which they are carried out: political, socioeconomic and natural-territorial. The food system has numerous feedback loops and is not linear in any way. Overall, it can be said that it begins with a

[75] See Luiselli (2017), pp. 148-189.

[76] "A food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes." (HLPE, 2018).

> combination of productive resources, such as land (soil), water, capital, and labour; what constitutes the "offer", then the transformation, storage, and distribution activities; and concludes with consumption and nutrition activities or actions, which constitute the "demand". However, the system also takes into account the biophysical-environmental, institutional, and economic environment where it operates." (Luiselli, 2021).

The systemic approach operates under the analytical framework of the organizational forms of a complex entity and their interdependence. In other words, systems describe a set of socioeconomic elements or actors, with their causal links and multiple interactions. It can be said that the transition from agricultural policy to agrifood policy is visualized here.

Also noteworthy is the fact that the analysis method based on food systems, while not new, is beginning to be widely used in broader policy-making approaches (Pinstrup-Andersen and Watson II, 2011). In this work they are fully considered as an integral part of new development policies and containment actions for the current crisis.

A recent work by the author notes:

> "We should clarify, however, that the concept of *food system* does not replace that of agriculture, far from it, but rather assumes it in a comprehensive manner. This activity continues to be a primary activity, although it has been losing weight in the formation of value in the face of agro-industrial transformations in processing and distribution to markets. [...] The concept of *food system* emphasizes the interrelationships or links in value or supply chains, which go from cultivation to consumption, passing through different phases or stages of transformation and value aggregation. In this sense it is very useful. The *food system* can also be analysed from a market and price formation perspective: activities pertaining to supply, production or transformation, and demand, linked to distribution and consumption. It is therefore of great descriptive and analytical utility. Among other things, it is useful to better understand issues related to food and nutrition security." (Luiselli, 2021).

We must not forget that, although the ultimate objective of food policy is to achieve full food security for the population – according to the basic definition[77] –, this objective is expressed and can be best achieved in policy actions centred on food systems. In other words, food security embedded in food systems.

As we have seen, the food-related issues are not only complex, but also extremely diverse. It includes agronomic, economic, ecological-territorial, hydric, climatic, zoonotic, and health topics, as well as, of course, nutritional. Production and consumption systems are structured in markets, which are expressed in complex value chains. It is no longer intended that a single institution or ministry undertake all these tasks, but that it takes into account the myriad of interfaces and interrelationships among the many issues related to food systems.

[77] "Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." (FAO, 1996).

We will address this important aspect in section 7.6 of this chapter (Strategic Proposal).

Poverty and health issues of are of great importance, since they relate to the efforts and tasks needed to achieve food security, as indicated in the definition above. It is important to note that food systems can be visualized at different territorial scales and that, by definition, they are not closed systems or airtight compartments. In fact, they are in continuous interaction through the market.

The systems approach that involves applying the methodological framework of a food system analyses the organization and interdependence relationships within a complex entity (Capra and Luisi, 2016). The systems describe a series of elements that conform them, their causal links, and their interactions (Pinstrup-Andersen and Watson II, 2011). Whether these are family production units, government institutions, technologies, markets, food quality and safety, zoonotic diseases, roads and infrastructure, or final consumers, just to mention a few. These elements interact with each other in many different ways. When it comes to *open systems*, interactions also refer to the external environment through *inputs* that enter the system from the outside, or *outputs* that pour out of it. The systems approach, according to Pinstrup-Andersen and Watson II (2011), serves to address complex issues, of causalities and multiple outcomes derived from their interactions within the system. The systems approach considers a given entity or system as a whole, with its inputs, dynamic interactions, outputs, and feedback (Ericksen, 2008).

The food systems model implies, as its central assumption, seeing the whole as a complex system and considering its linkages; if we really want to work towards achieving sustainability and overall food security, it cannot be linear. Keep in mind the dynamic flow made up by the basic elements of any food system: (a) inputs, stocks, and natural resources; (b) primary production; (c) storage, transportation and exchanges; (d) secondary transformation or agro-industrial processing; (e) again: storage, transport and exchange, and distribution, and (f) consumption. We could also add (g) nutrition and human health. This is why we say that it is about moving from agricultural to agrifood policy or, if you will, to *food systems* policy (Luiselli, 2021).

Food systems analysis is important to visualize the territorial strategy that we propose. The system, or its built-in value chains, require addressing productive activities beyond agricultural production as such. It aims to focus on the system's dynamics before and after production ("after the farm gate" as it is known in the literature). In general terms, if the system has a robust urban demand, it is dynamically activated towards meeting such demands,[78] and primary production also drives the intensification of production. But it is particularly the urban part the one that currently demands, not only more food than ever, but also more diverse food, with better quality and a higher protein content.[79] This means that the system requires technological improvements, inputs,

[78]This does not necessarily limit food production to a family's own consumption, at least not in the early stages of the production growth process.

[79]This is the so-called "dietary transition", observed in practically all emerging countries, very clearly in Mexico.

mechanization and an increasing endowment of credit and access to locally appropriate public goods (as we will see later).

The food system is activated in all its phases, and producers must be present in the different phases of the value chains. This generates important synergies in the territories where it operates. For instance, vehicles, warehouses, cold chains, workshops, maintenance services, etc. are needed. For this reason, the food system's infrastructure needs must be anticipated, not only for production, but also in the territories and settlements where the new productive dynamics occur. FAO (2017a) identifies five "agroterritorial" developments driven by the food system: agro-industrial corridors connecting one or more cities and towns; agro-clusters similar to the previous ones, but concentrated within a small or medium city; agroindustrial parks, which deal with transformations of greater scope and complexity; special economic zones (SEZs), dedicated in whole or in part to agroindustrial transformations, and agroindustrial business incubators.

Beyond the small production units, territorial changes should be observed, such as a trend towards greater concentration of units along the chains, greater capitalization, and development in general, and larger markets. Obviously, these shifts do not occur immediately or with the same intensity, but their direction is clear, as is the need to ensure that small producers have access the different links in the food system chains. These shifts will increase the size of non-agricultural rural economies and will, at least ideally, transform the spatial structure of the food system in question, inducing greater density and accumulation of territorial capital. Thus, the short chains can be slowly strengthened and lengthened. But technical and all kinds of support is required in the initial phases of the process in order to move forward. All this is expressed in the urban environment or, better said, it is part of the territorial dynamics that are sought to be activated within so-called urban-rural systems.

The need, frequent among the smallest producers, to achieve larger and more efficient scales under various forms of association with each other or through contracts with other economic agents operating in other phases of the food chains, should not be overlooked. Finally, it is crucial that the mechanization and application of technologies suitable for the smallest units be scaled up.

Thus, with a more complete view of food systems and their value chains, and with a defined target population, the strategy can begin with a few essential measures to launch a process of agricultural and rural development capable of increasing the production of staple foods by rural populations. These are not developed here in detail, but their strategic importance is outlined.[80] Before, it is convenient to recall a few basic considerations and premises:

1. The territories that are the object of our attention are where the poorest rural populations live. Here, poverty often has a very long history, and it has not been possible to reduce it in a forceful and continuous manner. For this reason, these

[80] For a more detailed view, see Luiselli (2017), Part Three.

are areas of low food security. Here, the pandemic has made itself felt, and it is in this context that it must be attacked.

2. There is a "new rurality", multifunctional and diffuse; most rural families no longer derive most of their income from agricultural activities. A consequence of this phenomenon is the growing integration of urban and rural territories (peri-urban or otherwise). The non-agricultural rural economy is an important phenomenon and is an integral part of this "new rurality".
3. In a country that is already 80 percent urban, food demand is becoming increasingly rich in protein, and also more diversified. But this is also happening in areas of the "new rurality".
4. There is increasing pressure on Mexico's biomes and ecosystems, putting its rich biodiversity at risk, especially its forests, jungles, and mangroves. This situation cannot continue, and the strategy proposed here must take it fully into account, beginning with its valorisation and the inclusion of environmental services as a valuable instrument for environmental protection.
5. Climate change is already present and has mainly negative effects on agricultural production and water availability; this will increase in the following decades. Furthermore, climate change is linked to zoonoses that are increasingly occurring, of which COVID-19 is only the most recent manifestation.
6. The proposed strategy incorporates the systemic nature of the agrifood issue, since it is necessary to understand value chains at the territorial level, as well as food consumption and nutrition aspects, if we really want to reduce food insecurity and the various zoonoses.
7. The proposed territorial strategy is essentially based on three convergent vectors: (a) prioritizing projects that stimulate agricultural production (and agrifood production, within a systemic value chain approach); (b) maintaining social programmes and conditional transfers, improving them and reducing their regressiveness, and (c) the much-needed convergence of projects and programmes, with greater coordination and coherence. But, above all, the strategy is geographically targeted. The territories where priorities are anchored are where the programmes must be implemented.

In view of these considerations and premises, our proposed strategy has seven main activities. Here we only state them succinctly.

To increase livelihood and food system resilience it is necessary to implement actions at various stages: once the impact of COVID-19 has been assessed or, instead, the main risk factors have been identified, policies must be adapted, local agricultural production must be supported – especially regarding fresh food –, and essential supply chains must be safeguarded, while ensuring protection of those who are most vulnerable.

This begins by strengthening small family production units, which are by far the most numerous and important rural productive form, as we will see later. Productive and credit support is needed immediately throughout the

entire agri-food or value chain system: seeds and other inputs, credit, and insurance; as well as improvements in extension and health, as they will be key sectors for the productive rebound, especially regarding widely consumed popular foods. Production for self-consumption in poor rural areas must be supported by seed "packages" and other strategic production inputs.

Strengthening value chains with *short commercial circuits* can minimize the loss of perishable products and ensure income. Furthermore, these tend to be less sensitive to disruptions in the event of new restrictions on movement, and can be supported through recovery plans. Additionally, associativity and cooperative schemes for the production, commercialization, and purchase of inputs, as well as for transportation and logistics, should be encouraged. Among other things, it is advisable to favour closer locations – shorter and closer chains –, especially regarding certain activities such as health or nutrition. Nearshoring, where locations are closer to the final consumer markets, is also advisable.

7.5 TERRITORIAL APPROACH AND FOOD SYSTEMS: THE ROLE OF CITIES AND SHORT CHAINS

It is now necessary to define a basic profile of Mexico's agricultural sector, in order to propose more solid food system modifications at the local or regional scale. Likewise, it is convenient to bear in mind the role of small family farming, as it represents an overwhelming majority.

A basic profile of the mexican agricultural sector

There are between 5.3 and 5.5 million rural production units in Mexico, also called "farms". The vast majority of these, around 80%, are small farmstead units, smaller than 5 hectares (around 60% are even smaller than 2 hectares). To a large extent, rural poverty and low productivity are expressed here due to a lack of resources and assets. A convergent phenomenon has to do with the advanced age of peasants or rural producers: 45% are over 45 years of age (INEGI, 2014). This is partly explained because a large portion of young people chooses to develop other types of activities or migrate to cities.

The remaining 20% of Mexico's production units form nuclei of modern and productive commercial agriculture that have consolidated important value chains in the last three decades, many of them internationally competitive. Within this category, it is estimated that only 6% (240 thousand units) are fully and continuously profitable, while the rest are considered "transitional", i.e. sometimes they participate in the market and other times they revert to self-subsistence (INEGI, 2014).

Another feature of the Mexican agricultural sector is its multifunctionality. Peasant household or family economies have been diversifying their activities and, today, most rural families derive most of their income from activities that are not strictly agricultural.

Another important issue has to do with the rural population's considerable dispersion in 184 thousand small settlements of a thousand or fewer inhabitants; of these, 160 thousand

have less than 250 inhabitants (CONAPO, 2012). It should be noted, however, that as part of the ongoing territorial transformations, this dispersion seems to be slowly contracting (Cervera and Rangel, 2015); this is part of the dilution of the country-city dichotomy. The new emerging rurality is increasingly settling in these peri-urban areas or in the vicinity of small and medium-sized cities.

In Mexico, within an "agricultural frontier" estimated by different authors at around 31.5 million hectares,[81] only 22 million are cultivated. Even so, Mexico is one of the countries with the largest area under irrigation in the world, with more than 6 million hectares – the most in Latin America –, of which 2.5 million are already under technical irrigation.

Despite showing slow growth in the last three decades, Mexico's agriculture already ranks high globally, placing 10th or 11th in terms of volume and value. Furthermore, the domestic market is made up of 125 million people with upper-middle-income, which means it has a very large domestic market, albeit one with high inequality. Even so, the agricultural sector's slow growth has accelerated in the last five years: according to INEGI, between 2002 and 2012 it expanded at a rate of barely 1.4% per year, while from 2013 to 2017 it did so at 3%. This renewed momentum has to do with the very good performance of agricultural exports, which in 2019 reached USD 32.5 billion.

[81] There are, of course, discrepancies around this figure; some authors place it at 26 million ha.

Small family farming

It is precisely this new rurality and the pre-eminence of family farming what shape the new role of our food systems, operating in urban-rural system territories, with medium and small cities articulating production and consumption. In the territories where this new rurality unfolds – small farm agriculture, often family farmsteads[82] –, it acts as a core part of the food systems and is one of the most widespread forms of rural production in Mexico. It often provides supply, food security, and is the basic engine of these food systems. At the same time, most of the peasants living in poverty reside in these small production units; all production or technology support strategies must consider this important circumstance from the start. As De Janvry and Sadoulet (2016) point out, given its sheer number, it is "one of the most important social categories in the world".[83]

The profound structural change that is taking place throughout the rural world points to an increase in the size of production units (PU) or farms.[84] This trend reflects the state of the structural transformation. It is a complex process that cannot be forced, and which should rather be accompanied by a variety of stimuli and public policies, aimed – above all – at making the most out of economies of scale and the diversification towards sources of activity and income outside the Pus. This was discussed

[82] A variant is the so-called "semi-family" agriculture, where production units also use supplementary labour, either through salaries or sharecropping outside the family itself.

[83] The authors point out that there are around 500 million production units ("farms") worldwide, with around two billion people living in them.

[84] See Luiselli (2018), pp. 22-26, and World Bank (2007).

in the section on new rurality and the "non-agricultural rural economy".

Certainly, many small family farming units will endure over time. Small farming, family or not, can be highly productive in terms of labour, capital, or land units – and there is abundant literature to support this.[85] But looking to the future overall, we are moving towards larger productive units, and many of them will no longer be family-owned. Nevertheless, there are lower limits: if a production unit is too small and has a low or erratic water supply and inadequate soils, their viability is clearly compromised. In these cases, viability can only be achieved through partnership schemes between small family farmers. Still, larger units in transition, or even the many commercial-scale units (just over 12% in Mexico), should not be excluded from the allocation of stimuli and aid. In any case, no agricultural and rural development strategy can omit considerations regarding family/small farming.

7.6 PROPOSAL FOR A PRODUCTIVE STRATEGY: TERRITORIES, CITIES AND FOOD SYSTEMS

This section attempts to propose a strategy that achieves convergence between small producers, food security, and territories. But, above all, it attempts to integrate the food systems operating in a network with small cities, which shall play a crucial catalyst or trigger role in the entire productive revitalization process.

Measures related to fighting the COVID-19 pandemic are implicit in this strategy. On the one hand, emphasis is placed on tackling the rise in food insecurity where it occurs most intensely: in cities. On the other hand, the strategy is in line with programmes aimed not only at productive revitalization, but also at providing direct relief to the population that suffers the most from the dual crisis.

Thus, within the proposals we are making, those related to non-agricultural rural economies – often an integral part of food systems –, such as collection centres, storage centres, and diverse agro-industrial establishments, as well as small food outlets and restaurants, are categorized as essential. Of course, this is part of the aforementioned new rurality: an increasingly urbanized rural environment. The territories where populations live in poverty – often subject to enormous water and environmental stress, exacerbated by the growing impact of climate change – are the main object of our proposals.

The proposed territorial strategy is essentially based on activating three convergent and interlinked lines: (a) triggering productive projects; (b) maintaining and improving social conditional transfer programmes, and (c) focusing or anchoring them in a specific territory through local food systems. The strategy, then, begins to unfold in more detail: the agricultural frontier must be analysed and, based on several preliminary conclusions, more land and more technified irrigation should be incorporated into production. The current and crop pattern and possible changes to it are also analysed.

[85] See Hazell and Rahman (2014).

The idea of inserting a series of very specific support measures, but with strict regard for cultural conditions and local knowledge, deserves separate consideration (Toledo, 2008). In this sense, there is an important difference with respect to the "technological packages" of the Green Revolution. The critical inputs to be promoted are, above all, seeds of local varieties (or even hybrids), but not transgenic; fertilizers and, where possible, bio-fertilizers and integrated pest management. The introduction of these critical inputs should be consulted with local participating communities and, under no circumstance whatsoever, should it be introduced in a "vertical" and authoritarian way.

In all this, particular consideration is given to the enormous need to revitalize a national seed (and fertilizer) industry. We should not forget that Mexico has at least 64 vernacular breeds of corn, which form the basis of its rich gastronomy. This genomic heritage must be cared for, improved, and extended. A renewal of INIFAP, allied to small and medium-sized producers, will be decisive for the strategy proposed here. The work proposes various organizational alternatives in this regard, such as the creation of a National Seed Industry Council.

Subsequently, following the systemic vision, we propose to integrate value chains "forwards" and take producers in the local food system to the next phases of transformation, storage, and distribution. This can be achieved through different partnership formulas and in commercialization (and risk management) tasks. Finally, in this section we consider it necessary to reassess the strategic role that the DICONSA system[86] can and should play, as an aid to small producers in both their supply and commercialization tasks. This is particularly important with regards to the current crisis. Credit issues are also important and crucial if we consider that just over 5% of producers regularly have access to credit. Consequently, various ways of promoting credit (and risk management) in rural areas are analysed. Among them are mutual funds and liquid guarantees, which deserve to be considered and promoted.

First, the productive-territorial base where a given target population of rural producers is located and operates must be expanded. To better understand this phenomenon, it is necessary to consider the important territorial changes that we have mentioned, but before addressing them, it is convenient to specify the large strategic areas of strictly territorial operation. It is not surprising that the strategy must act first by promoting production, both raising yields and extending the area under cultivation and, particularly, under irrigation. A certain reconversion of crops can also be induced. Here we will focus on the possible increase in area under cultivation.

Mexico's "agricultural frontier" must be taken into account. It has been estimated at a theoretical maximum of 31.5 million hectares, but in reality, only about 22 million are being cultivated. It is necessary to make some preliminary considerations. According to an analysis based on the 2007 Agricultural Census (INEGI, 2007), only 12% of the area could not be

[86] Distribuidora Conasupo, S. A. (DICONSA), a parastatal company.

adequately accounted for through the census. This leads us to assume that an increase of at least 3 or 3.4 million hectares of cropland is possible. It is important to emphasize that these lands are within the "agricultural frontier", and we can at least infer that they have already been opened up and previously ploughed: in other words, they stopped being cultivated. We should also mention that valuable ecosystems are currently recognized within the agricultural frontier, so unrestricted environmental depredation cannot be allowed within it. Therefore, it is also necessary to seek agricultural development that is sustainable in the long term.

Mexico's considerable regional diversity also goes with significant regional inequality in terms of living standards, economic development, and resource endowment. Today, the growing South-North regional gap is particularly worrying, as well as the persistent abandonment of certain areas, especially mountainous areas and indigenous community settlements. As mentioned above, Guerrero, Oaxaca and Chiapas are lagging alarmingly behind the rest of the country, but there are numerous regions that have also been left behind in other states of the Republic, including in urban areas. The stability or permanence of ancient small cities that play a mediation role between rural spaces and cities deserves a special mention. Thus, medium and small-sized cities are not something new or temporary on the path to large conurbations. They are and will be present in the territory at any time horizon.

A key piece of the strategy will be the renewed role of the State in the provision of essential public goods (Luiselli, 2017). The aim here is not about ending private programmes and projects, but rather about putting emphasis on public goods as the axis of a vigorous agricultural recovery. There are, mainly, four types of public goods: (a) applied research in seeds and agronomy, with a renewed role for the National Institute for Forestry, Agricultural and Livestock Research (INIFAP), and with a broader and more systemic approach; (b) extensionism, as a public and systemic service, applicable to the entire value chain, not only to the merely agricultural part; (c) health, very much in line with what the National Service for Agrifood Health, Safety and Quality (SENASICA) does, and finally, (d) *ad hoc* agricultural infrastructure, such as roads, dams, pumping stations, warehouses, etc.

In this context, it is now convenient to review a few of the measures to confront COVID-19. We must reiterate what we mentioned above: to date, the Mexican government's *ad hoc* response in terms of new policies against COVID-19 has been minimal, and basically barely incremental in some existing programmes. Here it should be noted that, beyond the current situation, these measures are basically tied with measures related to fighting poverty head-on; direct subsidy programmes and extraordinary cash transfers, especially aimed at the most vulnerable populations; in kind support, especially in urban areas, through school breakfasts, distribution of pantries, or establishment of "food banks". But these specific aids must be aligned with the broader strategy, which seeks more in-depth transformations, such as investments in infrastructure, technology transfers and, in general, provision of public goods, as we indicated above.

On the other hand, it is clearly evident that the food system, in its various dimensions, does not receive adequate stimuli and is governed by the vertical structure of the "agricultural" bureaucracy. This is a dilemma that occurs almost everywhere in the world. In the Mexican case, it is clear that the mandate of the Ministry of Agriculture and Rural Development (SADER, formerly SAGARPA) fails to cover the entire spectrum regarding food security and the food system as a whole (Shamah-Levy *et al*., 2017). The tasks that we are proposing here will require significant efforts by SADER and other public ministries and institutions to reorient and implement public policies. Particularly, SADER must undergo a major reengineering, reorienting itself more towards a target population and the prioritized supply of public goods: applied research, comprehensive and systemic extension, health, basic infrastructure, and irrigation. The introduction of multi-year and programme-based budgets is also a necessary step to provide greater certainty and direction to its tasks. More cross interaction with other ministries and public entities should be considered. The key decision-making process should be elevated to the Presidential Cabinet level. Another relevant aspect consists in forcefully advancing the progressive decentralization of functions towards the states. Mexico is as vast as it is complex, and major agricultural and food policy decisions must be made at the local or regional level: in the states.

The territory-based approach entails a paradigmatic change, rooted in the rural transformation towards a new multi-active rurality, and from it tries to generate renewed dynamics: activity and cooperation networks, associations, alliances, and networks between various economic agents, of course, including agricultural and livestock producers. In some way, the sectoral approach is reconciled with spatial approaches, and allows them to incorporate "local" aspects, with their resources, knowledge, and particular cultures. This provides a unique content to local food systems (and value chains). Above all, it more effectively links urban centres with each other and with their areas of influence or rural hinterlands.

Note that these links in the so-called urban-rural systems critically connect two nodal parts of the local food system: agricultural production areas and small (or medium-sized) cities, and provide small producers with access to new assets, both within their plots or productive units, as well as within the cities that are close to them. Urban markets are a driving force of local food systems; in other words, they are demand-driven markets. There is a similar urban dynamic in all this, but with important peculiarities that must be better understood: peri-urban areas. Here we cover them in some detail.

This is where the food security dilemma at the local level must be resolved, and where the poorest and most food insecure populations in the country are found.[87] Changes in the level of urbanization – more urban population and more cities that are better connected to each other – have, of course, numerous implications for the rural transformation or the new rurality.

Finally, a few brief final considerations are offered by way of conclusion. In the first place, it should be noted that the Mexican government must act more decisively and forcefully to face the serious situation posed by the COVIID-19 pandemic. It must do so in terms of greater resources and direct transfers to the most affected sectors, and also with new *ad hoc* programmes to support food security and poverty reduction. It is clear that the weak programmes currently underway are not enough.

The proposed territorial strategy is based, as previously stated, on essentially activating three convergent and interlinked vectors: (a) triggering productive projects; (b) maintaining and improving social conditional transfer programmes, and (c) focusing or anchoring them in a specific territory through local food systems. This is our main proposal, and it must go hand in hand with a redoubled effort to face the ravages of COVID-19. The proposal of productive relaunch made here must be understood in this sense. It is based on small agriculture, on the expansion of areas under cultivation, as well as on DICONSA's strategic action in the supply and distribution phases, considering the role of small and medium-sized cities.

On the other hand, it should be noted that the territorial approach that has been developed here is clearly functional to these proposals, especially when it comes to more precise action in urban-rural systems and, above all, taking into account the strategic role that small and medium-sized cities can play in all this. It is there where local and regional food systems operate, and it is also there where what we have deemed the new rurality is manifested. We believe that a combination of customized (or even sectorial) support and territorial policies represents an action horizon that is as innovative as it is promising. ■

[87] In this regard, see the Mexico Development Reports of 2015, 2016 and 2017 (PUED-UNAM). The 2017 report includes a section on Small Cities and various related aspects on Rural Strategy.

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8
FORMATION OF RESILIENT AGRIFOOD TERRITORIES THROUGH COOPERATION AND CO-MANAGEMENT PROCESSES. Colombia Case study

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This chapter aims to reaffirm the need to continue working on the organization, configuration, and integration of food territories and local markets, as a basis for improving agrifood system resilience and efficiency. To really move a transformative agenda forward, new paradigms must promote cooperation and co-management schemes with different actors, many of which have emerged strongly in the context of the COVID-19 pandemic to mitigate its impacts on supply chains. This calls for institutional innovations and changes in organizational culture, where governments must act as incentive generators for participation and collaboration between family farming, private companies, and agroindustries. All this intends to improve urban-rural integration and city-region links, not only to generate greater income, but to value the social and environmental processes, which stem from cooperation between the actors, at the same level.

The chapter invites us to reflect on the Colombian experience, a country that has conceived comprehensive approaches to food and nutrition security in its policies. From different territorial perspectives, Colombia has generated valuable evidence to interpret food flows and identify the main deficiencies and opportunities in developing territorial food systems based on proximity of markets.

From this, key elements and strategies are proposed, not only to improve the actions that lead to greater territorial cohesion in terms of food, but also to face the new challenges posed by the post-pandemic scenario. These challenges include planning food spaces, improving territorial logistics efficiency, promoting functional food circuits, food supply information systems, access and adoption of technological

innovations, and the creation of a structured agenda among territorial actors to contribute in a participative and active manner to food system sustainability.

8.1 INTRODUCTION

The health crisis caused by COVID-19 exposed the fragility of food systems. Although its impact did not trigger food shortages, negative repercussions are expected regarding food security indicators, which are added to a prior scenario of increased rates of obesity and malnutrition (FAO, IFAD, UNICEF, WFP and WHO, 2020). This is the consequence of a diet high in ultra-processed foods and low on fresh and healthy foods that could be supplied by local economies. In this context, there are several lessons to be learned from the pandemic. Nevertheless, it is necessary to highlight the resilience shown by territories, local markets, and the various actors who operate in them, to avoid a more severe food crisis.

Food chains were quickly affected by logistical problems, the closing of market channels, and production input shortage s, among other factors that made food supply levels in different areas of the country more vulnerable. Faced with this scenario, several social and economic actors reacted favourably, with spontaneous organizational schemes, such as cooperation networks of producers, merchants, and consumers, linkages to technological platforms, and development of alternative supply channels, among other measures that made it possible to appease the food impacts related to the pandemic.

These experiences generate a series of questions for the post-pandemic scenario. According to Azevedo (2009), *to what extent have governments left the spatial organization and regulation of food systems at the mercy of market inertia?* The author is emphatic in stating that choosing new products or more sustainable consumption patterns is undeniably associated with the role of states as inducers of new production and consumption parameters, either through legal contingencies, economic subsidies, or as promoters of healthy lifestyles. Likewise, the pandemic left us with the possibility of promoting new forms of organization and relationship between chain actors, governed by cooperation and co-management. But, *how to take advantage of the innate forces of territories and their actors so that food systems meet social and environmental targets?*

Undoubtedly, the pandemic has confirmed that the territorial configuration of food systems, and particularly supply systems, should be a public policy objective. This implies promoting more efficient food territories, so that food chains are inclusive and, in turn, more resilient to the impacts of climate change and health crises (HLPE, 2018). The driving forces behind this approach lie in organizing territories, connecting actors, and achieving cooperation between them. This connectivity shall not only be understood in terms of geographical proximity, but also organizational proximity, with common objectives that ensure permanent access to diverse and healthy foods, minimizing dependence on other markets and other production areas. From this perspective, the need to strengthen urban-rural links and create functional food circuits arises, so as to value local food production and its identity, meet the

demands of family farming, and achieve greater cohesion within the food community.

FAO has accompanied actions by various Latin American countries to promote this approach. In Colombia, departmental governments such as Antioquia, and more recently Nariño, Putumayo and the Special Administrative and Planning Region (RAP-E or Central Region),[88] as well as the municipalities of Medellín and Bogotá, have developed significant experiences and evidence. This allows us to derive policy lessons, key elements, and pending issues to create more efficient and inclusive food systems in the territories.

Hence, and based on the Colombian experience, this chapter aims to provide recommendations to move forward in this direction. This not only implies improving part of the processes and policy instruments in place prior to the appearance of COVID-19, but also contemplating the new challenges and demands generated by the pandemic.

The chapter is structured into five components starting with this introduction to the subject. The second component addresses the most important concepts related to the territorial integration of the food system.

The third one shares the main findings of the analysis of food supply systems in the territories, based on the results of exhaustive studies carried out by FAO[89] and other institutions, which expose some inefficiencies and negative externalities in food circuits. Analysis of these circuits is key to improve the territorial planning of the food system, as well as to configure efficient territorial relations and articulations. The fourth component invites reflection and suggests the key elements that should be present in public policies to promote more resilient and efficient food territories, supported by actor cooperation and co-management strategies. Finally, the fifth section presents the main policy considerations and recommendations.

8.2 CONCEPTUAL REFERENCES

Rethinking the spatial arrangement of the agri-food system entails a theoretical approach through which categories that support the empirical work that is presented are defined. The starting point is linked to the fact that society develops itself in a geographic space determined by its transformative action, through the use and appropriation of available resources, thus consolidating a close relationship between society and its environment, which is redefined permanently according to technical

[88] The Special Administrative and Planning Region, RAP-E, was created in September 2014. It is the first supra-regional public entity in Colombia that promotes and articulates economic, social, and environmental development plans in its associated territories: Bogotá DC and the Departments of Boyacá, Cundinamarca, Huila, Meta and Tolima. Learn more by visiting: https://regioncentralrape.gov.co.

[89] FAO Colombia has developed food supply studies in three of the country's departments (Antioquia, Nariño, and Putumayo), and supported the development of the Bogota Food Supply Master Plan and the Central Region Supply Plan. This included the analysis of more than 7 000 food chain actors and 25 family farm food products in the country's 250 municipalities. For an in-depth look at the different analyses of food flows, see the studies at: https://nacionesunidas.org.co/publicaciones-fao/.

and technological apprehensions (Fajardo Montana, 1996). In this sense, space must be understood as a porous container of social, political, and economic relations, arising from collective interactions that forge networks, which in turn must be understood as an inseparable, supportive and contradictory set of actions that are developed through systems of objects (Santos, 2000).

Then, by considering resources as natural heritage that defines a physical space, where human action emerges through social and economic exercises, "territories and territorialities" are generated (Santos and Silveira, 2001). From this standpoint, space is conceived as an active receptor, where objects and actions that are constantly relating and transforming are established, and the use and non-use of space itself is defined; this is the central axis of this empirical analysis.

In this regard, Pierre Bourdieu, in the book *The Social Structures of the Economy* (Bourdieu, 2003) and the text *Site Effects* (Bourdieu, 1993), proposes that the use of space is determined by hierarchical structures, which fosters a certain order where actions and objects are located. In this sense, the proposal to rethink the agrifood system's spatial order focuses on the relationships between public and private actors and citizens.

This implies an analysis of the relationships, which allows us to understand a background where objectified relationships are configured in different positions that, for this case, are established from the perspective of the agri-food system and the society of the place.[90] For this analysis, the territories must be valued beyond their functionality within the productive system, that is, not only to acknowledge them as places inhabited by food producers and possessing natural resources, but to identify the existing ties between productive territories and consumption, given that they are a manifestation of the urban-rural relationship. This allows public policy to trigger actions that go beyond the sectoral "intervention" approach and generate direct links between urban and rural structures.

From this perspective we look at the concept of agrifood system, developed by Malassis (1979) in the 1970s, as "the full range of activities that culminate in the formation and distribution of agri-food products, and consequently, the performance of functions of human nutrition in a given society." Along these lines, Rastoin and Ghersi (2012) view the agrifood system as "interdependent networks of stakeholders (companies, financial institutions, public and private organizations, and individuals) in one or various geographical areas (region, state, multinational region) that participate, directly or indirectly, in the creation of flows of goods and services geared toward satisfying the food needs of one or more groups of consumers in the same geographical area or elsewhere." (Rastoin and Ghersi, 2012).

Thus, when it comes to agrifood systems and their spatial structuring, it is appropriate to

[90] The term society of the place is intended to broaden the concept of a space limited by two worlds, rural and urban. Consequently, this dichotomy is left behind and emphasis is placed on the relations of society as an inseparable series of networks that move between different territories, some rural and others urban (Lefebvre, 1970).

recall three elements proposed by Milton Santos (2000). The first one refers to a *homologous happening*, something that results from the modernization of agricultural or urban areas and generates new spatial contexts that redefine their functionality; likewise, the lag in modernization can be understood as a process that functions under a logic of spatial subjugation. The second element consists of a *complementary happening*, based on country-city relations, as well as that between cities, which have the need to consolidate material and immaterial exchanges to sustain productive schemes. Finally, we have a *hierarchical happening*, where the rationalities that organize, direct, and concentrate activities impose functionalities that define the division of work (Santos, 2000).[91] The three elements lead us to consider transformation as a process predetermined by relationships between territories. In this sense, Ciccolella (2012) states:

> "These transformations have had their physical correlate in the restructuring of the territory. Both rural and urban areas have suffered the impact of profound changes in the forms of organization of production, land use, and its differential valuation, generating tendencies towards the formation of new territories and new territorialities. As a result of recent changes, metropolitan structure and morphology tend to be regenerated, after a process of destructuring-restructuring and deconcentration-recentralization, based on a new model of production-circulation-consumption and the transformation of the economic base of the big cities." (Ciccolella, 2012, p. 9-21).

[91] Santos, 2000, pp. 257-263.

In the case presented here, transformation is understood as a dialectical process, which makes it possible to visualize the relations of cooperation, adaptation, and resistance between social, political, and economic stakeholders. These links are the fuel that drives the very fluidity of the food system (Spósito, 1996, p. 48). However, this fluidity cannot be associated only with a manifestation of economic efficiency. Social equity or spatial and territorial justice must be considered within the analytical context. Consequently, it is crucial to include a socio-territorial vision in the mechanics of economic development (Zuluaga O., 2020).

These conceptualizations offer the possibility of considering the territory as a dynamic element from which a series of relationships emerge, which can be analysed as social, economic, and political structures that make up Cooperative Agri-Food Territories. These can be consolidated through relational actions of cooperation and complementarity between urban centres and their rural environments, through territorial reconfigurations based on the connection between stakeholders and between places where food is produced and consumed.

8.3 TERRITORIAL RELATIONS IN THE AGRIFOOD SYSTEM: EVIDENCE AND OPPORTUNITIES

In the last five years, FAO in Colombia has carried out studies that help to understand food supply systems from a territorial perspective. These studies are complemented by other research carried out by different institutions in the country, which leave in the analysis

part relationships that ignore local capacities and opportunities that would allow for the appropriation of economic resources and a more sustainable development, product of a territorial use based on the active participation of local actors in the agrifood system.

8.3.1 Redundancies in food flows

Some of the data that supports the above is expressed in the incoming or outgoing food flows to or from the territories, which may have origin/destination in the local or national economy, or in the global food market. In order to find better structures for food relations, these food flows must be recognized. Many of them are based on the productive specialization of the territories, a condition that is motivated by the markets in the big cities. This phenomenon is evident in the Special Administrative and Planning Region (RAP-E), made up by Bogotá and the departments of Cundinamarca, Boyacá, Huila, Meta, and Tolima, where food production exceeds demand 2.9 times. It is important to note that this region is home to 31 percent of Colombia's population, that is, 15.7 million people. Hence, production in this area alone could supply the food needs of 91 percent of the country (Flórez Espinosa, 2020, p. 68). As a consequence of this asymmetry, surplus food goods need to be placed in other markets, and this forces the consolidation of marketing schemes with a considerable number of intermediaries, who transport food to distant markets in various areas of the country.

This is evidenced in supply centres and market squares, spaces that function as reception epicentres of many foods that later return to the places where they were produced. This logic is analysed in greater detail in the RAP-E Supply Plan, which reports that the Supply Corporation of Bogotá (CORABASTOS),[92] the largest wholesale centre in Colombia, receives daily between 8 and 10 thousand tons of food, of which the capital consumes 55 percent, forcing a redirection of the remaining 45 percent of food flows. This illustrates high operational inefficiency regarding logistics, commercial, and communication matters. Consequently, food goods that enter a supply centre are redistributed back to the production territories, forging redundant inefficiencies in the chain:

> "This not only generates environmental and mobility costs within the city, but also highlights the increase in transaction costs derived from the participation of intermediaries who do not add value to the supply chain. For example, if we convert the tons of food that enter and leave the city into 35-ton trucks, 634 trucks would enter and 287 of them would leave again, being totally unnecessary." (Flórez Espinosa, 2020, p. 39).

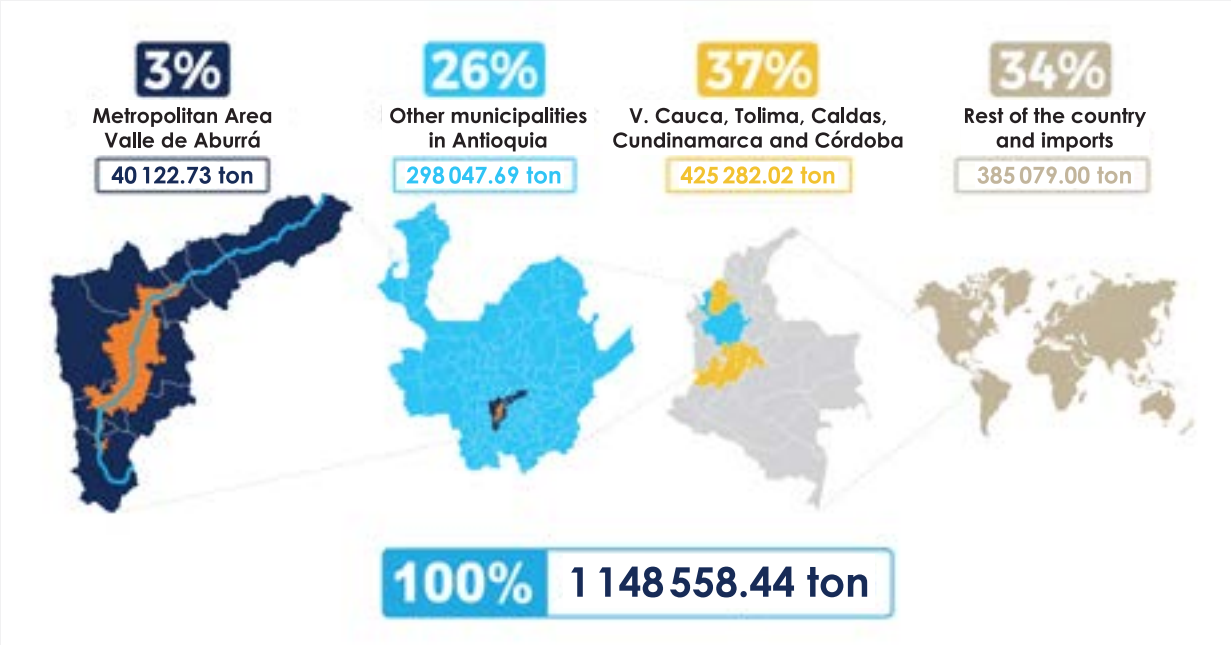
These dynamics coincide with those evidenced in the Antioquia Wholesale Central,[93] located in Medellín, with 70 percent of its food supply originating in places outside the department of Antioquia (figure 8.1); specifically, 43 percent hails from the RAP-E (Gil Zapata *et al*., 2011). We should note, however, that the connection

[92] The Supply Corporation of Bogotá is a Mixed Economy Society, commercial in nature, legally organized as a national corporation, linked to the Ministry of Agriculture and Rural Development.

[93] The main supply centre in Medellín and Antioquia for fruits, vegetables, grains, and groceries began operations in 1971.

Figure 8.1

Origin of Food Products Consumed in the Department of Antioquia, Colombia



Source: Prepared by the author based on data from PADAM and FAO MANA.

between Bogotá and Medellín is fluid, so it is natural that flows of all kinds of goods and services be present.

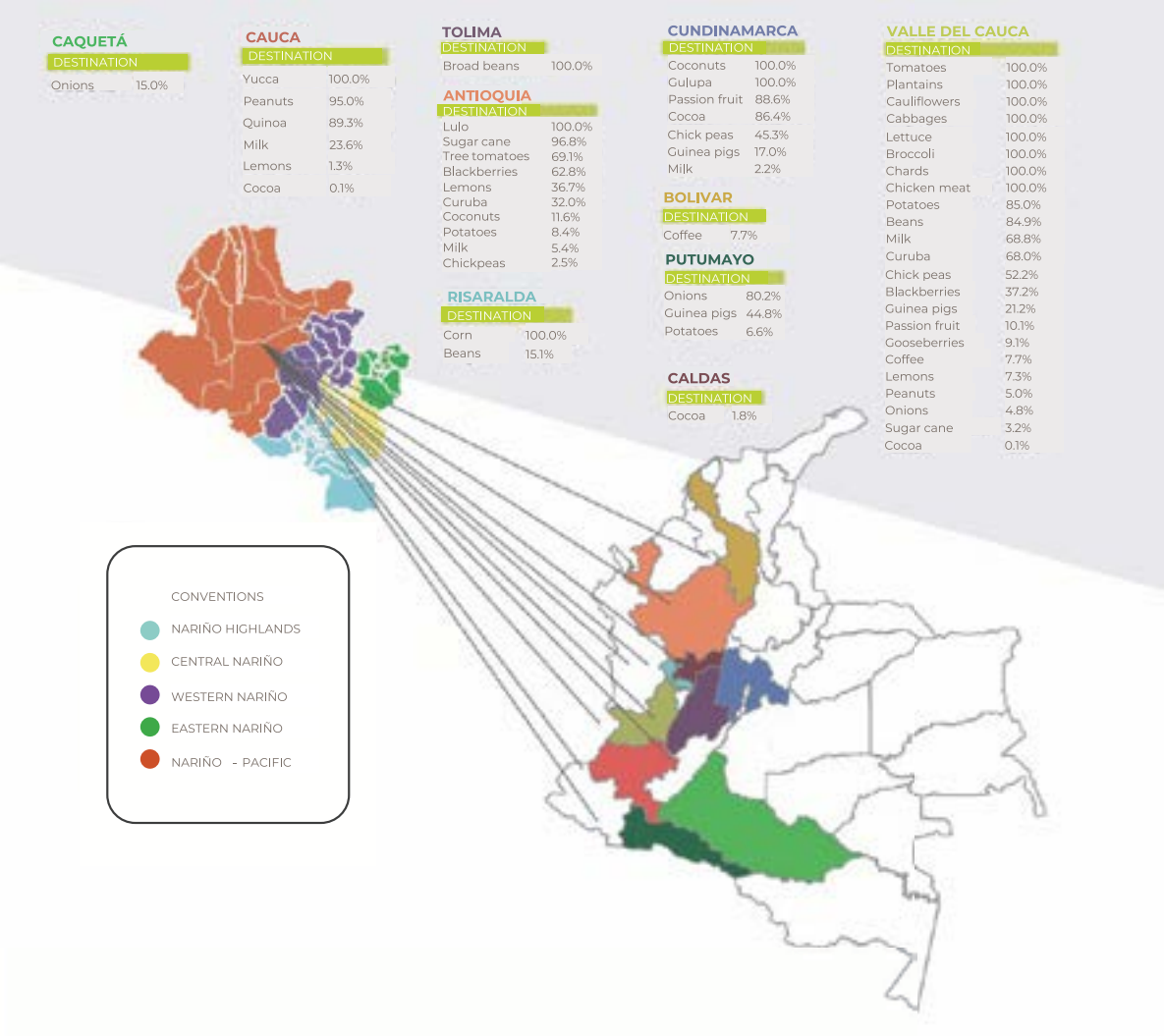
Nevertheless, inefficiency in the food supply circuits is clear, since Antioquia has the agroecological capacity to sustain its local markets (Government of Antioquia, 2017). This food inflow to the Department of Antioquia represents a production deficit that is close to one million tons per year, which in economic terms implies transferring approximately USD 972 million per year (De Paoli *et al*., 2016). This value was estimated on the basis of 27 food products from the basic basket that are traditionally produced by rural family agriculture. This inefficiency can be seen as an opportunity to take advantage of Antioquia's territorial capabilities and potential,[94] by connecting markets according to proximity, thus retaining resources that can be used to reduce development gaps. In fact, the percentage of people living with Unsatisfied Basic Needs (UBN) – which for urban spaces stands at 6.67 percent – in rural areas reaches 26.77 percent.[95] This inefficiency is also reflected in the food insecurity indicator, which reaches 75.8 percent in Antioquia's rural areas.

[94] Food dependency in the city of Medellín – the Department of Antioquia's main consumption centre – is not structured according to nearby rural territories whose productive vocation responds to the city's consumption habits. Currently, only 35 of the 124 municipalities in the department have rural-urban links with the city of Medellín, and many of them are in environmentally protected areas (FAO, 2019b).

[95] Information corresponding to people living in private homes according to the 2018 National Population and Housing Census (CNPV).

Figure 8.2

Destinations for the Main Food Products Produced in the Department of Nariño, Colombia



Source: Prepared by the author based on data from FAO, AECID and MINJUSTICIA.

On the other hand, food flow relationships in the Department of Nariño, which is located in the southern part of the country, bordering with Ecuador, form a production and marketing process that is highly articulated, with a high degree of local supply and, in turn, a food trade with connections that are sometimes located 1 400 km away, and generates constant food outflows to neighbouring departments. The strong relationship between Nariño and Valle del Cauca is noteworthy, since it may be seen as ambiguous if one considers that Valle del Cauca is the second largest producer of fruits in the country, with approximately 600 000 tons per year (most notably citrus fruits, pineapples, grapes, papayas, and bananas), and where close to 76 000 tons of vegetables are produced.

Our last example is found in the Department of Putumayo,[96] also in the southern part of the country bordering with Ecuador. In it, the food inflow from Nariño reaches 67.4 percent of the total volume coming in. It includes, notably, junca onions (92.6%), carrots (97%), and cassava (98%) (Rodríguez Fazzone *et al*., 2018, p. 53). This last piece of data reveals inefficiencies, considering that Putumayo produces approximately 14 991 annual tons of cassava (DANE, 2018). Similarly, inflows are reported from the Department of Huila, accounting for 41.9% of beans and 47.9% of corn.

The food products highlighted in the previous paragraph have productive potential in the territories that make up the Department of Putumayo, especially in the subregion known as Alto Putumayo, which has adequate conditions for producing vegetables such as junca onion, beans, and carrots. Understanding these flows allows us to infer that there is a critical structural situation in the Putumayo Department with regards to its dependence on food from other production areas and markets in the country. It relates to the deterioration of its food heritage – products of high nutritional and cultural value –, considering that it is a region populated by indigenous and peasant communities. Among the causes that have increased this vulnerability and lowered food resilience in the territory, it is important to highlight that this is the third department with the highest presence of illegal crops, with roughly 25 000 hectares (SIMCI, 2020). The increase in deforestation, together with the worsening of the armed conflict and related social problems, has had a significant impact on production systems. In this context, the Department of Putumayo requires specific planning for its agrifood system, one that is capable of regaining adequate levels of production, consumption, and food resilience in the territory.

The relational dynamics of all these cases share difficulties regarding connection and connectivity between stakeholders and territories, caused mainly by asymmetries in access to information and intermediation schemes that have high transaction costs, thus preventing the formation of more functional food supply circuits. Food dependency relationships based on food flows from external markets, as well as the decoupling of local production and local demand, force us to rethink the economic links between regions, in order to make the most of the territorial stakeholders' capabilities, infrastructure, and information.

8.3.2 Factors that affect food supply system efficiency and territorial integration

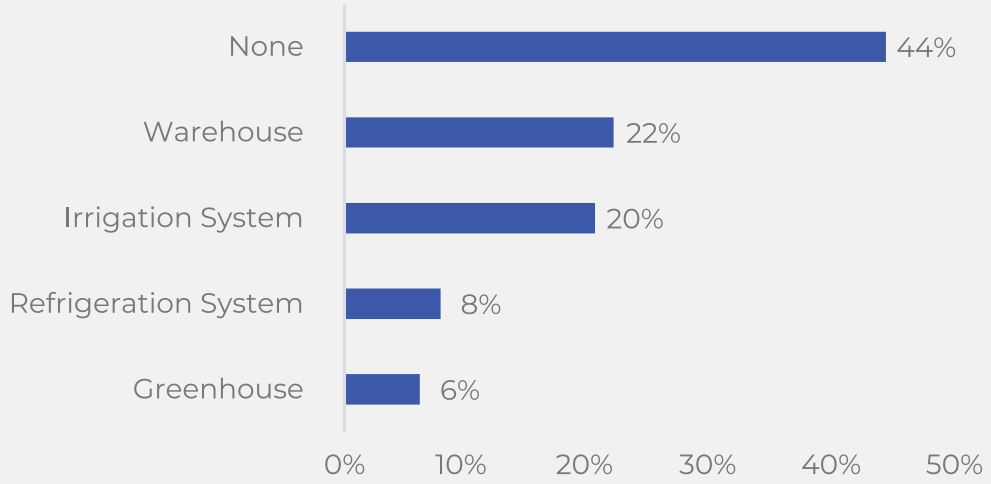
Food supply infrastructure

One of the main limitations that conditions the efficient operation of the supply system – in terms of proximity and equitable access of family farmers to the circuits – lies in the territory's assets. Such assets include productive infrastructure (collection centres, transformation centres, logistics centres, etc.) and markets (squares, local markets, fairs, etc.), both essential for adding value and strengthening the link between producers and end consumers.

[96] Department located in the southern part of the country in the Amazon region, bordering Peru and Ecuador.

Figure 8.3

Infrastructure Owned by Family Agriculture Organizations in the Department of Nariño, Colombia



Source: Adapted from Rodríguez Fazzone, Ramírez-Gomez *et al.* (2018).

The existence or not of certain investments, as well as the condition and optimal use of these assets, affects the supply system's efficiency. In the 125 municipalities that make up the Department of Antioquia, only one in four has an active marketplace or local market and, among them, only half of the premises are used for commercializing food products. In this scenario, it is not surprising that family agriculture sells only 3.1 percent of what it produces directly to consumers, and 1 percent through peasant markets (De Paoli, Rodríguez Fazzone *et al.*, 2016).

On the other hand, there is considerable geographic concentration of food processing companies. There are 1 479 processing companies registered in the Antioquia Chamber of Commerce, of which 75 percent are located in the city of Medellín, which implies that many foods must be transported long distances for the value-added stages, or that other markets outside the department must be sought. Overall, qualified interviews were able to determine a tendency to undervalue – by local institutions and governments – the influence that local market infrastructure has on food system configuration and its effects on stakeholder participation and positioning within the food chain (Zuluaga O. and Santini, 2019).

Along these lines, insufficient production and storage infrastructure owned by Family Agriculture Organizations was identified in the Department of Nariño. Only 21.8% have a warehouse for storing food, 20.3% have irrigation equipment, and barely 8% have refrigeration equipment (Rodríguez Fazzone, Ramírez-Gomez *et al.*, 2018) (figure 8.3).

Regarding small family businesses that process food and agroindustrial companies in the department of Nariño, the scarcity of refrigeration facilities is striking – 54.8 percent

Figure 8.4

Main Causes of Food Loss and Waste Reported by Family Farming Organizations, Agroindustries and Merchants in the Department of Nariño, Colombia

Source: Adapted from Rodríguez Fazzone, Ramírez-Gomez *et al.* (2018).

of them do not have this type of infrastructure. Similarly, a considerable portion of commercial establishments do not have refrigeration (58.6%), which can lead to health problems for the end consumer. Additionally, Nariño has a high level of informality regarding sanitary and commercial permits, with indicators that exceed 70 percent informality in categories such as wholesalers, legume stores and marketplaces (Rodríguez Fazzone *et al*., 2018).

The notable lack of infrastructure to ensure an adequate food supply impacts Food Loss & Waste (FLW), with figure that are close to 40 percent on some food chains in Antioquia and Nariño. As illustrated by figure 8.4, Family Farming Organizations associate FLWs with insufficient infrastructure for agronomic and post-harvest management, while, in the agribusiness and commercialization stages, storage and transport capabilities are the main causes of FLW. In terms of public policies, this variable should be considered as an indicator of efficiency in food production, trade, and consumption circuits. In Colombia, the National Planning Department reports a FLW of 9.3 million tons per year (Castañeda *et al*., 2016), enough to feed 8 million people.

These analyses point to considerable dispersion in the food supply and distribution systems of each of the departments considered. These are signs of economic and social inequalities that affect not only territorial cohesion, but also the environment. It is clear that current infrastructure does not favour system stakeholders coming together, a situation that contributes to the decrease in economic benefits for rural producers. At best, producers end up with 10 percent of the profit (De Paoli *et al*., 2016). This indicates that permanent food availability in markets does not necessarily mean that equitable and inclusive relationships are occurring in these departments, nor that a true focus on efficiency is

present in their agrifood systems.

It is important to point out that infrastructure must be understood as a series of objects that allow the population to access quality food and ensure healthy consumption. This is why we must think about infrastructure plans and initiatives not only from a production and supply perspective. Available infrastructure for food education in urban, peri-urban and rural spaces, such as community and family gardens, research centres, and food security observatories, among others, should be included. Additionally, structures that enable access for the most vulnerable population, such as food banks, should also be included.

Territorial and community associativity

Analyses carried out by FAO on the state of associativity in Colombia indicate that programmes aimed at building associativity are crucial, but still insufficient, to achieve a sustained integration of peasant organizations in the most dynamic sectors. Indeed, despite the country's efforts to promote actions to strengthen associativity, production channelled through producer organizations is lower than 5 percent, meaning that peasant production is still mostly dispersed (De Paoli *et al*., 2016). The number of small organized producers is also low. According to the latest National Agricultural Census, only 8 percent of them participate in an organization, and only 1 percent are members of a union.[97] The same trend occurs regarding cooperative schemes, where, of the 3 000 existing cooperatives in Colombia, only 7 percent are in the agricultural sector (CONFECOOP, 2019).

Additionally, a large part of the most robust policies for productive development prioritize their focus on pre-existing producer organizations, causing overlapping public supply.[98] Consequently, there is risk of increasing the gaps within the Family Farming sector, due to the disengagement of non-associated farmers from economic development strategies that include greater investments and productive incentives. Therefore, policies and programmes aimed at consolidating peasant organizations must expand their scope to include farmers who are currently not part of the community social capital.

Another limiting factor for associativity has to do with the digital divide. Access to electronic services reaches 55% in rural areas (Peña Gil *et al*., 2017), compared to 93% in urban areas. Internet connectivity in rural areas is approximately 16.2%, while in cities it reaches 63.1% (DANE, 2018). This restricts joint actions to promote associative access to markets or to purchases that promote economies of scale.

This suggests that one path to achieve the desired associativity and comprehensiveness is to conceive the territory as a unit of intervention, in order to promote the

[97] Data processed by FAO Colombia from the last National Agricultural Census of Colombia.

[98] An analysis by FAO Colombia carried out in 2016 determined that the vast majority of peasant organizations participated simultaneously in various government and international cooperation programmes. Most of these programmes have criteria for inclusion of beneficiaries requiring that organizations be already established, which, although is very important to strengthen them, is also necessary to promote associativity programmes and broaden the social base to include farmers who are not part of an organizational structure.

development of territorial environments with productive identity, where family farming lies in all its different manifestations (associations, cooperatives, and non-associated families with productive potential, among others), as well as other economic and social stakeholders who play active roles in the supply system (DANE, 2018). This implies that programmes should not only focus on peasant organizations to strengthen associativity, but should also promote horizontal platforms and networks that facilitate and motivate links between the different economic stakeholders in the territory, in order to generate a favourable framework that encourages territorial associativity.

8.4 KEY ELEMENTS TO IMPROVE TERRITORIAL FOOD SYSTEM EFFICIENCY AND RESILIENCE

This section presents reflections and elements that should be considered in public policies to promote food territories that are more resilient and capable of responding to the challenges looming in the post-pandemic scenario. Many of these recommendations are aimed at improving and scaling up actions that were being developed to transform food systems, particularly those seeking a better balance between climate change and food health. Others focus on the elements that should make up a new development agenda, and which, therefore, call for institutional innovations.

8.4.1 Seeking resilience and territorial cohesion in terms of food: The role of cooperation and co-management

One of the key pillars to strengthen territorial resilience is the **spatial organization of the food system** (Santos, 2000). Ensuring availability and access to diverse, low-cost, and healthy foods should be the guiding principle of this organization. Under this logic, stakeholder articulation and circuit configuration must function according to the food needs of the territory and its population, which may differ from the needs of other regions or communities. Cities, for instance, should analyze their immediate context and be clear about the resources available to draw up long-term development plans, integrating local food production into food spaces as a key factor for resilience and, in turn, recognizing the needs of the territories that support the city's food supply.

The pandemic has motivated **new organizational forms** in the territories, driven by genuine forces from social and economic stakeholders that managed to mitigate several of its effects on supply chains. These new organizational forms include collaborative networks of producers, articulation of retailers – where associativity is rare –, major efforts by family farmers to connect with end consumers and consumers seeking local products, and food distribution alternatives to ensure supply in sectors with low-income populations. Much of this process was the product of organizational solidarity (Santos, 2000) and a cooperative spirit. It is important to ask **how to make the most of the innate forces of stakeholders and territories so that food systems meet social and environmental targets?**

Among the organizational mechanisms that can be very effective for this purpose are **co-managed networks**. They seek to consolidate a platform founded on values of cooperation and reciprocity, where the community, farmers, and other food system stakeholders can discuss and establish priorities for the territory's food security and define an agenda of co-participation and co-management of different actions. These actions may include organizing local markets, managing associations, co-financing and promoting horizontal extension services, collective use of infrastructures, and other actions that respond to the food system's common objective (Rodríguez *et al*., 2019).

An important premise is that territorial cooperation mechanisms based on food links result from co-managed processes (Rodríguez *et al*., 2019). This requires an institutional and public policy architecture that stimulates participation and willingness the different stakeholders (civil society, companies, community, etc.) (Khan and Blankenburg, 2009). It also requires empowering and guiding them so that they play their role within the food system. However, in territories where governments have fewer capacities, we can assume that the dynamics can be spontaneously led by other agents that are able to organize themselves according to specific challenges, as was observed during the pandemic with the Seed Guardians Network.[99]

These mechanisms can also be essential to integrating **ecosystem services** in the food system, as a key component of the system's sustainability. This will only be possible if the relationships established between territories are symbiotic. In these regions it is common to find stakeholders with strong environmental leadership and organizational capabilities. These structures should be used to link the conservation agenda with food security challenges in the territory, thus consolidating an economy that values nature as an active subject, with its own rights inside a system of social relations.

One way to integrate these elements is to structure proximity markets and short marketing circuits.[100] These are key approaches to materialize the aforementioned organizational schemes and improve territorial food system efficiency. Short circuits or chains, far from being extinguished by the pressure and modernity of international markets, have become strengthened as means to transform food systems. In fact, when circuits are successful in expressing the interests of local stakeholders, they produce food that is healthier, more nutritious, and environmentally sustainable. They also facilitate quality assurance through control and social participation schemes (Azevedo Da Silva, 2009).

In this sense, a first process could consist in solidifying direct relationships between rural

[99] One of Colombia's most emblematic examples is the role played by the Seed Guardian and Custodian Network, who in the face of seed shortages due to the COVID-19 pandemic, managed to set up a spontaneous supply network to respond to the various seed requirements of family farmers, thus avoiding further impacts on productive systems and future food shortages.

[100] Read about short circuit and other market strategy experiences in Latin America in "Productive Chains and Short Circuits: Innovations in Production and Trade Schemes for Family Farming: Analysis of International and Latin American Experiences" (IDB *et al*., 2016). Available at: https://repositorio.cepal.org/bitstream/handle/11362/40688/1/S1600739_es.pdf.

and urban spaces, catalysed from a demand perspective, and organizing consumption micro-territories and cooperation networks between merchants and retail stores than can interact directly with producers, forming short commercial schemes that can serve as a "pretext" to assign special value to food relations between territories. The main paradigm shift involves moving from "short marketing circuits" to "functional food circuits" that, aside from better connecting producers and consumers, explicitly contribute to other aspects of food security in the territory, such as adjusting to seasonal products, reducing loss and waste, establishing fair prices, or reducing their water and carbon footprints.

Another process to strengthen urban-rural links consists in improving circular economy strategies. This is a way to reconsider territorial planning and development by redefining the concept of waste to make use of the by-products of economic activities (biomass, waste management, food loss and waste) as inputs to develop energy efficient circuits, such as those for soil nutrition, among others (Serra and Arandilla, 2015). Additionally, circular economy generates virtuous cycles that allow us to transcend from a reduced view of food to a production-consumption relationship, by valuing connections between food and biodiversity, or between food and landscape. In this regard, FAO has been decisive in announcing that, in less than a century, almost 75 percent of the main horticultural varieties have been significantly reduced, and that three-quarters of the world's diets depend on only twelve plant species and five animal species (Slow Food, 2012).

The equation is simple: the less diversity, the less possibility of adaptation and mitigation in the face of climate change. Conservation of biodiversity in itself ensures the sustainability of agricultural landscapes, is an indicator of a territory's health, and a space for cultural and tourist appreciation. In Latin America, although the concept of circular economy is on many governments' agendas, the need to define short and medium-term improvement objectives, targets, and scenarios to induce the necessary institutional changes is unavoidable. For reference, in an economy such as the United Kingdom of Great Britain and Northern Ireland's, it is estimated that 81 percent of economic circuits are based on a linear economy,

compared to the remaining 19 percent operating under circular economy schemes (Hill, 2012).

8.4.2 A New approach to the food supply chain

The pandemic forces us to reconceptualize **food supply chains**. This new scenario suggests the need to leave behind productive relocation, in order to strengthen local food production schemes that combine territorial efficiency and resilience. This not only seeks to improve production systems, but also distribution (FAO and ECLAC, 2020a), which directly affects consumption habits (Food Ethics Council, 2008).

Currently, International market acceleration has led to the specialization of logistics chains, operators, and platforms, with sophisticated levels of technology. However, progress has not been equally paced for fresh and semi-processed food supply chains going into the cities. Particularly, perishable products in the basic food basket (fruits, vegetables, meats, etc.) continue to be mobilized through very precarious and inefficient systems, which generate severe externalities: pollution, traffic congestion due to massive transport vehicles in large cities, huge amounts of food waste and other residues, and quality and safety issues.

On the other hand, in countries where commercialization of local and fresh food has grown notably, the main issue faced by producers has to do with organizing distribution processes that meet market and consumer expectations (Palacios-Argüello *et al*., 2017). Particularly, more innovation is needed in **last mile logistics**. Small-scale food distribution within cities is carried out through multiple transports because retailers, hotels, restaurants, etc., are highly atomized. Additionally, it is common for shopkeepers or vendors to go, by themselves, to large supply centres located in peri-urban areas, to obtain supplies. They use non-specialized vehicles, food is poorly managed, and poorly handled. As a result, there is high food deterioration and waste.

This issue has motivated the development of certain innovations.[101] One of them is the rise of the Food Hub concept, which has become a logistics mechanism that facilitates operations for local food supply chains, relying on sustainable transport.[102] The concept is based on collaboration and reciprocity, generating positive changes in communities and local food systems.[103] In the United States of America, interest in Food hubs arose from the need to work comprehensively on food safety and public health, thus creating environments that improve what people eat using local food suppliers. Currently, there are at least 170 Food Hubs operating in 65 percent of states in the United States of America. Operationally, there are no standardized Food hub models, they are configured according to specific commercial or logistical needs, and function under different

[101] Dansby *et al*. (2012) analyze three food distribution infrastructure innovation schemes: Nodes (food-related companies), Food Hubs (central aggregation facilities that link between multiple nodes) and Food Innovation Districts (FID). Additional recommended case studies include two commercialization schemes in France: the Associations for the Maintenance of Peasant Agriculture (AMAP), and the "The Beehive that says yes!" (La Rûche qui dit Oui!, LRQDO) model in IBD *et al*. (2016).

[102] Palacios-Argüello *et al*. (2017) referencing Stott *et al*. (2014).

[103] Palacios-Argüello *et al*. (2017) referencing Matson and Thayer (2013).

management modalities and legal structures (public, private, mixed, etc.) (Palacios-Argüello *et al*., 2017).

Similarly, logistical deficiencies also occur in the vicinity of production areas, that is, in the **first mile**. The lack of comprehensive distribution centres in rural areas severely affects the way in which products reach urban centres, many times without completing a vehicle load,[104] and with vehicles in precarious conditions at that. Investing in infrastructure to improve connectivity and reduce agglomeration of services in rural areas is key. This includes developing **territorial logistics clusters or corridors**[105] to improve neighbourhood logistics efficiencies (Orjuela, 2020), which in turn includes investing in storage capabilities and cold-chain, transportation, and technical service networks that link rural farmers and residents with value chains in the territories. As in the other processes we have described previously, these schemes must be fostered by encouraging stakeholder cooperation and coordination to share information, plan collaboratively, and optimize processes jointly.

8.4.3 Information systems and technological innovation: Accelerators for transforming food systems

Accelerated technological innovation could be the defining factor in transforming rural development and food systems (Trigo and Elverdin, 2019). In this broad spectrum of technological innovation we can mention microelectronics, Big Data, artificial intelligence, remote sensing and distributed ledger technologies, drones, and digitization, among others.[106] And although development of these technologies is still very heterogeneous, they will certainly redefine the limits of production systems, production chains and territorial restructuring (Rodríguez *et al*., 2019).

The fortuitous scenario generated by the pandemic motivated an unprecedented process of technological adoption, enabling a significant number of family farmers and new consumers to learn about, become interested in, and adopt technological tools. All seems to indicate that digitization of agriculture and food systems will increase in the post-pandemic world. Under this scenario, the role of governments will be crucial to ensure participation of the most lagging sectors. If the means to access new technologies

[104] According to the National Logistics Survey of Colombia (2018), vehicles that transport food occupy between 50 and 70 percent of available space.

[105] For more information, review the Supply Plan for Colombia's Central Region, where Regional Logistics Corridors are defined as part of the territorial approach. They aim to comprehensively articulate origins and destinations in physical and functional aspects such as transport infrastructure, information and communication flows, and commercial and trade facilitation practices. Furthermore, the plan includes key aspects of the supply system's Logistics Information Ecosystem, such as Green Logistics and Logistic Knowledge Management 4.0.

[106] Aside from those mentioned in this chapter, there are technologies that fall under the category of "precision agriculture", among them satellite imagery, remote sensing, the Internet of Things, drones, artificial intelligence, the cloud, digital networks, Global Positioning System and functional performance control; also, robotics and its associated technologies, which include agricultural robots, automatic steering equipment, variable rate technology and on-board computers; distributed ledger technologies, which mainly refer to the blockchain; FinTech, which refers to the use of digital technologies in the rural financial sector, and virtual reality, which is being increasingly used in agricultural training and extension (FAO, 2019b).

from before the pandemic remain unchanged, new territorial inequalities shall ensue.

Next, we will look at two promising technological tools for the future: robust food supply system information and technological commercialization platforms.

Food supply system information

Ideally, information related to a country, city, or territory's food supply system should be granted public good status and be at the disposal of all stakeholders in the food chain. This would give shape to production, logistics, and commercial optimization scenarios, drive forth stakeholder coordination and collaboration schemes to reduce risks, avoid food loss and waste, create strategic reserves, and prevent eventual shortages.

One of the main issues faced by governments in the context of COVID-19 was the lack of timely and real-time information on the territorial functioning of the food supply (product availability, food flow behaviour, alternative commercialization channels, loss of perishables, prices in rural areas, and biosafety conditions, among others). This made it difficult to develop spontaneous agendas with chain stakeholders. A clear consequence of this limitation was the difficulty in locating and providing responses to the most vulnerable sectors, such as small producers in dispersed rural areas, food transporters on secondary and tertiary roads in rural areas, or traders in informal markets.

It should be noted that the issue is not necessarily one of insufficient information, but rather that it is fragmented, or that there are database interoperability issues between rural sector institutions, thus making it difficult to strategically combine data for decision-making. There are also regulatory restrictions that limit data transfer between different entities. This lack of information is evidenced by: the non-existence of a unified database on rural producers, their organizations, and their production systems; the little (or fragmented) knowledge about supply operations in intermediate cities and remote rural areas, given that available information is sent to the large supply centres; the impossibility reaching the informal food sector (street vendors, grocers, neighbourhood stores) quickly and efficiently, and the difficulties in organizing an agenda with the food transport and distribution sector, which is a key link to ensure food availability (logistical issues were among the most common issues reported by producers in rural areas).[107]

Therefore, information systems and supply digitization are key elements to improve performance on food and environmental system indicators, to resolve obstacles towards a more adequate and transparent operation of markets and prices, and to generate technological and social innovation dynamics that improve supply system operation. Processes where progress is needed include: improving georeferencing between production and consumption areas, with real-time supply and demand data to allows stakeholders to make more efficient decisions; developing databases on informal food trade

[107] Information newsletter "The Food Supply under COVID-19 – Colombia" (Government of Colombia and FAO, 2020), developed from 1833 records from food producers and traders in rural areas.

(street vendors, grocers, etc.), which have no type of protection against shocks in the food system; designing technological applications to anticipate and alert eventual loss and waste, as well as contingency plans for when these situations are about to occur, connected in real time with public soup kitchens, agroindustries, food banks or, failing that, composting centres; expanding price survey mechanisms, especially on territorial markets, and monitoring from origin to destination, to provide greater transparency and avoid speculation.

E-commerce platforms: A new concept of short circuit

Paradoxically, the limitations regarding information systems described above occurred simultaneously with an increase in technological innovation processes during the pandemic. To some extent, the emergence and scaling of various tools prevented the collapse of the food system. These include e-commerce platforms, virtualized extension services, and applications and social networks that connect stakeholders, among others.

During the pandemic, business-to-consumer (B2C) and business-to-business (B2B) e-commerce platforms were crucial in leveraging access to perishable products such as fruits, vegetables, dairy, meat, fish, and processed foods. Particularly, B2C platforms grew and were used the most; in several countries, digital food purchases accounted for up to a third of the total (FAO and ECLAC, 2020a).

However, for food e-commerce to consolidate itself as a market alternative in all sectors, and especially family farming, its scaling-up must be accompanied by at least two processes. The first one – for when consumers are unable to physically access products to decide on their purchase – consists in providing a sanitary certification and other formal mechanisms to guarantee product quality. The second process is the implementation of an ambitious digital literacy programme: a more sophisticated agriculture demands new management skills and specialization, and for this it will be key to have trained human resources. This is an opportunity to design an innovation policy led by rural youth, turning them into agents of change to modernize the countryside. Their role should not only be oriented towards adopting technology to improve their productive systems, but also to act as providers of specialized technological services in rural areas.

This context creates a favourable framework for private sector alliances and incentives. According to FAO and ECLAC (2020d), the following emerging instruments could be worth promoting: smart supply and demand subsidies; support for incubators, accelerators, and technological innovation groups, and better access to innovative financial products (angel funds, venture capital, crowdfunding, etc.) for new micro, small, and medium-sized enterprises (MSMEs) and service providers.

8.4.4 Non-negotiable traceability

The post-pandemic scenario will toughen regulatory requirements related to food safety and biosecurity. Consumers will demand more information about where food originates and

how it is produced. This situation puts the need to implement rigorous traceability systems for products and processes on the agenda. Digital transformation and other technological tools offer governments the possibility to meet this challenge dynamically and to incorporate food chains that have traditionally been mobilized by informal economies, such as the fruit and vegetable economy.

This traceability agenda must be accompanied by a **formalization agenda**. As we have seen, among food processing actors in many Colombian territories, there is a significant gap with regards to health and commercial registration, informal work, and adequate infrastructure to ensure food safety. This aspect also generates informality and mistrust in economic relationships and transactions between stakeholders, and affects the possibilities of moving towards more transparent negotiation schemes, fairer prices for producers, and more stable commercial relationships, which is why it is crucial to implement an integrated policy to address these issues.

The opportunity also presents itself to promote traceability not only under coercive terms, but through incentives that can be used by producers to enhance their products, and by consumers to enhance processes. In other words, traceability systems should not only foster food safety, but can also be mechanisms to provide visibility and recognition to producers who are environmentally responsible, and who in turn value local production and territorial identity.

On the other hand, although traceability supported by standards and regulations is key, especially in distant or international markets, regulations are often restrictive for the more artisanal foods supplied by the territories (IDB *et al*., 2016). In this regard, another lesson derived from the pandemic is that strengthening the **commitment-trust nexus, based on mutual knowledge by stakeholders**, is equal to or more valued than assurances derived from regulatory compliance. It is crucial that governments promote spaces that favour building trust among the stakeholders in the chains. The more solid the territorial foundations are with regards to communities' sense of belonging and participation around food security, the greater will food resilience in the territories be. In this sense, it is important to improve strategies that are based on generating territorial trust, such as: Participatory Guarantee Systems (PGS);[108] agroecological networks, commitments and agreements;[109] Slow Food initiatives (Slow Food, 2012); collective brands and certifications;[110] zero kilometre food trends; anecdotal experiences of consumers in production areas, and promotion of food production systems and landscapes as tourist attractions.[111]

[108] See description of Participatory Guarantee Systems (PGS) at: http://www.ifoam.bio/en/value-chain/participatory-guarantee-systems-pgs.

[109] Agroecological commitments, in the form of periodic contracts that allow producers to make minimum plans regarding crop quantities and income, with assurances one year in advance, and perhaps even advanced payments as guarantees from consumers, is how the more advanced short circuits are managed. Source: LLobera Serra and Arandilla (2015).

[110] For more information, see IBD *et al*. (2016).

[111] According to Blanco and Riveros (2005), the organization of food routes is an excellent way to articulate agricultural and agroindustrial production with natural and cultural attractions under a territorial development approach, leading to a high degree of participation and benefit for local populations. This is made easier when there are attractive landscapes nearby, or at least when it can be easily complemented with other tourist offers within the same territory.

8.4.5 A common agenda with food system stakeholders

Food system transformation must begin by acknowledging that each type of stakeholder (public sector, private sector, civil society, community, etc.) plays a key role in the system's very sustainability, so it is necessary that these various stakeholders become involved in the change process in a conscious, active, and committed way. In fact, food industry involvement in public policy and food system regulation debates is recent, and some resistance is still there. Similarly, civil society, represented by social organizations, academia, and NGOs, has been working to acknowledge the value local food systems, but many of these efforts are diluted because they are individualized exercises, which fail to connect and consolidate more structural processes, and which are sometimes ignored by public policy.

A pragmatic step in this sense lies in developing a common agenda with food chain stakeholders, defining the roles and actions they could play to improve food system efficiency and sustainability in the territories, for instance:

- In the post-COVID-19 context, **businesses** whose activities impact the territories where they are located must begin to take collective actions that favour local communities and are linked with the development targets defined by the territory, contributing to their achievement. Many of them have received public aid to maintain their operations, but such aid must be subject to conditions and commitments that give rise to symbiotic public-private partnerships (Mazzucato, 2020). According to Porter and Kramer (2006), systemic crises, such as the one caused by the pandemic, present us with a favourable framework to rethink Corporate Social Responsibility (CSR) policies so that, aside from generating quality employment, businesses can be centres of innovation and benchmarks for all small and medium-sized companies within the territory, thus being able to take knowledge management actions. The **food industry**, due to its ability to influence consumption trends and patterns, can play a decisive role in creating conditions and contexts for healthy eating. For example, by assuming a greater commitment in the recovery and promotion of the nutritional attributes of food, as well as its natural flavours and aromas.

- In **wholesale markets**, which due to their nature of concentrating large volumes of food are decisive for improving food system efficiency, it is essential to implement food waste reduction and recycling. In this regard, some international markets[112] have incorporated food banks as foundational parts of the market, as well as innovative waste management schemes with circular economy logics for energy generation, creating not only energy self-sufficiency, but also supplying energy to other entities in the vicinity.

- **Commercial establishments** have a significant influence on consumer purchasing decisions. How to make the

[112] See the experience of the Rungis market in Paris (France): https://www.rungisinternational.com/en/ and Mercasa in Spain: https://www.mercasa.es.

most of merchants so that they become true promoters of healthy habits and responsible consumption? Studies carried out by FAO in Colombia[113] indicate that food merchants are not on the training agendas regarding food security. Hence, local governments should include them and train them on the nutritional properties of food, preservation methods, and the importance of diversity in consumption, so that they can make recommendations to consumers, especially vulnerable families where high fat and sugar diets prevail. also, it is necessary to promote a culture of association among stakeholders in the retail trade, for which we initially propose the creation of merchant associations and networks in urban neighbourhoods, among which are shops, legume stores, convenience stores, barns, and butchers. Among the main functions of this cooperative scheme are the organization of the food supply process, transforming it from a culture of individual work to one that favours joint purchases from production areas, and optimizing the distribution process.

- For their part, **consumers** must stop being simple recipients and assume a role based on responsible and supportive consumption, actively participating in the construction of territorial food systems. In this sense, the food education programmes that FAO has implemented regionally as part of school feeding programmes have shown, for example, the importance of involving family circles in these issues. This and other experiences have also revealed the need to work on a public perception agenda, especially regarding healthy eating and environmental sustainability.

- With regard to **transporters**, the logic based on appropriation of products by intermediaries – which gives rise to speculative practices and furthers inequity – should be changed to a logistics scheme where producers contract distribution services. Additionally, as we have pointed out, the conditions of the vehicles that transport food are alarmingly precarious. Food transportation cannot be treated as other logistics processes, so specific policies and incentives are required to engage and modernize this sector.

- **Cooperatives** must play a special role, given that they fully embody social responsibility. Cooperatives have strategies that put them above the competition, and are key for economic and social inclusion. Furthermore, they can provide effective tools to improve education, savings, and credit. In the future, cooperatives may be key players in consolidating food systems, spreading technological innovation, and mitigating the effects of climate change. A trend that needs to be strengthened is the shift from an agricultural associativity focused on specific products, to an associativity that represents a territory's goods and services, one that seeks especially greater synergy in food product commercialization and marketing processes.

[113] According to a study conducted by FAO on the supply system in Nariño (Rodríguez Fazzone, Ramírez-Gomez *et al*., 2018), the percentage of food merchants who have received training or technical assistance on food safety issues such as food conservation, handling, and healthy habits, is significantly low, accounting for less than 15 percent.

- Finally, and perhaps most importantly, is the need to launch an ambitious programme centred on capacities, resources, and time to strengthen **Rural Family Farming**. Here is the most resilient stakeholder in territorial food systems, because despite its precarious social, productive, and technological conditions, it has remained as the main supplier of fresh and diversified food for cities, accounting for up to 70 percent in some countries of the region (Soto Baquero *et al*., 2007 and Salcedo and Guzmán, 2014). In this regard, policies for this sector cannot be conceived to consider only specific elements of its production units, but also its functional logic – the basis of its resilience –, which is that of a diversified production system. Additionally, it is necessary to consider the multiplicity of functions and contributions that rural families perform beyond food production (Rodríguez Fazzone *et al*., 2020). Family agriculture's socio-productive systems have not only been a vehicle to offer healthy diets, but have made it possible to conserve ecosystems and be an effective mechanism against the onslaught of climate change. This multifunctionality makes Rural Family Farming and its environment the starting point from which territorial food systems must be configured.

8.5 FINAL CONSIDERATIONS

This chapter's key message is that food system efficiency, sustainability, and resilience are not the sole responsibility of governments. Without losing sight of the fact that access to food is conditioned by macroeconomic variables such as exchange rates, interest rates, and inflation, we need to build more evidence on the inefficiencies of food systems, and actively involve the various stakeholders, especially in the private sector, in the solutions. It is crucial to define a baseline and monitor indicators on how companies affect healthy eating, and foster agreements to mitigate environmental and dietary impacts. In this exercise is where the territories' intrinsic strengths must be exploited and empowered, catalysed into co-managed networks and platforms that generally have work schemes motivated by cooperation and reciprocity. These elements, without a doubt, must be an integral part of food system governance and operation in a territory.

From a public policy standpoint, it is important to underline that cities and departments in Colombia, which for more than a decade have worked on a holistic vision of food security, are now more resilient against potential health and food crises. Actions promoted to improve urban-rural integration and nutrition education, as well as to promote local markets connected with short trade circuits, are noteworthy. It is also key to have information on territorial food flows and on the levels of food dependence from other markets, in order to design more efficient supply schemes with food chain stakeholders.

Nevertheless, it should be noted that there is still no public policy or legal framework that directly relates to territorial planning of agrifood systems. This can be explained, in part, because the concept itself is recent. In order to move forward in this regard, and by way of conclusion, the following recommendations, developed throughout the chapter, are made: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- To strengthen territorial food supply information systems, combining intersectoral databases on production, markets, natural resources, and climate change projections. In turn, it is necessary to design an incentive and reciprocity strategy to turn private food chain stakeholders into active subjects to feed the supply information system in real-time. Placing special emphasis on generating information from intermediate cities and their interaction with nearby rural areas is recommended to improve the links between production and consumption areas, with territorial logistics corridors that could be optimized by using digital platforms.

- To position the agrifood system concept and approach, it is necessary to improve horizontal articulation schemes between government actors who are generally distant, as is the case of the Planning and Social Development Departments. A bridge must be constructed between the social and the strategic (which normally implies the economic), to impact the relationship between agrifood system stakeholders. The most practical frameworks for this are Territorial Planning regulations and the social approach enshrined in the Territorial Development Plans. Planning agrifood systems implies defining special areas and places to achieve food security, articulated by economic and social actions. On the one hand, value chains in productive systems must be integrated and, on the other, social actions such as food pedagogy, feeding vulnerable and school populations, urban and rural gardens, and food banks, among others, should be carried out.

- Another key element in food territory integration and resilience is agrifood system infrastructure planning. Productive infrastructure and its spatial distribution condition the way in which a territory's food is distributed and consumed. In this process, the physical conception of places where food is stored, transformed, distributed, and commercialized must be expanded to conceive that infrastructure also enables social relations to build food citizenship, fostering the connection of food with culture, the environment, and urban-rural integration. Therefore, those infrastructures for food pedagogy in urban, peri-urban and rural spaces, which vindicate each of the activities that are part of the system (gastronomic culture, sustainable diets and environmental relations, green belts, community and family gardens, market plazas and peasant markets, among others), must be included in the planning process.

- Governments must give greater importance to territorial impact policies that have significant amounts of flexibility in their designs. First, so that they can move from a logic of population targeting and budget allocation per beneficiary, towards providing territorial resources and incentives that allow simultaneous work with the different stakeholders in the food chain. Second, programmes and projects must have explicit components to promote linkages between stakeholders and strengthen territorial associativity, for instance: encouraging the expansion of associative social bases and horizontal cooperative agreements, developing trademarks and marketing strategies that represent territories rather than products. In turn, this perspective is the right one to promote functional food circuits, circular economy, bioeconomy strategies, green businesses, and rural tourism strategies. On this issue, see the case of Colombia's Territory Renewal Agency (ART), which promotes development policies with a territorial approach in the 170 municipalities most affected by armed conflict.

- One of the structural issues that requires greater political will is the construction and implementation of a sustainable policy to formalize the food system, especially focused on: formalizing rural and retail employees to ensure decent work; designing financing instruments and specific subsidies to improve infrastructures related to food handling, processing, and preservation, a situation that is more critical in intermediate cities and in market places; drafting a policy to modernize food transports, and generating incentives, support, and training so that food processing SMEs can formalize themselves (regarding commercial and health records, as well as process and product certification, taking advantage of trends in solidary and responsible consumption.

- The catalyst to introduce all these agrifood system transformations is digitization and technological innovation. On the one hand, disruptions generated by the COVID-19 pandemic have led to a significant number of farmers, consumers, and other stakeholders – who were not normally familiar with technology platforms – quickly and efficiently adopting these technological

tools. This inertia must be exploited by governments to scale up technological innovation in the rural sector in an inclusive manner, with accompanying investments from the private sector, and engaging rural youth as agents of change and providers of technological services in the territories. Additionally, the digital transformation requires innovations in institutional frameworks, starting with a change in organizational culture aimed at rethinking business models, involving new professional profiles to create or adapt strategic planning, conducting data management and analysis, process digitization, and creating value based on reciprocity with the food system stakeholders. ■

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9
DIGITIZATION OF THE FOOD SYSTEM IN LATIN AMERICA AND THE CARIBBEAN: STATE OF THE ART, TRENDS AND CHALLENGES

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9.1 BACKGROUND

9.1.1 COVID-19 and the digitization of society: A cultural shift

One of the tangible effects of the health crisis is associated with the digitization of society: progress that was expected to take years to materialize, has occurred in a few months. Digital technologies have been key in maintaining functional economies and societies during the emergency, impacting the areas of health, education, commerce, and work. A recent report by ECLAC on the impact of COVID-19 in Latin American and the Caribbean (LAC) indicates that, between the first and second quarters of 2020, the use of teleworking solutions increased by 324 percent, electronic commerce by 157 percent, and online education by more than 60 percent (ECLAC, 2020e).

We can say that we are facing a true cultural shift, as this trend affects all areas and all social sectors. However, the adoption of technological solutions is conditioned by structural factors: a widely varied production structure, a labour market strongly characterized by informality and precariousness, a vulnerable middle class, a weakened welfare state, deficient digital infrastructure, and many socioeconomic restrictions regarding access and connectivity. Countries of the region have adopted measures to promote these technological solutions and ensure continuity of telecommunications services. Nevertheless, the scope of these actions has been limited by gaps in the access and use of these technologies, as well as in connection speeds.

Despite this, many simultaneous transformations have been observed. These include all the links that make up the food system, from food production, land use, and greenhouse gas (GHG) emissions, through food distribution and consumption, gastronomy, and dietary improvement, to waste management (see figure 1.1, p.26-27).

These changes – affecting the whole of society – are heterogeneous and incomplete, and develop rapidly. There are many things happening simultaneously in the region, but there is no overarching vision that allows us to make a global assessment of what is happening at the scale of the entire food system. In this chapter, we identify these processes of change and assess their scope in the region, with special emphasis on public policies. Finally, we propose several ideas to promote a digitization process that helps accelerate the transition towards a more inclusive and sustainable food system.

9.1.2 Digitization in urban and rural areas: Access issues

Despite progress made in recent years, more than half the households in the region still cannot access the Internet. This occurs more markedly in rural territories and among the lowest income quintiles (figures 9.1 and 9.2). Thus, the digital divide between lagging rural territories and the most advanced urban sectors is still very significant.

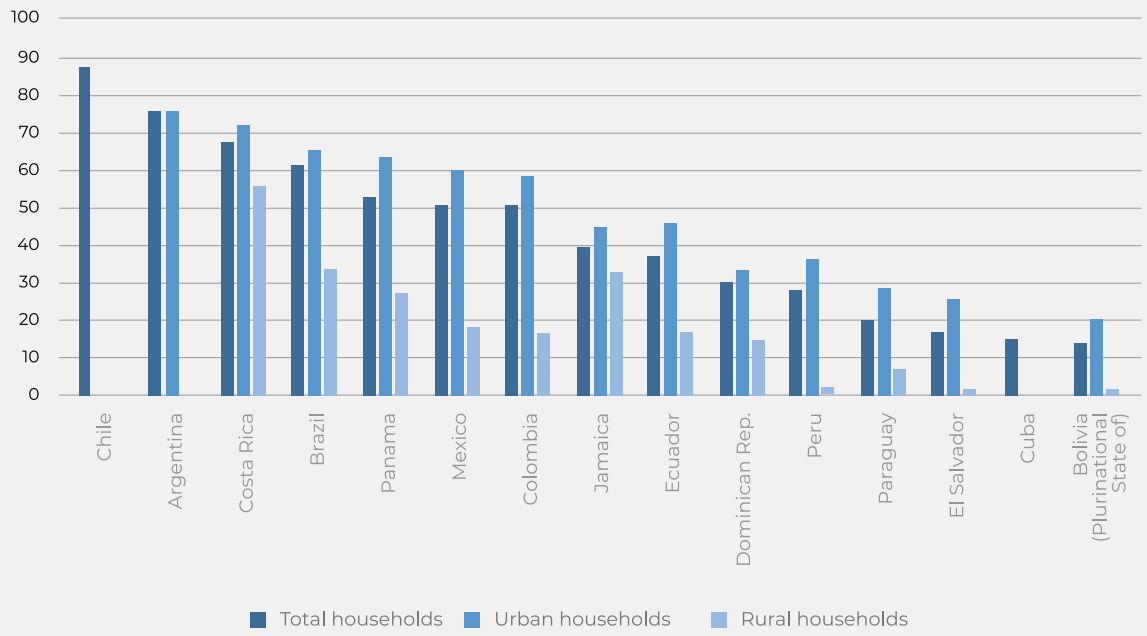
It is estimated that 66.7 percent of the region's inhabitants had an Internet connection in 2019 (ECLAC, 2020e). The remaining third had limited or no access to digital technologies due to demand gaps originating from their economic and social condition, particularly income level, age, and location. This gap is widened when it comes to rural areas: regionally, in 2019 only 23 percent of the rural population was connected to the Internet, a figure that is much lower in countries such as Bolivia (Plurinational State of), El Salvador, Paraguay, and Peru, where only 10 percent of rural households has a working Internet connection. Even in better-off countries, such as Chile, Costa Rica, and Uruguay, only about half of rural households have connections (ECLAC, 2020e). Likewise, there are many territories in the region that do not have cellular network coverage – the so-called "white zones" – where population dispersion does not make telephone company operations profitable.

In terms of age groups, the very young and the elderly tend to have the least connectivity: 42 percent of those under 25, and 54 percent of people over 66, do not have an Internet connection. The groups with least connectivity are children aged 5 to 12 and adults over 65, while the most connected are age groups 21 to 25 and 26 to 65 (ECLAC, 2020e). There are other demand gaps as well, such as rural women or rural schools, which have been assessed in specialized studies (IICA *et al*., 2020; Rotondi *et al*., 2020).

The issue of access is decisive, as made clear in various national studies carried out in recent years (Buainain *et al*., 2020; Berterreche *et al*., 2017; Cruz, 2020; FAO and IDB, 2019; Fernández *et al*., 2018; Martínez, 2019; MINTIC, 2019). These limitations on access to digital technologies in rural areas, and especially in

Figure 9.1

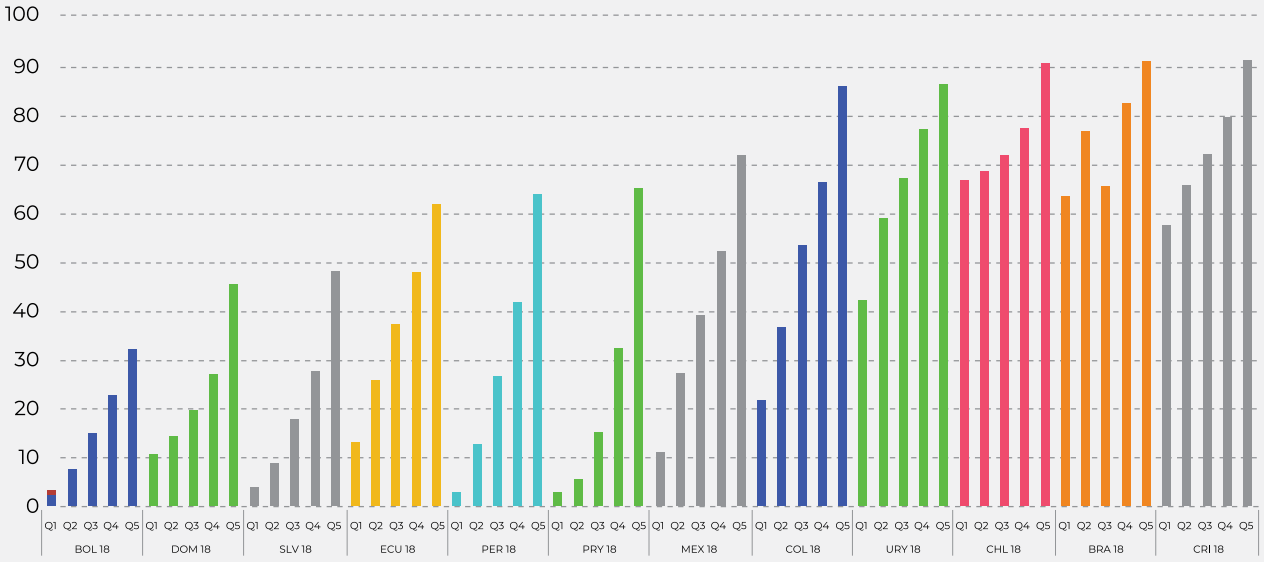
Households with Internet Access, countries in Latin American and the Caribbean, 2017 and 2018
(percentage)



Source: Prepared by the author based on data from the World Telecommunication/ICT Indicators database.

Figure 9.2

Households with Internet Access by Income Quintile, countries in Latin American and the Caribbean, 2018 and 2017
(percentage)



Source: Prepared by the author based on data from ECLAC's Household Survey Data Bank (BADEHOG).

agricultural operations, are directly linked to the telecommunications infrastructure deficit in the region. Although there are currently several ongoing global and regional initiatives to fill supply gaps, especially regarding infrastructure for mobile networks, it is not clear if and when these investments in infrastructure will be reflected in more and better access to digital technologies for Latin American farmers, particularly in lagging areas mostly linked to family farming. Several projects are currently competing to install a satellite network that covers all territories in the world: among these, Amazon's Kuiper project, the PointView Tech project, powered by Facebook, and SpaceX's Starlink project. These projects have set 2022 as their deadline to begin operations, and it is expected that they will deliver connectivity (end solutions) to some of the most remote locations on the planet. These benefits will entail a certain degree of progress, but the limitations imposed by broadband and by mobile devices themselves will only make it possible to deliver minimal service, which will likely expand over the coming years.

Additionally, to transmit large amounts of data (aggregated information), nine submarine cables were built in the region between 2016 and 2018 (another 6 were planned for 2019 and 2020), along with 18 Internet traffic exchange points (IXP) built between 2015 and 2017 (ECLAC, 2108). Additionally, several countries have consolidated their 4G systems thanks to spectrum allocation and investment programmes, with 67 percent regional coverage expected by 2025 (GSMA, 2019). This will pave the way for the arrival of 5G technology, scheduled for 2020 in Brazil, Mexico, and Uruguay, which will drastically increase mobile connection speeds, among other things. Nevertheless, this process is expected to be slow, with 4G and 5G coexisting for a long time, with 5G coverage reaching just 7 percent by 2025 (GSMA, 2019).

These trends generate some optimism about the arrival of the internet in rural areas, which would open up new possibilities for the digitization of different segments in the agrifood system, from food production to distribution, commercialization, and consumption. However, the final impact of this process will depend on reducing several gaps, which could delay the effective connection and use of new technologies, such as equipment and connection costs, aside from the gaps related to the digital skills of agricultural producers and other rural inhabitants in the region.

9.2 DIGITIZATION AND TRANSFORMATION OF THE REGIONAL FOOD SYSTEM

At the farm level, digital technologies help solve market failures and facilitate the insertion of producers in value chains, reducing transaction costs, improving access to information, and generating new links with agro-industries, market agents, and consumers (FAO, 2020e). This chapter's main argument is that, in order to accelerate innovation and the transformation of the food system, an active agenda of digital policies applied to agriculture and the rural world is necessary in each country, as well as regionally. This means improving productivity among companies, as well as moving towards more sustainable and inclusive production

models. This shift also implies adopting consumption patterns that protect the health of the region's population, minimizing negative environmental externalities, and managing the waste generated by these chains.

Productively, the application of digital tools in agriculture creates opportunities to improve production processes and promote an agroecological transition, much needed in the face of the current emergency and future systemic crises. The development of disruptive generic technologies has paved the way for a wave of innovations in agriculture that are transforming production processes, as well as production and consumption networks. This is a paradigm shift that seeks to combine productivity, transparency, efficiency, and sustainability, bringing production closer to distribution, the farmer to the consumer. To achieve this, digital agriculture has differed from the modern agriculture of recent decades, since it connects agrifood system stakeholders into networks, and makes it possible to exchange information from such networks, generating value and benefiting the system as a whole.

The same is true for other food system components, especially at the consumer level. Digitization of agriculture enables consumers to have greater influence in defining the goods and services to be generated by regional agriculture. The current health crisis affects household incomes, and price levels become a more relevant concern for broad sectors of the population (FAO and ECLAC, 2020d). Nevertheless, the crisis also reinforces many trends observed before the pandemic, including urbanization processes and shifts in consumption patterns caused by people having less time to buy and cook food, the evolution from a product-centred view towards one centred on products-services (outsourcing), or the emergence of new distinctions used by consumers to rate products, people, and processes: biosafety and traceability, first, but also other attributes directly linked to family farming, such as such as Fair Trade, agroecology, indigenous peoples, or locally grown certifications. This increase in consumer awareness implies valuing the attributes of food goods and services that help us face the current health crisis and that, additionally, help avoid future systemic crises. This favours the development of new products and services, new commercialization channels, and new social behaviours regarding food. Digitization profoundly modifies the relationship between production companies and their customers (distributors, restaurants, and consumers). The possibility of gathering information on social networks is a rich and new way to establish a more personalized link with consumers. This will accelerate the transition from production of large undifferentiated quantities to a more segmented and personalized type of production.

Connectivity and the ability to collect, use, and exchange data remotely is the basis of this food system transformation, which includes a wide variety of digital technologies, such as the Internet of Things (IoT), Big Data, and artificial intelligence, as well as practices based on cooperation, mobility, and open innovation. This digitization process is based on three closely linked aspects: (i) collection and treatment of large amounts of data that make it possible to optimize and rationalize decisions and resource use, as well as to

make predictive analyses to anticipate future scenarios; (ii) exchanges between peers, which break with farmers' traditional isolation and makes it possible to develop new models of governance and collaborative coordination, where many stakeholders can interact, and (iii) the advantages seen by consumers who, thanks to internet purchases, are able to select products better suited to their new preferences and values. According to OECD classifications, digital technologies with possible applications in agriculture include: the operation of digital platforms, sensors, IoT, robots, drones, Big Data, Cloud Computing, artificial intelligence, and blockchains (OECD, 2018). All of them can make significant contributions to increase productivity and coordination between economic stakeholders, while at the same time reduce pressure on the environment.

From the improvement of industrial processes to the predictive maintenance of equipment, many new practices aim to gain resource use efficiency, while having positive impacts on sustainable development. There are many areas where digital agriculture can generate benefits for producers and society: (i) it makes the use of inputs more efficient; (ii) favours innovation and improved productivity; (iii) it facilitates cooperation between farmers, as well as between farmers and other stakeholders in the Innovation System; (iv) it allows for direct connection between the two ends of the chains (producers and consumers), and (v) improves market transparency.

Another area of innovation has to do with private projects that are implemented collaboratively. There are non-profit projects that allow the sharing of photos, ingredients, nutritional information, additives, and other food product features. This information is useful to encourage industrial producers to make changes based on consumer preferences (open innovation). The same function is fulfilled by culinary blogs, especially those implemented by younger generations (digital natives), who tend to be educated about refined and natural products, homecooked products, product origins, and animal welfare. Thus, social and collaborative modes of consumption are generated.

9.2.1 Ecosystems

Environmental monitoring

Digital tools have been used in environmental monitoring for a long time. It yields enormous benefits in terms of cost, quality, precision, and effectiveness. All the countries in the region have Geographic Information Systems that integrate different spatial information. Currently, drones are used to monitor deforestation, and sensors can be used to track products in supply chains, allowing waste volume and final disposal location to be known. There are many projects that apply Internet of Things and Business Intelligence technologies for environmental monitoring and designing public policies for land use planning, sustainable production, and environmental conservation.

Proper water resource management, at the watershed and micro-watershed scale, is a key factor for sustainability. The possibilities of systemically managing this resource have been favoured for many years with the early arrival

of information digitization. From a conceptual standpoint, the aim is to optimize resources, while making their use compatible between different economic sectors (human consumption, agriculture, mining, industry, etc.) and different levels and types of organizations.

When considering water, there is a health network (drinking water) and another network for agricultural and industrial use. A metric is necessary to manage both networks: meteorological, fluviometric, level measurement, and water quality monitoring stations. These instruments are installed as infrastructure is improves – reservoirs, canals, intakes, gates, drilling works, etc. –, for which there are several public investment programmes. Sensors are thus multiplied, the watershed becomes increasingly smart, and water resource use can be optimized. In this, it is crucial to have participatory governance schemes, together with improvement of the watershed's internal management capacities: irrigation communities, vigilance boards, canal associations, local communities, companies, municipalities, and all the associated complex public institutions that regulate the use of these resources. This is what is known as Integrated Water Resource Management (IWRM), an approach that enables information to be delivered to all stakeholders in the initial stages of the process, so that they can make consensual decisions and agreements to avoid conflicts as use intensifies. Examples of this approach include the Cuenca Inteligente 68 programme, implemented in the Santa Lucía river basin in Uruguay (Míguez, 2015), or the one used in the Choapa river basin in Chile (DGA-MOP, 2015).

Biodiversity management

Biodiversity conservation policies and programmes require spatial analyses, since it is by definition associated with geographic territories. The task must integrate multiple layers of information, which is scattered, fragmented, and often invisible, given that there are considerable knowledge gaps around biodiversity. Gathering, systematizing, assessing, and integrating this data is complex and expensive, as it requires a strong infrastructure and capacity development.

The IoT exponentially increases data availability and involves citizens in resource or city management solutions, allowing us to face situations regarding difficult access and management. There are many areas where this technology is having a considerable impact, such as deforestation control – especially in places where illegal logging is high and very difficult to monitor –, or in early warning systems for managing pests, floods, storms, and other climatic phenomena. Territorial management projects,[114] carbon emission maps in the Amazon,[115] or citizen science projects[116] are also made easier with these technologies.

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[114] See the Smart Land strategy developed by Ecuador's Private Technical University of Loja (UTPL), at: https://smartland.utpl.edu.ec/

[115] See the TED Talk "Ecology from the air", by Greg Asner: https://www.ted.com/talks/greg_asner_ecology_from_the_air

[116] See Mexico's Avian knowledge Network, AVESMX (http://avesmx.conabio.gob.mx/) and the iNaturalist portal (https://www.inaturalist.org/).

9.2.2 Primary agriculture

Large and medium-sized farms: Experiences in Argentina and Brazil

The introduction of cell phones in rural areas, cloud computing, remote sensing, and the use of satellite or aerial images are enabling production control and decision-making from places far away from the actual farms, expanding production possibilities into new and remote areas, and improving efficiency regarding the use of inputs. For instance, it is estimated that sensors in irrigation systems could reduce the amount of water used in agriculture by 50 percent, and that lighter and more automated machinery, controlled remotely, could reduce soil compaction, a critical issue in agriculture. These sensors and machines, applied along with other agronomic research methods, make it possible to collect data to implement precision agriculture, that is, establishing productive zones within farms to apply different combinations of technology. It is estimated that precision agriculture can reduce agrochemical use by up to 60 percent in some regions/crops (Goldman Sachs, 2016). Additionally, digitization also facilitates administrative tasks, such as accounting, stock management, use of machinery, human resource management, or relationships with suppliers and buyers. In the case of agro-industrial companies, there are specific applications to monitor and analyze the ongoing operation of various production lines in real time, allowing us to anticipate situations and better allocate resources.

These technological modernization processes are closely linked to each country's agroecological and social realities, since the application of new technologies depends on local conditions. In the case of countries with large economies of scale, such as those of the Southern Cone, integrating producers into national and international markets, as well as strong and well-established agricultural input and service industries, act as the drivers of the new technological cycles. On the other hand, in countries where smaller production scales predominate, as in fruit growing operations in Chile or Peru, these advances are still incomplete.

Equipment sales figures collected by the Argentine Federation of Agricultural Machinery Contractors reveal rapid progress regarding the use of machinery with Global Positioning Systems (GPS). These data indicate that, in 2018, the extensive crop harvest was carried out using 11 240 yield monitors, which practically covered 100 percent of occupied land (34 million ha) (Méndez and Vélez, 2018).

To promote digitization, Argentina applies a supply approach that covers the entire economy and considers a specific strategy for the sector, promoted by the Ministry of Agriculture, called AgTech. The State plays an active role in it, promoting science, technology, and innovation policies, both overall and for the new digital technologies sector, as well as mechanisms to promote and support entrepreneurship, including business incubators and start-ups (Fernández *et al*., 2018). These policies take into account the National Science, Technology and Innovation Plan "Innovative Argentina 2020" (2012-20), Law 25 922 of 2004 for the Promotion of the Software Industry, the Industrial Strategic Plan 2020, and the National Telecommunications

Plan "Argentina Connected", among other initiatives. January 2020 saw the regulation of the knowledge economy promotion law, by which AgTech companies can receive tax benefits (Infocampo, 2020). Additionally, the private sector also plays an active role, taking advantage of economies of scale, the integration of producers into national and international markets, and the existence of a strong and well-established agricultural input and service industries that induces these new cycles (embedded technology).

In Brazil's case, according to a recent survey of 750 farmers in the main production regions and chains (McKinsey, 2020), the first ones to adopt precision agriculture in Brazil are large-scale farmers and/or the youngest farmers. Fifty three percent of the farmers surveyed use or intend to use at least one type of precision agriculture technology, and 47 percent already do, while 33 percent use two or more. For farmers in the cotton and grain chains in the MATOPIBA area (in the Centre-North part of the country), use is even more widespread, with an adoption rate of 75 percent. Younger producers are the main users of VRA (variable rate application) technology. VRA and drones for diagnostics are the main applications used today. Nevertheless, the survey concludes that technological fluency is still limited due to a lack of understanding of all the capabilities that these new technologies have and a lack of trained salespeople. Traditional Brazilian farmers are more conservative regarding new technologies, tending to be late adopters: while 26 percent of farmers in the cotton and grain chains in the Cerrado and MATOPIBA zones are willing to try new technologies without proven track records, only 6 percent of the producers in the coffee, legumes and vegetables, sugar cane, and grains chains in the southern zone would do the same.

According to the same survey, Brazilian farmers are connected digitally and through WhatsApp. Eighty five percent of them use WhatsApp on a daily basis for agricultural purposes, and seventy one percent use other digital channels daily for issues related to their farms, as well as to search for information; the new frontiers (MATOPIBA) lead this trend with a ninety seven percent usage rate. In turn, thirty six percent of surveyed farmers shop online for their farm inputs, but this is generally limited to the most inexpensive inputs. For example, producers are open to buying machine parts online, but not the machine itself. For large investments, such as machinery, farmers are increasingly negotiating with sellers via WhatsApp, but deals are still mostly closed in person. Digital infrastructure, digital security and user experience (UX) are the main obstacles to greater adoption of new technologies. Only twenty three percent of farmers have full Internet access throughout their entire farm operation, and this number is even lower in the most remote areas. Lastly, forty percent of them would increase their transactions through digital channels if online platforms were perceived as more secure.

Family farming: Large gaps across the region

Overall, this progress has not included the world of family farming. In Argentina, for instance, 10% of the establishments own 78% of the land, while, at the other end, 46% of producers share just 1.3% of the total agricultural area, in plots of less of 50 ha (INDEC, 2002). To a large extent, most

Box 9.1

Digitization in a Rural Area of Medium Development in Nicaragua

- **Internet access**: Forty five percent have access (as indicated by 30 out of 67 farmers surveyed); 48% use social media; 67% prefer to communicate in the afternoon, and 96% would be willing to train through Social Networks.
- **Cell phones**: Seven percent of 274 farmers surveyed had a cell phone; 38% had a smartphone; among women, 29% had a cell phone and only 10% had a smartphone.
- **Main limiting aspects**: Poor network signal in most communities / Lack of power in some communities / Outdated apps or app versions / Difficulty for older producers to use the apps / Lack of telephones (especially smart phones).

Source: Prepared by the author with data from the Blue Harvest Plus Project - CRS Nicaragua, 2020.

small agricultural holdings are found within the regional economies of the country's northeast and northwest, producing mainly fruits and vegetables, cotton, tobacco, and other industrial crops. The National Institute of Agricultural Technology (INTA) has implemented several projects, but these are not nearly enough to breach a technological gap that is very complex. Doing so will require investments and capabilities that this sector is currently not capable of providing.

This reality is evident in all countries of the region, where family farms represent between 80 and 90 percent of all farms, and digitization is in its early stages. For context, Nicaragua's 2011 national agricultural census reported 226 thousand family farms, 87% of the total number of farms. Of this number, only 13.5% of family farm was receiving technical assistance; 14.5% had access to training; 14% had access to credit, and 75% had no education or only primary education (Rodríguez *et al*., 2013). There is little field data to gauge the magnitude of the digital gap. Data collected from a project in an area of medium potential in Nicaragua reveals that only 45% of producers have internet access, and only 38% have a smartphone (added to the 7% who only have a cell phone). This information points to a wide gap, but it also reveals that there is a minimal baseline to digitize the territory. At the same time, interest among producers in joining the network is noteworthy (96% manifested interest in training through social networks) (box 9.1).

Agricultural employment and automation

Over the past century, agriculture in most parts of the world went from being labour-intensive

to partially mechanized and energy-intensive, and in the last 15 years the sector has begun to digitize. Both processes have driven the continuous departure – in some cases massive – of labour from agriculture to other sectors, mainly of workers in standardized tasks within the production process. More recently, and still on the very early stages in developing countries, robots and artificial intelligence are being used (at economically feasible costs) to perform non-standardized tasks that were hitherto solely carried out by human workers (Marinoudi *et al*., 2019). The introduction of this new robotic technology and of artificial intelligence in agriculture could generate radical shifts in labour productivity, helping to mitigate shortages in labour markets, especially regarding seasonal work.

The strong uncertainty generated by the COVID-19 pandemic has begun to accelerate this process. Several countries in the Northern Hemisphere faced logistical complications for temporary workers to work in the 2020 summer crops. In the end, crops in the Northern Hemisphere could be harvested and labour supply problems were overcome. It is clear that these uncertainties and logistical issues will accelerate the automation and robotization of farms, reducing dependence on seasonal work. A reduced workforce will imply lower incomes and lower remittances sent by these temporary workers to their families, which may have a destabilizing effect in the region in the medium term.

Automation in agriculture is also increasing more rapidly as a result of low labour availability in specific sectors, areas, and months, although for the agricultural sector as a whole the numbers still seem small. According to the IDB-INTAL indicator, based on the McKinsey Global Institute methodology, between 40 and 60 percent of agricultural employment in the region is automatable (IDB and INTAL, 2018), varying from country to country, with the highest potential for automation in Peru and Mexico.

9.2.3 Production chains

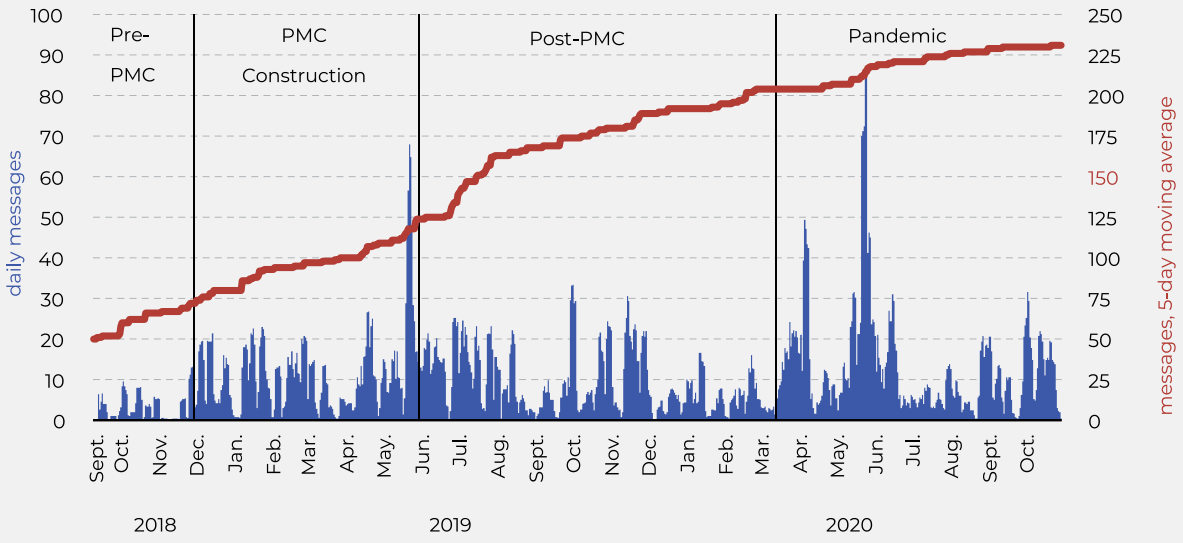
Social networks and Big Data are modifying the internal organization of agro-industrial chains. These new forms of communication, learning, and marketing transform power relations, modify stakeholder behaviour, and generate new networks between producers, suppliers, and consumers.

Strategic orientation, coordination and participation

For many years, the region has relied on several mechanisms to coordinate production chains, with specific modalities that vary depending on each country (Sotomayor *et al*., 2011). Except for public consultation processes designed to approve technical regulations (especially regarding phyto and zoosanitary issues), there is little progress being made to digitize this function, despite its potential to achieve "better policies" (OECD, 2019). An interesting example is the WhatsApp group Think Tank Cacao, in Ecuador, which has used this tool to improve coordination between all stakeholders and links in the cacao chain to implement a Competitiveness Improvement Plan (figure 9.3).

Figure 9.3

Message Frequency in the WhatsApp Group Think Tank Cacao, Ecuador, August 2018 – October 2020



Source: Prepared by the author based on data from Think Tank Cacao (TTC)

Notes: Think Tank Cacao is a WhatsApp group created in 2018 to facilitate information sharing between stakeholders during the formulation of the Cacao Chain's Competitive Improvement Plan (PMC). The group is coordinated from a European cooperation project (International Technical Assistance for Post-Earthquake Productive Reactivation) that works in coordination with the Ministry of Production and the Ministry of Agriculture and Livestock, and is made up of 244 professionals, union leaders, producers, government officials, exporters, industrialists, and chocolatiers, all of whom participate in their personal capacities. Since the group's creation, 8 024 messages, almost 500 hyperlinks, and more than 1 000 files (press articles, PPT presentations, videos, photos, etc.) have been exchanged. Today, in the face of the COVID-19 crisis, the group has played an important role in coordinating the cacao chain's response to the events caused by the pandemic. Message frequency increased 4-5 times after March 15, 2020.

Logistics

At the logistics level, the main grain transnationals (ADM, Bunge, Cargill, LDC, and COFCO) have recently made an alliance to standardize data and digitize global transactions for agricultural shipments, using digital technologies such as blockchain and artificial intelligence. This will make it possible to increase the chain's transparency and efficiency worldwide, although the question of how to incorporate SMEs and small producers remains (Businesswire, 2018).

Distribution

As we have pointed out, the digitization of marketing processes has undergone a qualitative leap since the start of the pandemic. The pre-existing trend of establishing direct links between producers and consumers (short circuits) (IDB *et al.*, 2016) has accelerated, given families' confinement in their homes. In this context, e-commerce has become essential. The largest increases in online presence are seen on transactional business sites (active presence) and on e-commerce sites. In Brazil and Mexico,

the number of new e-commerce sites increased by more than 450 percent in April 2020, when compared to April 2019. Meanwhile, sites with an active presence in Colombia and Mexico increased by nearly 500% in the same period. In June 2020, online presence of retail companies increased by 431% compared to June 2019; the increase in food delivery restaurants and services was 331%, and in business services, 311% (ECLAC, 2020e).

In the case of wholesale markets, a recent survey applied to 64 large markets in 15 countries in the region indicates that 73 percent of them has adopted sales systems through digital applications or platforms. Additionally, half the markets have reached agreements with delivery companies to deliver to homes, companies, and distributors, and 38 percent indicate that they have opted for delivering food baskets door to door and to shopping clubs (FAO and FLAMA, 2020). This same phenomenon is observed at produce fairs and markets.[117] This trend is likely to consolidate itself after the pandemic, as it is consistent with finding a way out of the crisis and avoiding future systemic crises.

9.2.4 Consumers

Underlying trends

Digital technologies and their information flows represent a paradigm shift for consumers in the food system. With new technologies, the way we consume food has changed, and this has had implications at every production stage. Digital technologies, with a fair and balanced implementation, can improve efficiency in the steps prior to consumption, with less waste and greater producer and consumer satisfaction.

Food system products are complex, therefore, potential efficiency gains through proper use of digital technologies are considerable. Foods are complex products, since they are "differentiated, have different brands, and their demand varies according to time and location" (Senauer, 2001). Furthermore, food demand, purchase, and consumption do not simply depend on prices and income – the usual factors used in traditional models –, but also respond to the information they themselves carry, as well as psychological factors, such as the attitudes, perceptions, and emotions they generate (Senauer, 2001).

The question is how digitization contributes to understanding what consumers want. Tools such as social data science, blockchain, or Big Data are useful in this regard. There are applications that connect brands and distributors, simplifying product data management (composition, visual elements, labelling, marketing information, enriched content, regulations, nutritional information, environmental impact, recipes, etc.), intended both for manufacturers and retailers, as well as for final consumers, extracting and structuring metadata to optimize and automate synchronization between all components.[118] Other applications provide real-time reports about special offers on food surpluses made by merchants who are near the consumer. There are

[117] See Chile's directory of Online Farmer's Markets at: https://www.indap.gob.cl/covid-19/mercados-campesinos-online/.

[118] See Alkemics, a marketing automation software that helps companies market and sell products on different platforms: https://www.alkemics.com/en/.

also those that connect restaurants, spas, theatres, or stores with potential customers.[119]

Digital technologies impact consumer preferences and decisions, mainly through their interaction with information. Technology allows for information gathering, storage, analysis, and exchange (World Bank, 2019). This increases the quantity and quality of information available to consumers before, during and after food consumption. Markets work better with more information: it improves competition and minimizes generation of negative externalities under certain conditions. Digitization also has an impact on power relations, prices, quality standards, and other parameters that configure the connection interface between agents.

In the same fashion, consumers generate key information for producers (and for all other stages in the production chain). Use of this information can improve consumer experience according to preferences, as it allows intermediaries to improve their efficiency, thanks to the information that reveals their preferences, which the consumer itself passes on them intentionally or unintentionally. There is evidence in some markets that technology and information flows can minimize negative externalities generated in the production chain through pressure on the demand side. Well-informed consumers can express preferences for products that minimize associated ecological damage (for example, organic, ecological, or low carbon footprint products). Stamps and labels, backed by blockchain technology, can incentivize the proper use of environmental resources. Flores *et al*. (2013) introduce a way to classify products as organic or non-organic using biomarkers and isotopic analysis. Prior to the pandemic, increasing interest in locally grown food was observed, as well as an increase in local supply schemes (Kolodinsky *et al*., 2020).

Digital transformation also has implications for people's nutrition, by increasing the quantity and quality of nutritional information available to consumers. For instance, technology is an important tool to improve food choices, where the blockchain can help with traceability. Another example relates to product perishability, such as with fruits, vegetables, and seafood. There is a positive correlation between food's nutritional quality and its level of perishability. As technology extends the life of perishable products, access to them will also increase.

Shifts in the face of COVID-19

The pandemic has accelerated adoption of technologies in the food system, especially those that impact consumers. According to a survey by McKinsey & Company, globally, 58 percent of commercial interactions in July 2020 were digital, versus 36% in December 2019 (LaBerge, 2020). The same survey indicates that the pandemic has increased the supply of products available online: in July 2020, 55% of the global commerce supply was available online, versus 35% in December 2019. The shifts can be long-term: 62% of the companies in the survey consider that changes in this area will be permanent.

The pandemic has restricted the movement of people, modifying interaction with consumers

[119] See Leloca, an application that allows users to access offers from local merchants in selected areas: http://www.leloca.com/.

and final points of sale. On the one hand, consumers spend less time shopping in person: time spent in supermarkets and pharmacies fell by almost 40 percent in Latin America and the Caribbean during the last two weeks of March 2020, when compared to the average of the first five weeks of the year (figure 9.4). On the other hand, the pandemic has also generated significant changes in consumer preferences due to its effects on income (drops in employment and, therefore, in wage bills), due to substitution effects (relative food prices have changed to reflect logistics issues and shifts in demand) and changes in consumer preferences. In Latin America, bread and fruits are the product categories that have seen the most drastic increases in consumer interest between the first weeks of 2020 and the second week of March (2020) and onwards. Internet searches for these products increased between two and six times between March and April. Searches for chickens, rice, and milk also increased, but on a smaller scale and depending on the country and subregion. In Brazil, for instance, interest expressed online for bread increased up to 2 times with regards to pre-COVID-19 levels during the first months of the pandemic, but by August and September 2020, searches had normalized, showing a slight increase of 1.1 times versus the pre-pandemic period (box 9.2).

Shifts in consumption patterns due to COVID-19 can have a great impact on nutrition. By increasing consumption of cheaper products, the overall quantity and quality of the nutrients consumed is reduced. As for goods such as alcohol and tobacco, no major changes are expected. In El Salvador, spirits are the category least purchased online, and in Chile, searches for cigarettes increased less than other products since the start of the pandemic. A study among adolescents in Italy, Spain, Chile, Colombia, and Brazil (Ruiz-Roso *et al*., 2020) indicates that quarantine has led to increases in the consumption of fried food, fruits, and sugary foods, while the amount of fast food consumed has decreased. In larger studies carried out about the 2006-08 price crisis, Iannotti and Robles (2011) found a reduction in the amount of calories consumed among the poorest quintiles, driven by rising prices and a loss of purchasing power. Clearly, this crisis is different, but there are still risks of malnutrition and undernutrition caused by the pandemic.

9.2.5 Food loss and food waste

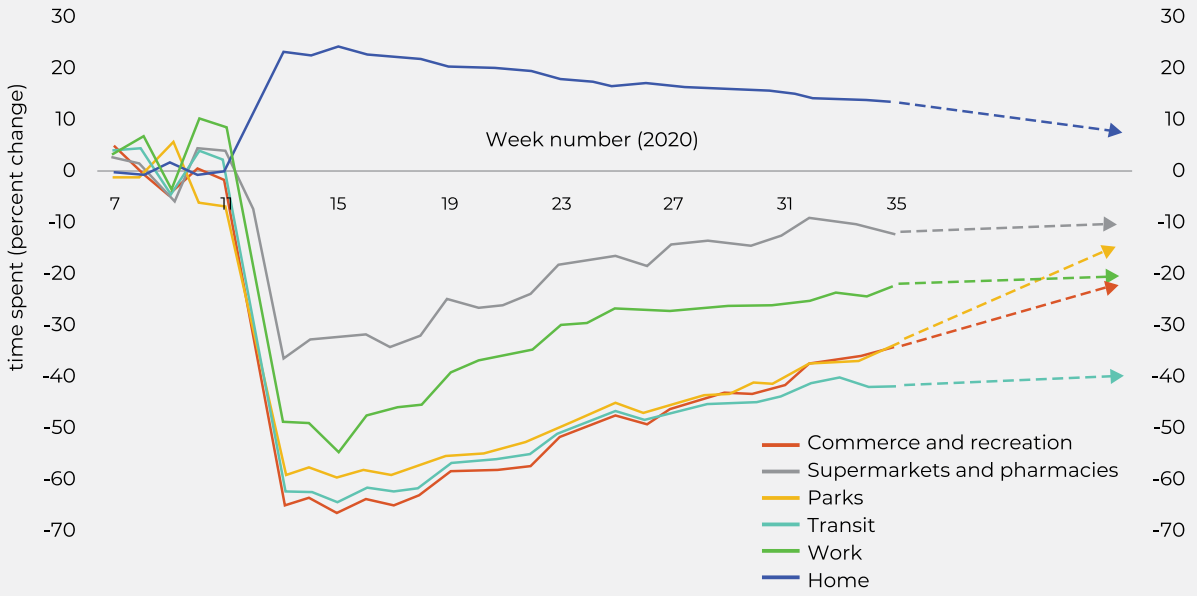
According to FAO data, the world currently produces enough calories to feed its entire population. However, more than 820 million people suffer from hunger or malnutrition, since between 30 and 40 percent of all food produced is never consumed. In developing countries, food loss can even exceed 40% during the harvesting, handling, storage, and transportation stages that precede consumption.

Food loss and food waste are obstacles to food security and are significant contributors to increasing greenhouse gas (GHG) emissions. Reducing food waste and food loss is a challenge that requires a systematic approach, one that considers its causes at all levels within agrifood systems. In developing countries especially, the food waste reduction must necessarily include small producers and family farmers, promoting the development and use of friendly

Figure 9.4

Time Spent in Different Places, Latin America and the Caribbean, variation by week of 2020 vs. the first 5 weeks of the same year

(weighted average)



Source: Prepared by the author based on data from Google LLC (2020).

and accessible post-harvest technologies that allow these producers to increase the supply of nutritious food and improve their income levels and food security.

Teutsch (2019) has mapped one hundred low-cost solutions to reduce food loss among small producers, some of which rely on digital technologies. These can help with production planning and decision making, minimizing losses in terms of revenue. Regarding food waste, a review by Zeinstra *et al*. (2020) mentions technologies, such as cameras, applications for refrigerators, advertising, and information exchange, that were reported as effective in reducing this waste. However, applications that improve food waste knowledge and awareness have had little impact on consumer behaviour.

Digital technologies can help improve food need estimates *ex ante*. That is what an application called Copia does, enabling real-time links between companies and food delivery services to minimize the food waste generated by the corporate world.[120] Another app called LeftoverSwap helps geolocate food surpluses, regroup them, and redistribute them among food banks, nursing homes, and compost makers.[121]

9.3 PUBLIC POLICIES AND TARGETING STRATEGIES

9.3.1 Electronic government

[120] Learn more at: https://www.gocopia.com/index.html.
[121] Learn more at: https://leftoverswap.com/.

Box 9.2

Online Interest for Basic Staples, multiplying factor by country/subregion during different stages of the COVID-19 pandemic

(simple average per country)

	BREAD			FRUIT			MILK			RICE			CHICKEN		
	COVID-19 MAX	COVID-19 AVG	AUG-SEP 2020 AVG	COVID-19 MAX	COVID-19 AVG	AUG-SEP 2020 AVG	COVID-19 MAX	COVID-19 AVG	AUG-SEP 2020 AVG	COVID-19 MAX	COVID-19 AVG	AUG-SEP 2020 AVG	COVID-19 MAX	COVID-19 AVG	AUG-SEP 2020 AVG
Central America	3.6	1.8	1.5	3.4	1.3	1.1	2.1	1.4	1.3	2.5	1.4	1.2	2.1	1.4	1.2
Brazil	2.0	1.4	1.1	1.9	1.1	1.0	1.5	1.2	1.1	2.1	1.3	1.3	1.4	1.3	1.1
Southern Cone	3.2	1.8	1.3	3.4	1.2	0.9	2.0	1.4	1.2	2.1	1.4	1.1	1.5	1.3	1.1
The Caribbean	3.1	1.5	1.3	2.2	1.2	1.1	2.3	1.3	1.3	2.6	1.3	1.2	2.1	1.3	1.1
The Andes	3.0	1.7	1.4	4.5	1.5	1.1	2.0	1.4	1.3	2.3	1.4	1.2	2.3	1.5	1.3
Mexico	1.8	1.4	1.4	3.1	1.4	1.2	1.5	1.3	1.2	2.1	1.6	1.3	1.5	1.3	1.1

Source: Prepared by the author based on Google Trends data.

Notes: According to pre-COVID-19 average interest, the columns show: the maximum recorded during the pandemic (COVID-19 MAX), the average recorded during the pandemic through July 2020 (COVID-19 AVG), and the August and September 2020 average (AUG-SEP 2020 AVG).

Digital technologies can be very useful to modernize public programme management and coordinate stakeholders within chains and territories, streamlining processes and generating new conditions to move towards greater transparency and better control systems. Progress here also reinforces the bottom-up logic that has been used in rural development for several years: today it is possible to develop processes of co-construction, co-use and co-maintenance, thanks to the emergence of a collaborative economy based on a kind of disintermediation that favours direct contact between stakeholders. This is valid when it comes to State services that are effectively demanded by private stakeholders (for instance, obtaining health permits), and it is especially intensified when there are high levels of dissatisfaction among clients or users regarding the way in which these services are provided. These platforms are widely favoured in such cases, a phenomenon that some have deemed the "uberization" of the State – the rapid and innovative disruption of pre-existing economic models based on digital platforms, without operators or physical infrastructures, and focusing on the client (Bertholet and Létourneau, 2017). It is all about reinventing the interfaces between citizens and the State: paying taxes, applying for a passport, filing a police report, processing a municipal permit. Everything indicates that this trend will progressively invade all of the State's spheres of action, especially those related to the provision of services (paid or unpaid) to companies and citizens, and/or to the use of their capabilities and knowledge to improve the provision of such services. The following priority areas have been identified:

- **Weather and market information**: This area is well developed in all countries, thanks to the implementation of specific applications to provide information to producers. The main areas are market information (basically

daily prices in the wholesale markets) and agroclimatic information services (useful for monitoring pests, scheduling irrigation, and raising warnings in the event of emergencies) provided by meteorological stations distributed within the territories.

- **Technical advice and training**: Extension or technical advice is perhaps the area where the digitization process is occurring most rapidly. In line with the progress observed in education and training, the work carried out in this area follows two main trends, which complement and reinforce each other. On the one hand, there is a clear trend towards the digitization of extension (or technical advice) processes, which is partly due to efforts made by state institutions, as indicated by experiences in Argentina,[122] Chile,[123] Paraguay,[124] or San Vincent and the Grenadines.[125] Initiatives developed by a few NGOs also play a very important role. These include specific applications, such as the Sustainable Trade Platform in Colombia,[126] or spontaneous initiatives promoted by extension agents themselves, especially through WhatsApp groups, Facebook, Twitter, and other social networks. Due to its local nature, this last category is difficult to detect, but it is expected to be developing on a massive scale, as shown, for example, by the experience of the Instituto Plan Agropecuario of Uruguay's Ministry of Livestock, Agriculture and Fisheries, implemented in the Department of Rocha (Scarpitta, 2020).

- **Training:** The digitization of this work area was relatively well established before the crisis, thanks to Massive Online Open Course (MOOC) platforms, specialized in providing distance courses, accessible through the Internet, and without limits on the number of participants. An interesting example are the online courses offered by the Manuel Mejía Foundation, from Colombia's Coffee Growers Federation (FMM, 2017).

- **Microcredit:** Compared with other world regions, rural microcredit in the region has seen modest progress, and we can say that digitization has not yet truly impacted this subsector (Trivelli, 2019). Despite progress seen by the financial sector as such in the region (consolidation of the Fintech movement, microfinance system regulations, development of digital payment systems based on mobile phones, and incursion of telecommunications companies in the financial business, among others), the rural sector has seen little benefit from this wave of innovations. Between 2011 and 2017, the percentage of rural residents with credit remained stable, in contrast to the accelerated expansion in access to transactional and savings accounts in the financial system

[122] See the INTA Virtual Agency app, a technical communication tool for citizens to contact an Extension Agency and ask their questions: https://inta.gob.ar/documentos/agencia-virtual.

[123] See the Rural Talent Directory of the Chilean Agricultural Development Institute (INDAP): https://www.indap.gob.cl/talentos-rurales/inicio.

[124] The Assistance and support app for agricultural producers in Paraguay allows users – through smartphones – to make inquiries on agricultural-livestock production and obtain advice remotely: https://www.senatics.gov.py/servicios-senatics/aplicaciones-en-linea/app-agroayuda.

[125] The AgriExtApp is a product for Caribbean farmers to receive advice remotely using their mobile phones: https://apps.apple.com/py/app/agriextapp/id1536781947.

[126] Learn more about the Sustainable Trade Platform at: https://comerciosostenible.org/.

(World Bank, 2021). Only 9 percent of rural people over the age of 15 used their mobile devices to access an account in the financial system, well below the world average of 21%, and considerably lower than the 71% of rural Kenyans who do so (World Bank, 2017). There are wide differences among LAC countries: in Chile and Paraguay, respectively, 24 and 26% already use their mobile devices to access accounts in the financial system, while in Peru and Colombia only 3 and 5% do so, respectively. It is likely that these difficulties are due to the banks' traditional reluctance regarding the agricultural sector, or to cultural barriers that may be removed thanks to digitization. For this to happen, it is important that the financial system have points of service to make it possible to operate with physical money. An interesting phenomenon relates to the rapid expansion of alternative service channels. According to World Bank data, between 2004 and 2018, the number of ATMs per 100 000 inhabitants doubled in the region, mainly in urban centres in countries such as Brazil, Mexico, Argentina, and Colombia. Another alternative channel consists of agents located in convenience stores, who act in the name and on behalf of a given bank, and who have been growing in relevance.

- **Traceability, certifications, and information:** The health crisis has highlighted the importance of ensuring supply chain operation. To achieve this, digital technologies such as geographic positioning systems, unique barcodes or radio frequency identification devices (RFID), the blockchain, which ensures transparency, traceability, and trust, have been useful, and are rapidly growing. There are many successful traceability experiences in the region. One of them is the National Livestock Information System (SNIG) applied in Uruguay since 2006, which requires cattle to be individually identified. Digitization also helps deliver information to consumers.

9.3.2 Innovation systems

Digitization also favours the restructuring of Innovation Systems, since it redefines the link between researchers and extension workers and producers, horizontalizing their relationships and redefining their roles. One change has to do with the role of agricultural research institutes (ARIs), which play an increasingly important role as agronomy and agriculture become more complex, since the installation of sensors on farms requires sophisticated data interpretation capabilities. At the same time, new research possibilities are opened up, turning farms into living labs, along with experimental stations.

Digital technology is embedded into the machinery, equipment, and supplies produced by large global corporations, such as BASF, John Deer, New Holland, or Monsanto. Digitization also implies the emergence of new stakeholders, such as service companies that analyze large amounts of data (Data Analytics) to generate site-specific responses, such as sowing dates, types of seeds, or adequate machinery. Another relevant stakeholder are start-ups, which mediate between scientists and companies in the productive sector, filling a gap that until recently

was almost insurmountable. In Latin America, more than 200 start-ups in the Latin American association of young leaders in biotechnology (Allbiotech) play key roles, with important groups in Costa Rica, Chile, and Mexico, among other countries.[127]

Given their complexity, hard technological innovations (equipment, seeds, sensors, etc.) are initially tested in experimental stations. In Chile, this is undertaken by the ARI's Precision Agriculture Programme, which conducts research in precision agriculture and the operation of new digital technologies at the farm level. This programme operates in alliance with several large exporting companies, such as Hortifrut, Orafti, or Carozzi, among others (Best, 2010). In Uruguay, ARI's Agroclimate and Information Systems Unit (GRAS) is in charge of promoting the sector's digitization. This Unit provides a series of agroclimatic information products through the web, using data from the ARI's meteorological stations, data provided by INUMET, CPTEC (Brazil) and the International Research Institute for Climate and Society (IRI). An important project was the National Livestock Information System (SNIG), a pioneering model of animal traceability in the region, which has been used as a benchmark in other countries. Progress has been made in other areas, such as information services about natural resources/production/foreign trade, bioinformatics, precision agriculture, management, models, monitoring, and early warning (Berterreche *et al*., 2017). In Argentina, INTA focuses its Precision Agriculture Programme on three experimental stations: Castelar in Buenos Aires (grains), Manfredi in Córdoba (machinery) and Cipolletti in Río Negro (fruit growing), where it basically works with drones, mechanization, and robotization. These three research institutes, together with the Institute for Agrifood Research and Technology (IRTA) in Catalonia and other institutes from other countries, are promoting the formation of an Ibero-American Network for the Digitization of Agriculture and Livestock.

Digitization also impacts technical and university learning programmes, modifying technical content and forms of knowledge transmission, where videos, texts, infographics, and other marketing techniques are integrated to become more visible on the web and provide courses aimed at wide audiences. more spacious. Finally, digitization redefines research programmes that seek to add value and consolidate bioeconomy as a new techno-productive paradigm, forcing us to rethink the methods used to manage innovation, favouring agility and innovation that is collaborative and open to consumers.

9.3.3 The new role of rural youth

Digitization raises key questions: are there consultants or service companies in the right place, at the right time, and with the right knowledge? Is the manpower needed to do the extra work required by new technologies available? (Best, 2010). Technical progress contributes to improving productivity and sustainability, but also generates more ignorance and more uncertainty. This is the case of adult generations of producers, who face difficulties

[127] Allbiotech is a non-profit organization that promotes the development of biotechnology and the bioeconomy in Latin America: https://www.allbiotech.org/.

entering both the digital world and that of sophisticated agriculture, based on sensors and automated machines. This requires more specialists and more specialized knowledge: hence the strategic importance of young people. In this context, there are seven virtual communities of rural youth in the region that are worth mentioning. Together, they make up about 14 thousand people (box 9.3). These communities have been supported by PROCASUR/IFAD,[128] with the exception of Chile's Yo Joven&Rural community, which has been promoted by INDAP. Another interesting initiative is Chispa Rural, a platform designed by FAO in Guatemala to improve labour inclusion and foster the entrepreneurial spirit among rural youth.

9.4 SECTORIAL AGENDAS FOR DIGITIZATION

In order to promote these transformations, it is important to implement public policies based on Sectorial Digital Agendas that contain appropriate regulations and incentives. This requires a participatory dialogue that includes all stakeholders, as well as clear political will on the part of governments and civil society.
These sector strategies must be connected to the digital strategies being implemented in the region, which define the baseline and central guiding framework. ECLAC is working on national and regional digital agendas with several countries in the region, with the aim of breaching supply and demand gaps.[129]

This line of work has not developed much at the sectoral level. The most advanced case is found in Colombia, which has a sectorial digital agenda that has been duly validated by the private sector and by the Ministry of Agriculture (MINTIC, 2019). Chile is at an earlier stage, with an initial proposal that has not yet received official support (Martínez, 2019). There are also several studies that point in this direction, some of them under development, as in Argentina, Brazil, El Salvador, Guatemala, Honduras, Mexico, and Uruguay (Fernández *et al*., 2018; Buainain *et al*., 2020; Cruz, 2020; FAO and IDB, 2019; Berterreche *et al*., 2017). However, as far as we know, there are no other countries in the region that are implementing sectoral digital agendas using a comprehensive logic. At the same time, it is necessary to apply a specific policy on data collection, management, and analysis – both at the national and international levels – that facilitates organizing and optimizing information, much of which is an increasingly relevant public good (Shah, 2020).

9.5 CONCLUSIONS

9.5.1 Summary of key trends

The digitization of the regional food system is underway, which entails many benefits, but also many risks. The following specific aspects are noteworthy:

[128] The Procasur Corporation is a global organization that specializes in harvesting and scaling local innovations: http://www.procasur.org/.

[129] See the 2022 Digital Agenda for Latin America and the Caribbean (eLAC2022): https://www.cepal.org/es/elac2022/agenda-digital-2022.

Box 9.3

Virtual Youth Communities in Latin America and the Caribbean

Network Name	Number of Facebook Followers	Web / Social Media Address
National Network of Young Rural Entrepreneurs of Colombia	3 562	Website: https://rednacional.kairos.team/ Instagram: @rednacionaljovenesrurales Twitter: @redjovenrural YouTube: https://www.youtube.com/channel/UCxBCwrvCygfqwQFSfNgdEzA
National Network of Rural Youth of Guatemala	1 790	Facebook: @RNJRGuatemala
National Network of Rural Youth of Honduras	495	Facebook: @juventudruralhonduras
National Network of Rural Youth of El Salvador	1 250	Facebook: @juventudrurales
National Network of Rural Youth of the Dominican Republic	198	Facebook: https://www.facebook.com/Red-Nacional-De-J%C3%B3venes-Rurales-Rep%C3%BAblica-Dominicana-110530227279841/
National Network of Rural Youth of Costa Rica	2 002	Facebook: @LaRedJRCR
National Network of Rural Youth of Chile (Yo Joven&Rural)	4 048	Website: http://yojovenyrural.cl/ Facebook: @yojovenyrural

Source: Prepared by the author.

- There are many supply and demand gaps that must be bridged to achieve successful digitization.

- A good part of the digitization process is driven by the private sector, through the sale of machinery and equipment with embedded digital technology. This implies that the digitization process develops relatively spontaneously, without necessarily having an organizing framework.

- Digital technologies can have positive productive, environmental, and social impacts, since they enable the collection and processing of large amounts of data to optimize and rationalize decisions and use of resources, generate predictive analysis to anticipate scenarios, and inspire new governance models.

- Chains are reorganized and redefined, becoming more transparent and participatory. On the one hand, there is growing consumer participation in the definition of products and production processes. Thanks to internet purchases, consumers can select products that are suited

to their new preferences and values. On the other hand, large international traders digitize their logistics processes and become integrated on an international scale, using digital technologies such as blockchain and artificial intelligence. The same is true of distribution channels, where retail companies – as well as all other company categories – have increased their online presence.

- The application of digital technologies to recirculate food waste is a trend that is just beginning, although it has consolidated itself in specific areas, such as food banks.

- The same can be said of digital technologies applied in microfinance, a field where the region is still underdeveloped.

- Regarding service provision, the most promising field has to do with technical advice (or technology transfer) and training.

- The same can be said of digital technologies applied to the environment, water management, and biodiversity protection, where there is high potential for optimization.

- Digital infrastructure is promoted by the states, but there is a void in terms of sectoral or territorial digitization policies.

9.5.2 Final considerations

The digitization of the food system in Latin America and the Caribbean raises many questions that remain unanswered. Perhaps the most important one refers to the dual role of technology: depending on the public policies implemented, it can bridge gaps or widen them. Considerable technological and social leaps have been experienced in various parts of the world. From this perspective, the endogenous initiative model arising in communities with no or little connectivity is interesting. Here, connectivity is provided through very small-scale local commercial initiatives, which are not reflected in the statistics. This model has been successfully applied in Argentina, Colombia, and Mexico (IICA *et al*., 2020).

Another important work area relates to digitization's impact on power relations, specifically with the way in which information is managed and how companies and social groups behave. One aspect of this issue lies in the possibilities of favouring non-competitive behaviours among companies, generating processes of "tacit collusion" and other cartelization schemes to influence prices (FAO, 2020e; McCullough *et al*., 2008).

Another dynamic, with the opposite effect, refers to the possibilities of generating direct links between small companies, bypassing large distributors and other intermediaries thanks to blockchain technology, thus reducing entry costs and barriers. Finally, the digital world enables transparency, and social media influences the behaviour and ethical values of companies, civil society organizations, citizens, or policies.

Digital technologies revolutionize information gathering processes, which traditionally were very slow and costly. The application of sensors, IoT, and other digital technologies implies

the collection of large volumes of data, which grows exponentially and, therefore, must be properly integrated and made compatible. From this perspective, it is crucial to define national and regional strategies for the collection, management, and analysis of agricultural and rural data, based on privacy policies and data ownership, or on ethical criteria to properly manage them. In a few countries in the region, the pandemic has accelerated the updating of regulatory and institutional frameworks. The main shifts point to the creation of data protection authorities and the implementation of protection assessment systems. Other questions have to do with cultural changes and business models, such as the redefinition of farmer identity, whose trade is undergoing a transformation that requires new skills. Aside from their traditional productive functions, the roles of entrepreneur, businessperson, and engineer are added to their profiles, plus the ability to collaborate and operate in networks.

In a post-pandemic world, the Sustainable Development Goals (SDGs) of the 2030 Agenda are more important than ever. The key question is whether digital technologies will allow us to gain efficiencies and induce leaps or generate emerging properties that accelerate and redirect development processes towards the achievement of the SDGs. To this effect, it is necessary to support a transformation process based on broad political and social agreements, which little by little shapes a new model of agricultural, food, and rural development (Trivelli and Berdegué, 2019). Digitization can be a factor that favours this rural transformation, with all its uncertainties and risks.

To answer these questions, at the request of the governments gathered at the Global Forum for Food and Agriculture, held in 2019 under the auspices of the German government, FAO and other international organizations have proposed the creation of a space to facilitate the debate on the digitization of agriculture, entitled "International Platform for Digital Food and Agriculture" (FAO, 2020e). This forum will include governments, producer organizations, the private sector, international organizations, scientists, and civil society, to explore how to maximize the benefits of digitization and minimize its risks. It is necessary to define more clearly how digital technologies are linked with new emerging paradigms, such as the bioeconomy, the agroecological transition, or new food consumption patterns, something that becomes urgent after the pandemic.

In short, the health crisis clearly indicates that we cannot return to business as usual. It is accelerating a technological mutation – already underway – that is leading to the transformation of the regional food system. Times of crisis are times of opportunity. ■

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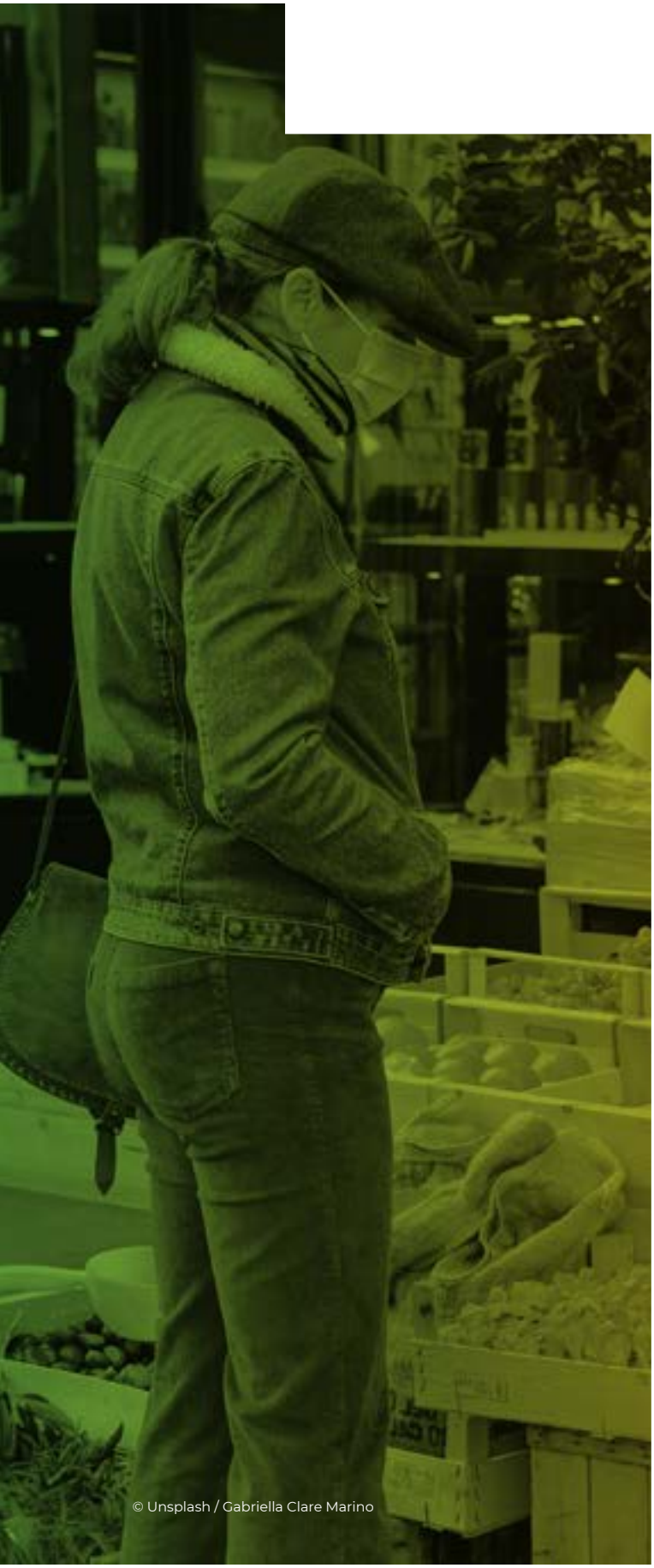

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10
THE IMPORTANCE OF CONSUMERS IN FOOD SYSTEMS

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Consumers International Council Member and Executive Director of El Salvador's Centre for Consumer Defence.

10.1 INTRODUCTION

The COVID-19 pandemic has not only impacted health. Measures adopted by most governments in Latin America and the Caribbean (LAC) had repercussions on the economic situation of consumers, mainly due to the reduction of incomes caused by loss of jobs and livelihoods. As we will discuss in this chapter, this situation has not affected everyone equally; particularly, it has had greater implications for women and the poorest sectors. Furthermore, several governments in LAC adopted measures to contain the virus that included closing borders and public markets. These measures, although temporary, affected food availability in some traditional markets and caused greater food losses in production areas or distribution centres. This, in turn, resulted in economic losses for producers and rising food prices for consumers. In fact, before the pandemic, many consumers were already facing difficulties regarding economic access. On the other hand, the food industry took advantage of the crisis to increase promotion strategies for ultra-processed foods and beverages, which have negative effects on consumers' health, as seen in other chapters of this book.

Knowing consumer organizations and their roles is important, given their potential impact on the development of sustainable and inclusive food systems. For this reason, this chapter explains how these consumer organizations arose and in which LAC countries they are present, so as to facilitate future coordination with stakeholders. Likewise, it includes information on the operation of several consumer organizations within the United Nations framework, particularly the work articulated with FAO and the advocacy by the Parliamentary Fronts Against Hunger (FPHC) and the Community of Latin American and Caribbean States (CELAC).

The chapter also identifies the challenges that consumers will have to face in the development

of inclusive and sustainable food systems. But more importantly, we identify proposals to be developed by consumer organizations to influence the necessary changes to improve access to healthy and quality food in all countries in the region.

10.2 IMPACT OF THE COVID-19 PANDEMIC ON CONSUMERS

The cease of economic and productive activities caused many consumers to lose their ability to purchase food. As different economic reports in the region have shown, consumers who were already living in poverty are likely to move into extreme poverty, while many in the middle class will move into poverty. It is projected that only the effects of "quarantines, that is, the loss of income caused by stay-at-home orders, even when factoring in different aid programmes announced in the region, may lead to increases in poverty by 8 to 14 percent. This would imply a contraction of the middle class, particularly the consolidated middle class, which would drop between 8 and 17 percent" (IDB, 2020, p. 30). This means that up to 52 million people could be forced into poverty in LAC as a result of the pandemic, delaying the fight against poverty by 15 years (Ruiz, 2020).

But the pandemic has not affected everyone equally. Oxfam points out that there are 8 thousand new millionaires in Latin America and the Caribbean – people with a net worth of more than USD one billion. The richest people have increased their fortune by USD 48.2 billion since March 2020 (Ruiz, 2020).

Even among the poorest consumers, the impact is not the same. Women as consumers have been more affected than men. Before COVID-19, among the estimated 11 to 18 million people employed in domestic work in LAC, 93 percent were women. Domestic work also represented about 14.3% of jobs for women in the region, but the vast majority (77.5%) operated in the informal sector, without access to social security or decent employment conditions (UN Women, 2020).

According to the UN (Aubin, 2020), the closing of schools, public spaces, or nurseries in response to the pandemic further aggravates the situation. Before the onset of the novel coronavirus, Latin American women were already dedicating almost 3 times more time to unpaid care work than men. They also face more complications in accessing telecommuting jobs or generating income through work away from home.

Ultimately, it will likely be women who will suffer the pandemic's greater impacts. Along with the limiting of their job opportunities, they will be strongly relegated to domestic work, despite the fact that they are the largest providers for households in the region.

There is no denying that protecting consumers from an unknown virus was necessary. While health is a fundamental human right, so is the right to adequate food. In this regard, we shall analyze some of the main elements that make up the food system. A food system encompasses all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities related to the production, processing, distribution, preparation, and consumption of

food, as well as the products of these activities, including socioeconomic and environmental outcomes (HLPE, 2018).

Food procurement is conditioned by three elements, namely: the food supply chain, the food environment, and consumer behaviour. Particularly, this chapter will refer to the food environment related to conditions during the pandemic. According to the High Level Panel of Experts on Food Security and Nutrition (HLPE), "the food environment refers to the physical, economic, political and socio-cultural context in which consumers engage with the food system to acquire, prepare and consume food" (HLPE, 2018). The review carried out in preparation of this chapter points to considerable changes in the food environment that have affected certain consumer behaviours.

As mobility restriction measures were implemented, supply centres where consumers traditionally purchase food (central markets and alternative markets, among others) were closed in some countries, while food purchases in supermarket chains increased. This situation is attributed to the fact that, in most countries in region, consumer ability to get to their workplaces was severely limited, as was the use of collective public transportation (figures 10.1 and 10.2) (OCOTE, 2020).

Although mobility restrictions were extreme in several LAC countries, and despite the closing of many traditional markets, consumers increased their purchases in public markets whenever possible (figure 10.3). As Nielsen (2020a) points out, the reason is that consumers know that it is cheaper to buy food in public food markets than in supermarkets.

Several external factors have affected consumers' economic access to food. The main factor is the loss of jobs and, in many countries, the drop in remittances from abroad and the rise in food costs. The closing of large companies, as well as companies in the micro and small business sector, has led to the loss of employment sources. Projections are not encouraging: it is estimated that more than 2.7 million formal companies in the region will close, implying a loss of 8.5 million jobs (ECLAC, 2020c).

The World Bank has warned that remittances in Latin America and the Caribbean will fall by 19.3%, although it projects a recovery of 5.6% by 2021 (World Bank, 2020). Between 80 and 90 percent of remittances are used to cover basic needs (food, health, and housing), so their contraction will have strong effects on consumption and poverty rates (Forbes Central America, 2020). But the drop in remittances will not affect all countries equally either. For example, before the pandemic, remittances represented more than 30% of Haiti's GDP, close to 20% in El Salvador and Honduras, and over 10% in Jamaica, Guatemala, and Nicaragua; a contraction between 10 and 15% is expected as a result of the pandemic (ECLAC, 2020a).

As noted above, restrictive mobility measures, both for consumers and for small and medium producers, made it difficult for consumers to purchase food at the same prices prior to the pandemic. This led to food price volatility, which affected consumers' finances and the poverty measurement line itself, as it is relates to the cost of the basic food basket (BFB).

Figure 10.1

Change in Workplace Accessibility (mobility), LAC, 2020

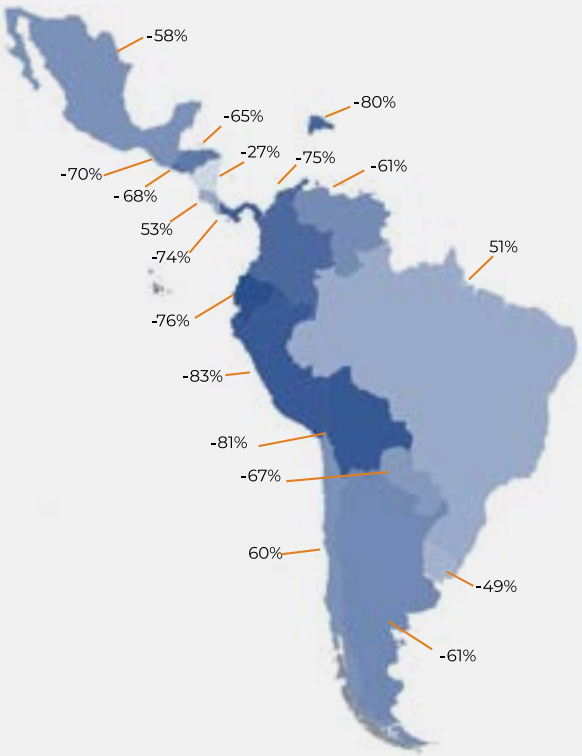
(percentage)

Source: Adapted from OCOTE (2020)

Figure 10.2

Change in Use of Public Transportation, LAC, 2020

(percentage)

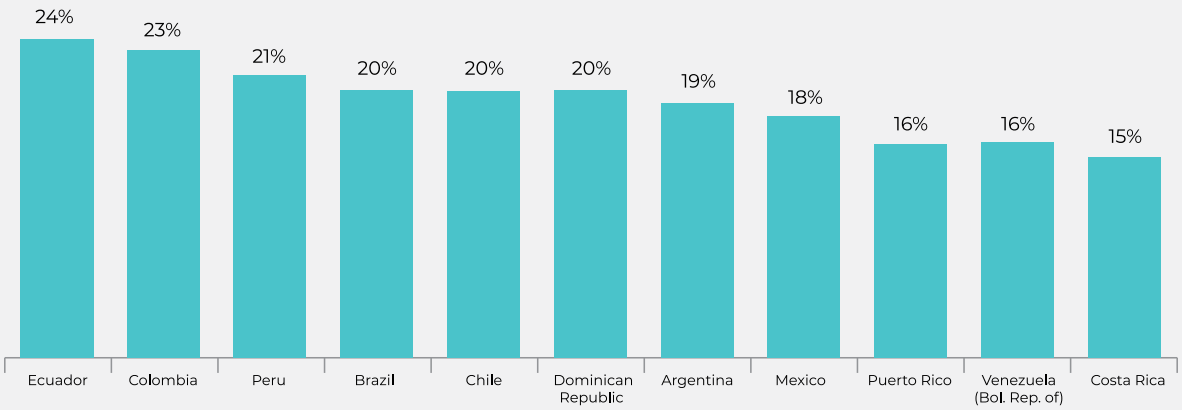


Source: Adapted from OCOTE (2020)

Figure 10.3

Increase in Public Market Purchases during the Pandemic, LAC countries, March 2020

(percentage of change from the months prior to the pandemic)

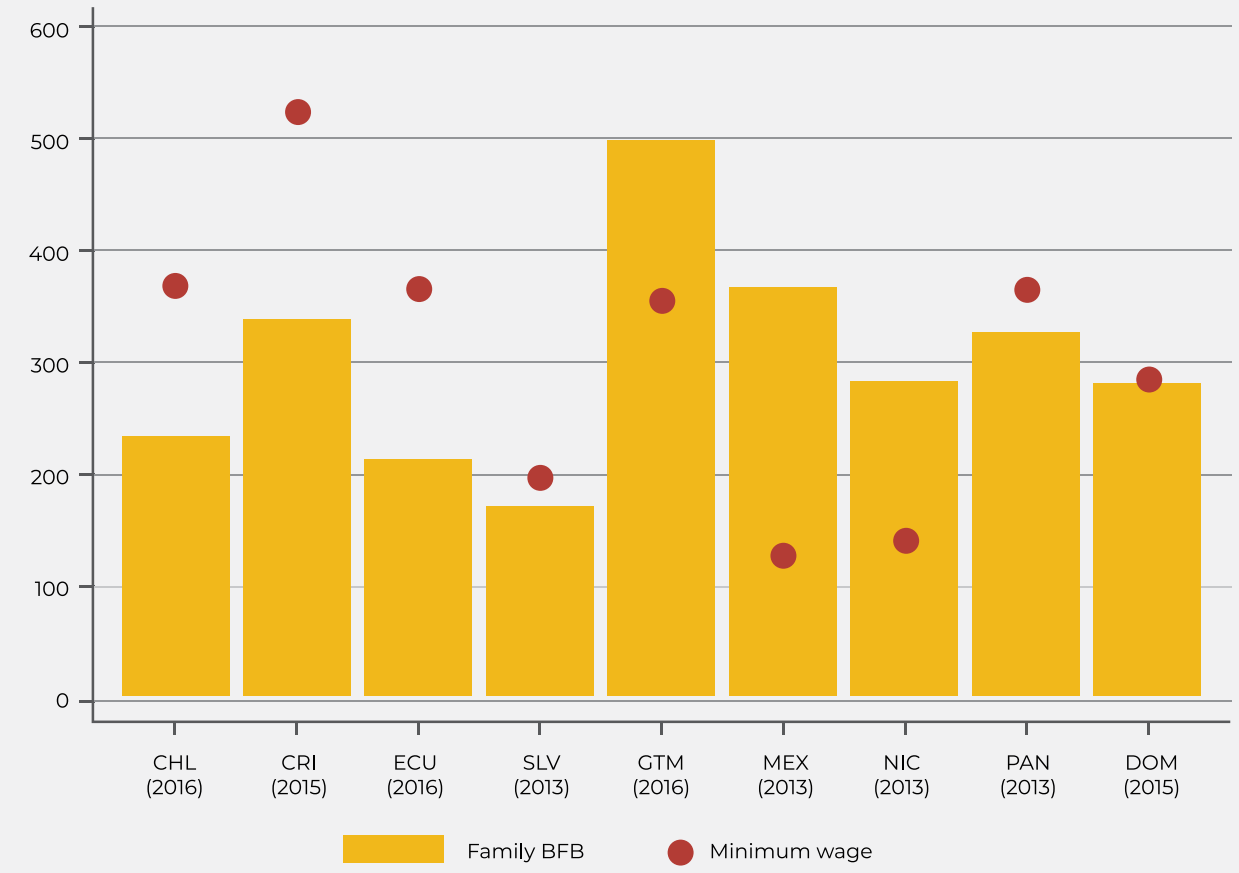


Source: Adapted from a survey conducted by Nielsen (2020a).

Figure 10.4

Minimum Wage and Cost of the Individual Basic Food Basket (BFB), LAC countries, variable years

(USD)



Source: Adapted from FAO, IFAD, UNICEF, WHO and WFP (2019).

As is known, the BFB covers the goods necessary to meet the population's nutritional requirements and is used by ECLAC to determine the extreme poverty line in each country. Minimum wages are set to cover minimum food requirements and, from this, a household's degree of vulnerability in terms of food and nutrition security can be determined (FAO and PAHO, 2017).

In some countries in the region the minimum wage exceeds the cost of the individual BFB, but in others it does not, with some even requiring more than two minimum wages to afford it (figure 10.4). According to a study carried out in five countries of the Central American region by El Salvador's Centre for Consumer Defence (CDC, 2018), in some countries the cost of the BFB is above the minimum wage, and in those that have segregated salaries for urban and rural sectors, rural consumers are at a disadvantage. Regarding the urban sector, the countries that cannot cover the cost of the BFB are Honduras and Nicaragua. For the rural sector, this group also includes Guatemala (figures 10.5 and 10.6).

The CDC believes that measuring the minimum wage relative to the BFB does not necessarily reflect the situation that consumers really face, and that it is not the appropriate method to estimate consumers' ability to obtain food. With that same minimum wage, a consumer has to pay – as part of their monthly spending – basic services such as water, electricity, transportation, telephone, gas, municipal taxes, and the legal discounts on wages. This reality reduces the possibility of acquiring food even further for poor families. For instance, when the cost of living El Salvador was analysed, it was found to be USD 706.00 per month (CDC, 2019).

If conditions were "normal" before COVID-19, considering the points made above, there is no doubt that conditions have changed and economic access to food has been seriously affected by the pandemic. It is true that the problem in LAC is not food production, but economic access to food. As FAO Regional Representative, Julio Berdegué, points out, "so far the issue has not to do with lack of food, but rather with the lack of money to buy it" (Montes, 2020).

Economic access to food for consumers has been influenced by price increase. Figure 10.7 shows the "ups and downs" in the price of basic products (potatoes, tomatoes, onions, green peppers, and beans) contained in the BFBs of five Central American countries.

An opinion survey conducted by Nielsen in 13 Latin American markets found that 93% of consumers believe the pandemic will have a negative impact on their economic situation. Sixty three percent stated that it will affect their employment status, and 51% estimated that the virus is very likely to continue affecting their markets, at least for the next four months or more (Nielsen, 2020a).

According to Berdegué, who cites an opinion study carried out in Peru, the quantity of food consumed daily has decreased in 70% of the country's households. Similarly, in 65% of households indicate that the quality of food consumed daily also decreased. A staggering 36% of Peruvian households claimed to have run out of food in the last two months due to lack of money or other resources. In Peru's rural areas, the first figure reaches 90%, the second 90%, and the third 59% (Montes, 2020).

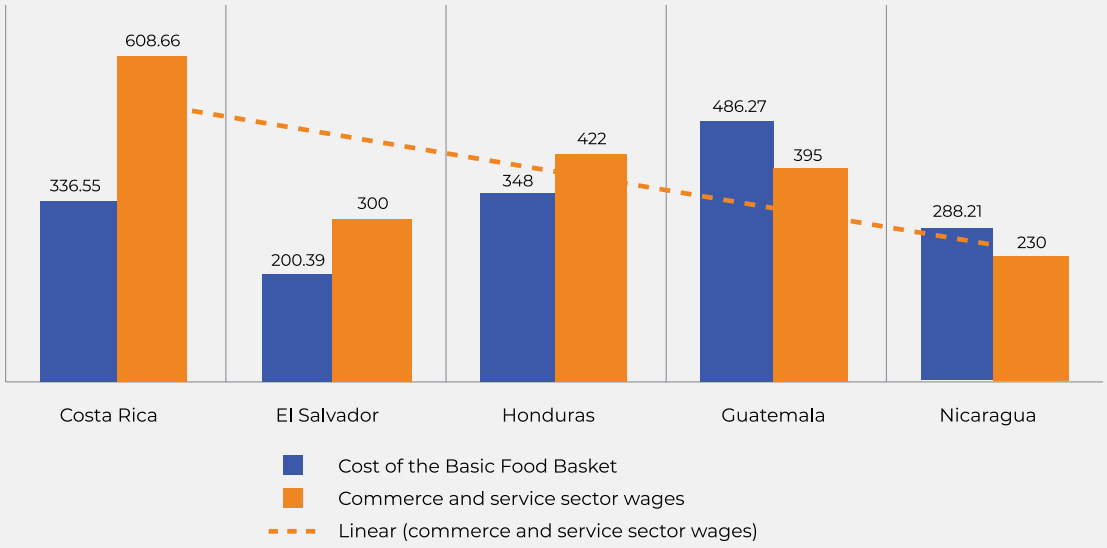
Promotion, advertising, and information

The COVID-19 pandemic has impacted food consumption in various ways. One of them has to do with the increased consumption of hypercaloric products (fried foods, desserts, etc.), as well as canned, packaged, and less perishable products (FAO and ECLAC, 2020b). The food industry did not miss the opportunity: at a time when confinement measures were the strictest, the ultra-processed food and beverage companies employed all kinds of strategies so that consumers could continue buying their products. According to the NCD Alliance and the SPECTRUM consortium, 786 examples of companies using commercial strategies disguised as "solidarity" initiatives were received from more than 90 countries around the world. Most of these schemes operated as donations to offset pandemic impacts, when in fact they were actually promoting their products, as described in box 10.1. The countries cited most frequently

Figure 10.5

Minimum Wage in the Commerce Sector and Cost of the Basic Food Basket (BFB), Central American countries, 2018

(USD)

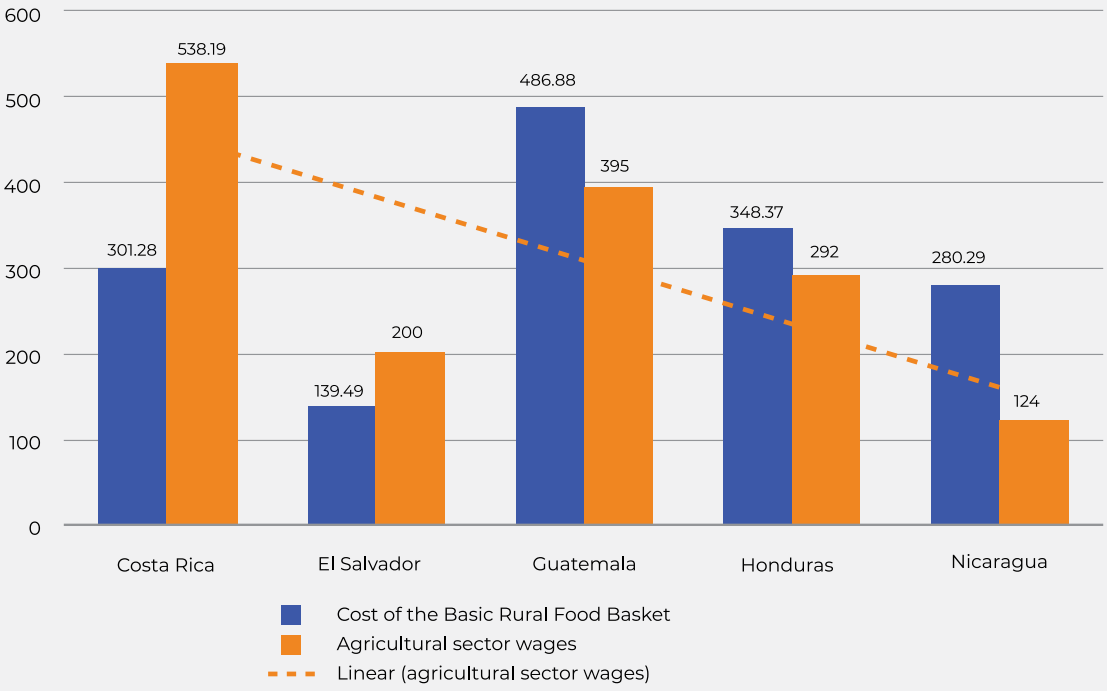


Source: Adapted from CDC (2018).

Figure 10.6

Minimum Wage in the Agricultural Sector and Cost of the Rural Basic Food Basket (BFB), Central American countries, 2018

(USD)

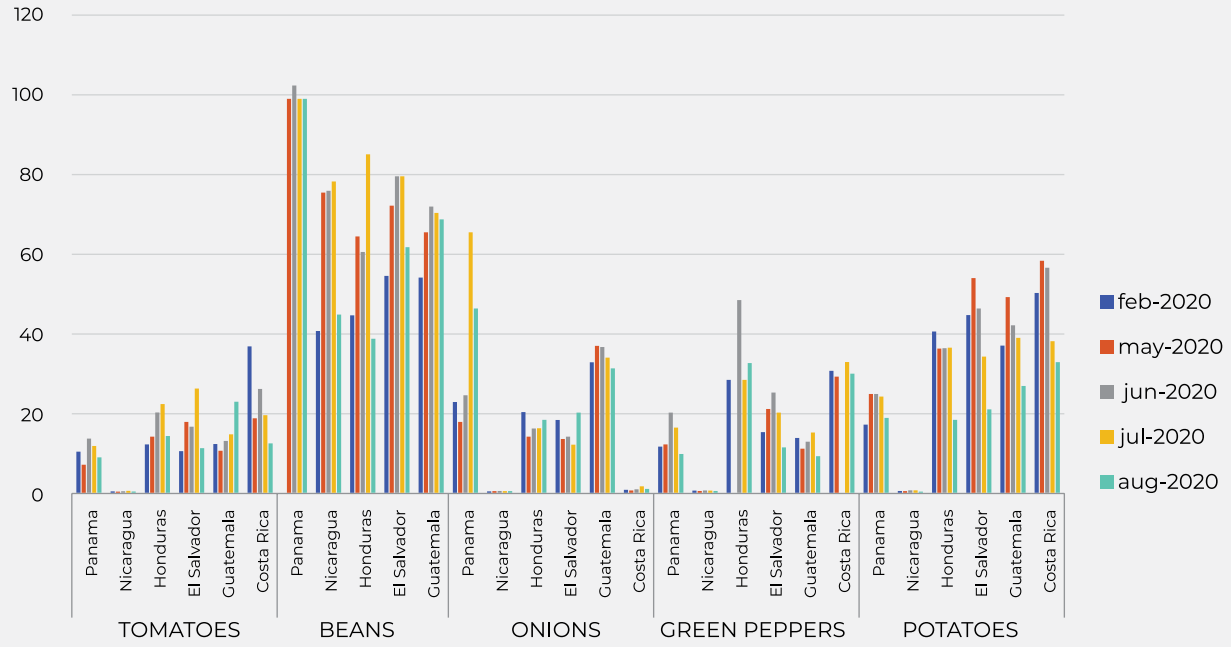


Source: Adapted from CDC (2018).

Figure 10.7

Cost of Products in BFBs, Central American countries, February to August 2020

(USD per unit of volume used in each country for each product)



Source: Prepared by the author based on data from national agriculture and trade institutes in: Panama, Nicaragua, Honduras, El Salvador, Guatemala, and Costa Rica.

were the United States, the United Kingdom of Great Britain and Northern Ireland, Australia, India, Mexico, Brazil, and Jamaica (NCD Alliance, 2020).

Several governments in LAC, as well as in other parts of the world, have been documented as accepting donations of ultra-processed food and beverages, then delivering them to the population. While people were facing fear of the virus and hunger, companies showed up making donations, always with their logos in the background.

In this regard, the distribution of breast milk substitutes deserves special mention. As is known, the World Health Organization (WHO) International Code of Marketing of Breastmilk Substitutes stipulates that infant formula products must not be promoted over breastfeeding (WHO, 1981). Even so, several companies went to the extent of linking their formulas' benefits to the fight against COVID-19. A product of the Nutricia brand, owned by the multinational Danone, bombarded Instagram users in Paraguay with the message "Can COVID-19 be transmitted through breast milk?" Such a question points to a desire to instil fear about giving breast milk to babies. In Peru, other advertisements emphasized on formula's supposed ability to strengthen the immune system. The Similac brand highlighted the presence of "a key nutrient" that would help protect children "from viruses and bacteria" (Wallace, 2020).

Box 10.1

Examples of commercial strategies disguised as solidarity actions used by companies in the food industry during the COVID-19 pandemic

Company	Country	Type of action
McDonald's	United States of America	The "Lovin' Southeast Missouri" campaign offered first responders a free "thank you meal" if they shared a selfie with the franchisee.
Pepsico and People's Daily China	China	Labels were made for limited-edition newsprint-style soda cans to celebrate those fighting the pandemic, such as healthcare workers, scientists, and hospital builders.
Burger King	United States of America	Waived delivery fees to encourage people to "stay at home", and donated 250 000 hamburgers to nurses through the American Federation of Nurses.
Subway	Canada	Offered 1 free mask for every 2 regular sandwiches purchased, and suggested that it was a great way to "protect yourself and your children."
Burger King	Brazil	Took advantage of growing digitization trends by asking users to agree to be monitored using a geolocation tool and receive a "Lockdown Whopper" in exchange for staying home longer.
FEMSA	Mexico	The giant bottling group and convenience store chain owned by Coca-Cola and Nestlé committed to donating packages of Nestlé breast milk substitutes to vulnerable communities in Veracruz. FEMSA also distributes unhealthy snacks and sugary drinks to families in disadvantaged neighbourhoods of Monterrey.
Coca Cola	Paraguay	Donated personal protective equipment to the National Institute of Respiratory Disease, which included 22 000 surgical masks, 5 000 N95 respirators, and 2 000 surgical gowns. The Ministry of Health described Coca-Cola Paraguay as a company with a "desire to contribute to strengthening the health system and support the National Government's efforts."
Pepsico	Australia, Belgium, Egypt, France, the Netherlands, New Zealand, the United Kingdom of Great Britain and Northern Ireland, Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Panama, Peru, and Uruguay.	Donated USD 5 million through food bank charities in these countries.

Source: Adapted from NCD Alliance (2020).

Despite the fact that distributors of milk substitutes can only donate equipment or informative/educational materials, without mentioning any of the commercial product categories included in the provisions of the aforementioned Code, in El Salvador, the Swiss firm Nestlé contributed 15 900 cereal units, 2 500 cups of served coffee, 100 000 cups of coffee delivered to medical personnel, 1 500 *pupusas* among quarantine centres, more than 30 000 units of soup, and more than 2 500 bags of milk, among others (Nestlé Central America, 2020). In Guatemala, the same company delivered 32 256 glasses of milk and 27 744 servings of cereals to the Secretariat of Social Affairs of the Municipality of Guatemala (García, 2020).

10.3 HOW ARE CONSUMERS ORGANIZED?

It could be said that consumer rights started to be acknowledged in the second half of the 20th century, but the first consumer movements manifested themselves in early years of the century, demanding new regulations in the United States due to price increases and several scandals relating to pharmaceutical substances. This movement culminated in the approval of the Pure Food and Drug Act of 1906 (Ovalle Favela, 2005).

According to Ovalle Favela (2005), the second consumer movement took place in the mid-1930s and was motivated by a disproportionate increase in consumer prices amidst the economic depression, by the sulfanilamide scandal, and the housewives strike in Detroit. And the third, and final, consumer movement began in the mid-1960s, motivated by the thalidomide scandal, rising prices, and mass media action.

In this sense, it can be argued that consumer defence as a socioeconomic phenomenon has its roots in the United States, starting with the creation of the Federal Trade Commission in 1914. It was then that the idea of consumer protection started gaining strength in North America (Pavan, 2005).

Consumers Research was then formed in 1929, the first organization specialized in consumer protection. The organization underwent an internal conflict that led, in 1933, to the creation of Consumers Union, a strong association that quickly became the benchmark and model to follow, first by similar organizations in Europe and Australia, and then by various consumer movements around the world, which brought together housewives, workers, students, professionals, and a wide variety of social activists (DC, 2015). In 1960, this movement became global after the creation of the International Organization of Consumer Unions, known as IOCU, and today called Consumers International (CI) (DC, 2015).

It is important to acknowledge that there are many consumer organizations around the world. There is no exact data on how many there are, since some of them are recognized in fact and others by law. There are a few organizations that speak on behalf of consumers, but their purpose is for profit. There is an organization that brings together the majority of consumer organizations around the world, and includes several consumer protection government officials among its members. Consumers International (CI) is the body that represents consumers worldwide, and

it has more than two hundred affiliates in over one hundred countries around the world.

In LAC, thirty-nine entities are CI members, thirty belong to civil society, and nine hail from government. The ones from civil society are in charge of representing consumers' individual, collective, or diffuse interests. These are powers acquired by virtue of the legal consumer protection frameworks that exist in the region's countries. Their function is not to apply consumer protection laws, since this role corresponds to government agencies. All consumer organizations – at least those that are part of CI's membership – are non-profit and legally constituted in the registries of associations, foundations, and non-governmental organizations (NGOs) in each of their countries. This means that the work they perform does not allow them to receive financing from any private company to avoid conflicts of interest. They are independent from political parties, religious entities, or any other group.

In several countries they receive funding through consumer protection agency budgets, which is allowed by law. They also are funded through legal representation of company cases that affect the collective or diffuse interests of consumers, as well as by what they manage to collect from their memberships. Finally, they obtain funds from managing projects for solidarity cooperation agencies or regional United Nations agencies. Therefore, the work they carry out is done with commitment and solidarity towards consumers, to the extent of their possibilities.

Consumer organizations in the region have different levels of development and advocacy capabilities, but as a whole they have demonstrated their potential to assume and represent the population's interests if the field of consumer relations, which is a common and sensitive aspect in people's quality of life. In this manner, these organizations have become a new kind of community association that, through various thematic programmes (which include public services, food, sustainable consumption, education, legal protection, social responsibility, fair trade, product safety, and financial services, implemented through research, campaigns, product testing, and community work), strengthens civil society and aids development, social cohesion, and democratic life in our countries (Sánchez Legrán and Murillo, 2011).

In LAC, particularly, there are two regional consumer networks, none legally constituted. The first one is the Latin American and Caribbean Council of Consumer Organizations (OCLAC), which was created on April 13, 2007, and where most Spanish-speaking consumer organizations currently participate (Sánchez Legrán *et al*., 2020). The second one is limited to Central America, known as Consumers in Action for Central America and the Caribbean (CONSUACCIÓN), and brings together consumer organizations from Panama, Costa Rica, Nicaragua, El Salvador, Guatemala, and the Dominican Republic, and is coordinated by the CDC.

Most countries in LAC have a legal framework for consumer protection. In some countries, the legislation is more developed than in others. There are countries, such as Brazil and El Salvador, that have National Consumer Protection Systems, and Peru, for instance, has

the National Consumer Protection Council. This allows other government entities, such as ministries, secretariats, and municipalities, among others, to establish links and respond to demands made by consumers regarding the provision of goods and services.

10.4 GLOBAL AND REGIONAL FRAMEWORK FOR CONSUMER ACTION

United Nations guidelines for consumer protection

Consumers have a global protection framework, the International Organization of Consumers Unions, currently known as Consumers International, which is the organization that influenced the United Nations General Assembly to approve resolution 39/248 of April 16, 1985, which contains the United Nations Guidelines for Consumer Protection. As Ovalle Favela (2005) points out, already "in 1973 the European Council's Consultative Assembly issued resolution 543/73, which approved the definitive text of the European Consumer Protection Charter."

Regardless of which countries are further ahead in acknowledging consumers, the important thing is that now the whole world has international Guidelines for Member States to apply. The UN Guidelines were reformed in 1999, and again in 2015, coinciding with the approval of the Sustainable Development Goals (SDG) by the United Nations. In all, eighty-eight guidelines were approved by the General Assembly in resolution 70/186 of December 22, 2015 (United Nations General Assembly, 2015).

According to the UNCTAD Manual on Consumer Protection (2018), direct responsibility, whether in applying or enforcing legislation, rests with public entities, official and unofficial standardization bodies, ombudsmen, professional or sectoral associations, self-regulation and co-regulation associations, and consumer associations. From this group, it is noteworthy that consumer associations are the ones who have permanently advocated for consumers, who, insistently, have prioritized the issue of food.

The guidelines are a framework that is not yet adequately adopted. For example, guideline 24 states that "Member States should encourage fair and effective competition in order to provide consumers with the greatest range of choice among products and services at the lowest cost" Along these lines, guideline 36 calls for "a) adopting or maintaining policies to ensure the efficient distribution of goods and services to consumers; … b) encouraging the establishment of consumer cooperatives and related trading activities, as well as providing information about them, especially in rural areas." (United Nations General Assembly, 2015). This could mean an opportunity for consumer organizations to help improve access to markets so that end consumers obtain not only better prices, but also healthy and nutritious food from small and medium-sized producers.

Along these lines, guideline 31 encourages Member States to:

> "… within their own national context, encourage the formulation and implementation by businesses, in cooperation with consumer

organizations, of codes of marketing and other business practices to ensure adequate consumer protection. Voluntary agreements may also be established jointly by businesses, consumer organizations and other interested parties. These codes should receive adequate publicity " (United Nations General Assembly, 2015).

The key aspect in this is that FAO could be a great catalyst in the relationship between consumer organizations and government agencies, so as to influence public policies that help improve food access and quality.

Collaboration agreement between FAO and CI

In 2017, FAO and CI signed a collaboration agreement at the highest level, which acknowledges that consumers around the world can be a powerful force in driving change towards more sustainable and equitable food systems. (FAO, 2017c). The agreement highlights areas of interest shared by FAO and CI, and includes topics such as the right to food, consumer protection, nutrition, and food safety. Both organizations agreed to use their global networks to increase consumer awareness on key food issues in areas such as international trade, food labelling, and antibiotic resistance. (CI, 2017).

Parliamentary fronts against hunger and the community of Latin American and Caribbean states

Consumer organizations' relationship with Parliamentary Fronts Against Hunger (PFH) in recent years has been decisive. FAO has enabled consumers to advocate for the Human Right to Adequate Food in the region.

The PFH for the LAC region was formally launched in 2009, during the Interparliamentary Conference on the Right to Food Security held in Panama. Then, 65 parliamentarians from 19 countries signed a declaration of explicit commitment to fight hunger in their countries. This Front sought to establish connections with other committed actors, strengthening multisectoral collaborations between politicians and existing fronts or social movements in a coordinated manner in the fight against hunger (FAO, 2017b).

The CDC, as a member of the CI Council, had the opportunity to raise a global and regional voice at the Seventh Forum of the PFH LAC, held in Mexico City from November 9 to 11, 2016. In the final declaration, the CDS managed to influence parliamentarians on the need to legislate for measures that confront overweight and obesity through greater advocacy towards accessing nutritious and healthy foods, as well as regulating ultra-processed foods and promoting physical activity.

Regarding the Community of Latin American and Caribbean States (CELAC), at a working meeting to move forward in the implementation of CELAC's FNS Plan on Food Security and Climate Change: Challenges and Opportunities in Latin America and the Caribbean, held in Santiago de los Caballeros, Dominican Republic, from August 1 to 3, 2016, consumers managed to exert influence so that, for the first time, the need for consumer participation in the Plan's implementation was acknowledged.

The fact that consumers strongly demanded more sustainable food systems was also acknowledged, as was their potential to intervene and collaborate in the transformation of these systems through their consumption decisions. Thus, CELAC's FNS Plan can be strengthened – especially with regards to resilience and climate change – through approaches such as agroecology, which together with initiatives such as local markets and other practices to bring producers and consumers closer together, can also help achieve more sustainable food systems that promote better nutrition (FAO, 2016b).

10.5 ACTIONS AND CHALLENGES FOR FOOD SYSTEM TRANSFORMATION

10.5.1 Consumer actions

Consumer organizations in LAC have on their agendas the achievement of the human right to adequate food, in accordance with Sustainable Development Goal (ending hunger). The Latin America and the Caribbean Regional Symposium on sustainable food systems for healthy eating, held in El Salvador from September 5-7, 2017, ratified the commitment to:

> "(1) Take measures to make food systems sustainable, equitable, and inclusive, ensuring healthy eating and the population's well-being. This means ensuring healthy food availability, diversity, access, consumption, biological use, and stability.
>
> "(2) Establish policies and legal frameworks to promote the production of agroecological foods, protecting biodiversity and intensifying the use of native seeds, promoting good agricultural and trade practices, and establishing healthy food collection centres, to facilitate access to nutritionally adequate and safe food.
>
> "(3) Develop and adopt healthy Basic Food Baskets to ensure the right to adequate food." (CDC, 2017).

The Consumers in Action network for Central America and the Caribbean (CONSUACCIÓN) has pointed out that Central America lacks adequate regional markets and policies to support sustainable agriculture and healthy food consumption systems. Healthy sustainable food systems in Central America must address multiple challenges, such as negative climate change impacts, nutritional transition processes and the double burden of nutritional disease, a lack of integrated rural development, gender inequality conditions, persistent structural poverty, youth unemployment, and an increase in forced migration affecting countries in the region (Revista Summa, 2020).

During the COVID-19 crisis, consumers have clearly manifested the public policy agenda items that they have been promoting and developing at the regional and country scales. In response to the situation brought on by the virus, consumers spoke out regionally, requesting that governments in the region "… facilitate the channels to access basic necessity products and sanction those who speculate with their prices or cause artificial shortages." (OCLAC, 2020).

Furthermore, in Central America, consumer organizations in CONSUACCIÓN expressed their public position and kept the population

informed, through social media, about the price increases affecting essential foods contained in the BFBs. Governments were asked to better monitor market prices, confront speculation, and set food prices in accordance with the legal frameworks established in Consumer Protection Laws. As a result, governments set price tables in Honduras and El Salvador.

With the purpose of defending consumers' finances, given the loss of jobs and livelihoods, CONSUACCIÓN called on governments to address various issues, including the use of milk formulas among the donations made by companies promoting their products, the price variations seen in drugs to counteract the virus, and the moratoriums on the payment of public and financial services, among others.

Specifically in El Salvador, given the volatility of food prices, the CDC considered it necessary to develop an initiative to improve future access to food, by establishing an alliance between consumers and small and medium-sized family farmers. Ecommerce shows a clear path in this direction, for two reasons: (i) the increase in online purchases as a result of the pandemic, and (ii) consumers' changing priorities in the face of this new reality.

According to a study on consumer behaviour in the context of COVID-19, trends show increasing use of new ecommerce technologies, as well as growing willingness to continue using of this resource even after the pandemic (Nielsen, 2020b). Regarding the second aspect, according to the EY Future Consumer Index, 27% of consumers are cutting expenses, 78% of them have reduced their purchases, and 64% buy only the essentials (EY, 2020). Without a doubt, the essentials are food. Figure 10.8 illustrates these two aspects: consumers are prioritizing food and using new technologies.

In this sense, the CDC is creating an online platform entitled "I consume what I produce", which will connect consumers with producers to sell products such as fruits, vegetables, greens, basic grains, and bee products, among others. The pilot experience, unique in LAC, contemplates that 11 consumer organizations – connected through the Link of Consumer Associations of El Salvador (ENLACES) –, as well as individual consumers, will be the potential buyers. On the other hand, producers that will benefit from selling their products to end consumers belong to small farmers' Federations and Associations. Consumer demand in the city of San Salvador is likely to increase as the online platform promotes these products.

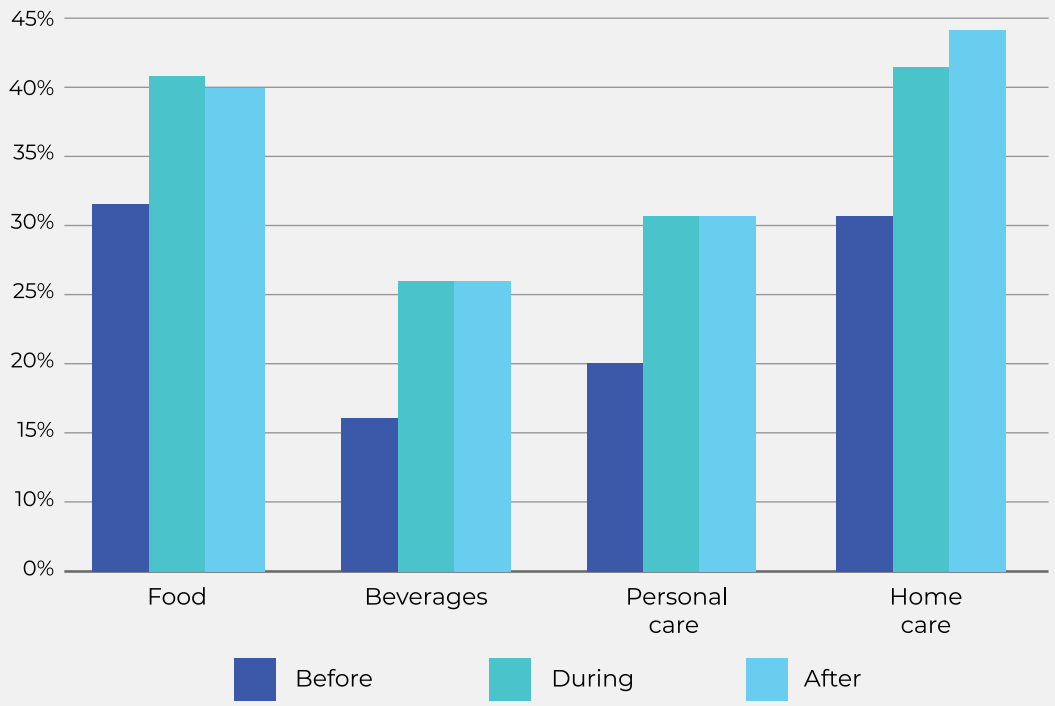
This initiative seeks to improve food security in vulnerable urban sectors, ensuring provision of healthy, natural food, produced in the country and at affordable prices. Likewise, appropriate and sustainable technologies will be implemented for environmental preservation and recovery, and market access and responsible consumption initiatives will be promoted. Undoubtedly, through public policies, these efforts could yield better outcomes.

10.5.2 CONSUMER CHALLENGES FOR THE PUBLIC POLICY FRAMEWORK

Several elements in food environments, such as food availability, economic access, promotion-

Figure 10.8

Online Purchase Intention during and after the COVID-19 Pandemic, LAC average
(percentage)



Source: Adapted from Nielsen (2020b).

advertising, and information, as well as food safety, affect consumers as a whole. These systems condition consumer behaviour regarding adequate nutrition and, hence, affect their health.

Food loss

In LAC, Food Loss and Waste (FLW) are estimated at 34 percent, this equals close to 127 million tons, or 223 kg per person. FLW accounts for food system inefficiencies; producing food that is ultimately not consumed implies unnecessary use of natural resources, such as water, soil`, and energy, as well as labour, among others (FAO and PAHO, 2017).

Loss occurs mainly during production, post-harvest, storage, and transportation. Waste occurs during distribution and consumption, and is directly related to the behaviour of wholesalers and retailers, food services, and consumers who decide to discard food that still has value (FAO, 2016c). In this section we shall place special emphasis on food loss.

There are over 16.5 million agricultural holdings throughout Latin America and the Caribbean, which represent 80% of the total holdings. Fifty six percent of them (9.6 million) are in South America, 35% in Central America and Mexico (5.8% million), and 9% (1.5 million) in the Caribbean. The weight of family farming

in the agricultural sector varies from country to country, but its primacy is undeniable: more than 90% of all farms in Antigua and Barbuda, Chile, Guyana, Haiti, Honduras, Paraguay, and Suriname are family farms. In other countries, although the percentage is lower, it is still the largest sector in agriculture, totalling more than 80% of agricultural holdings in Brazil, the Dominican Republic, El Salvador, Granada, Guatemala, Nicaragua, Panama, and Saint Lucia (FAO, 2019a).

Even with the considerable weight that family farming carries in the region, consumers find it difficult to acquire healthy and nutritious food directly from family farmers who, in turn, face difficulties selling them. The significant food loss occurring in the region is, in part, a consequence of this.

Difficulties in selling products are associated to food loss or waste. It is noteworthy that these losses have not only occurred during the period of maximum restrictions in response to the pandemic, but have been occurring frequently in the region for a long time.
For instance, in Panama, after the adopted restrictions, news circulated about huge losses of products such as tomatoes, peppers, squash, and potatoes. However, before the pandemic:

> "… Only in the old Food Market, 30 tons of food waste were generated daily. When the facilities moved to Merca Panamá, the loss has decreased to 22 tons per day, without considering the waste generated before reaching the market." (Rojas, 2020).

In El Salvador, due to the closing of borders, "the failure of the system used to declare merchandise at customs has already caused losses worth USD 300 000" (Alemán, 2020). As a result of the pandemic, São Paulo's green belt, a region responsible for 25 percent of the national vegetable supply in Brazil:

> "… Farmers have been forced to discard most of their production in early April. The dairy industry has also been affected by the coronavirus pandemic. In the Serra Dourada region, in northeast of Brazil, some 220 producers have been forced to dump 15 000 litres of milk daily during the end of March." (Alemán, 2020).

Food deserts

Food deserts can be described as geographic areas where inhabitants have little or no availability of affordable and healthy food options (especially fresh fruits and vegetables), due to the lack of grocery stores within convenient travel distances (Food Empowerment Project, 2020). While the term first appeared in the UK in 1995 to describe the shortage of supermarkets in suburbs, it later went global. Without a doubt, this is an issue that affects different parts of the world, including areas in the United States, Latin America, Asia, and Australia (Keep it Pure & Simple, 2014).

There is much discussion about whether the term should only refer to geographic access. Many authors point out that the issue of access should focus on poverty and not on geographic location. Access does not always guarantee higher consumption of fresh food. The physical environment greatly influences

obesity conditions, but not in the sense of how close access to fresh food is, but rather in how easy it is for people to purchase it, as well as how walkable their daily lives can be (Lomelí, 2017).

In fact, from an affordable access perspective, eating healthy is more expensive. A healthy diet, which includes the estimated essential nutrients and energy that each person needs, costs on average USD 3.98 per day per person. In Latin America, this is 3.3 times more than what a person below the poverty line can afford. This means that 104 million people – 26.5 percent of the regional population – do not have access to healthy diets (FAO, IFAD, UNICEF, WFP and WHO, 2020).

Overweight and obesity

Failure to consume nutritious and healthy food, either due to difficult access or misinformation, has serious repercussions on consumers' health. PAHO has pointed out that the increase in consumption of ultra-processed foods is strongly linked to the increase in body weight in 13 Latin American countries studied. In those with a high consumption of such foods, such as Mexico and Chile, the population has higher average body mass. And in countries such as Bolivia (Plurinational State of) and Peru, where consumption tends to favour traditional diets, average body mass is lower (PAHO, 2015). But far from decreasing, there is a constant increase in the numbers. Among adults, overweight and obesity rates rose from 42.7 to 59.5 percent between 1990 and 2016, which translates into 262 million overweight people in the region (FAO, PAHO, UNICEF and WFP, 2019).

As is known, consumption of ultra-processed products, as well as a lack of physical activity, generates Non-Communicable Diseases (NCDs), especially cardiovascular diseases, cancer, diabetes, and chronic respiratory illnesses. These are the main causes of death in LAC, responsible for approximately 80 percent of deaths in the region (PAHO, 2019). There are existing proposals that must be applied and coordinated to face overweight and obesity, including initiatives to increase taxes on sugary drinks, given that various studies have shown that consumption of these drinks increases the risk of NCDs.

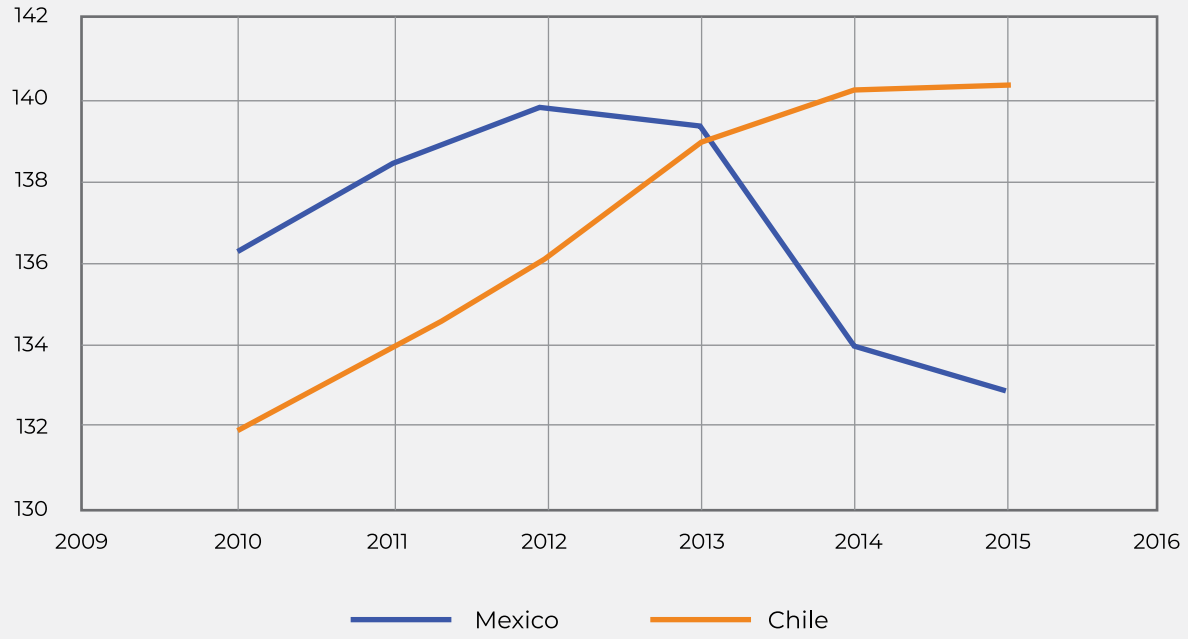
In 2014, Mexico approved the Special Tax on Production and Services Law (LIEPS). That same year, Chile enacted its tax reform that amended Law Decree No. 825 of 1974, on Sales and Services Tax. As a result of these measures, according to a study carried out by the University of Chile's School of Public Health, Chileans went from drinking an average of 3.5 litres of sugary drinks per month in 2011, to 2.7 litres in 2015 (School of Public Health Dr. Salvador Allende G., 2018). The reduction in consumption is clear in both Mexico and Chile (figure 10.9) (Nutritional Health Alliance, 2020).

Despite this progress, the rest of the LAC countries do not have approaches like those of Mexico and Chile. This tax increase should not be seen as a fiscal policy action, but rather a public health one, where resources generated should contribute to preventing NCDs through awareness campaigns and consumer education. Resources could also be used to promote small and medium-sized agricultural production of healthy and safe products.

Figure 10.9

Consumption of Sugary Drinks in Mexico and Chile, 2010-2015

(litres per capita, annual average)



Source: Adapted from Nutritional Health Alliance (2020).

Another measure demanded by consumer organizations is Front-of-Package Food Warning Labelling. In Chile, Law 20 606 of 2012 "On the nutritional composition of foods and their advertising" establishes the regulatory framework for consumer warning labelling according to maximum nutrient thresholds that include fats, salt, sugar, and calories in packaged food products, as well as banning their advertising and sale in schools (CDC, 2017).[130] In Mexico, the implementation of a similar law has just started (October 1, 2020); countries like Peru have already approved their own laws on the matter, and other countries, like Uruguay, are in the process.

The advantage of this new type of labelling is that it will warn of excess calories, sugar, sodium, saturated and trans fats in products. Legends will also be included to warn of the presence of caffeine and sweeteners, and the use of characters and drawings aimed at children in the products will be conditioned, in accordance with recommendations made by UNICEF (2020) and other international organizations.

The warning labels themselves condition the use of cartoons to help mitigate the urge in children to eat certain foods. However, much progress is needed in advertising regulation. Both WHO and PAHO have urged countries to restrict promotion and advertising aimed at children of unhealthy foods and beverages. This type of promotion includes all marketing

[130] To learn more about the Chilean nutrition labelling law, see Chapter 5 of this book.

techniques used in communication channels aimed exclusively at children and people under 16 (UNICEF, 2015).

Street vendors

As is known, street vendors are common in most LAC countries. They are an option for consumers to purchase prepared meals and, above all, at a low cost. In LAC, purchasing food public streets represents between 20 and 30 percent of urban family spending (FAO, 2002c). In themselves, street vendors are small businesses that provide regular sources of income to millions of men and women with little education or limited skills in developing countries, especially since the activity requires a low initial investment (FAO, 2002a).

One concern in this regard relates to food safety. But there are also other issues, such as sanitary issues (accumulation of waste in the streets and drainage clogging), city traffic jams also caused by pedestrians (occupation of the sidewalks by street vendors), illegal occupation of public or private space, and social issues (child labour, unfair competition with formal trade, etc.) (FAO, 2000).

Globally, it is estimated that food sold on public streets represents around 30 percent of consumers' caloric intake. It is also a significant source of income, especially for women, who represent between 70 and 90 percent of vendors in some regions (World Bank, 2018). FAO has made significant efforts to improve street food quality. During the 1991 cholera outbreak in Peru and Bolivia (Plurinational State of), FAO provided technical assistance to detect the virus in some street foods, such as ceviche, made from raw fish. At that time, they managed to train more than 600 inspectors and 50 000 food handlers (FAO, 2002b). FAO also has guidelines to educate suppliers of these types of food.

Singapore, an island country in Asia, is an important example for consumers today. As part of a hygiene policy, a decision was made to put an end to street vending. As an alternative, new spaces were created, called hawkers (stalls that sell food and beverages in spaces surrounded by tables and chairs), where vendors can operate in a more suitable environment (Singapore Guide, 2020).

10.6 A LOOK AT THE FUTURE OF CONSUMERS

Advocacy for public policies is now more necessary than ever. The impact of the COVID-19 pandemic shows that progress made in achieving SDG 2 (Zero Hunger) is starting to recede. The data analysed previously show that unemployment will have grave consequences for LAC. Today more than ever it is necessary to ensure access, both physically and economically, to food. We must advocate to bring small and medium-sized local production closer to end consumers.

Consumers certainly represent a great opportunity to change food systems. According to HLPE (2018), collective changes in consumer behaviour can open avenues to establish more sustainable food systems that improve food security, nutrition, and health. Sustainable diets: help protect and respect biodiversity and ecosystems; are culturally acceptable, accessible, economically fair and affordable; are

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nutritionally adequate, safe, and healthy, and optimize the use of natural and human resources. Empowering female consumers is key, since they can act as advocates for healthy diets and help shape choices related to good nutrition.

It is crucial to make progress regarding healthy environments and lifestyles. Street vending is a great opportunity for consumers, along with municipalities, to work on food safety issues, so that they are served in healthier environments. For this, it is crucial to influence government institutions that provide public health services, where ultra-processed foods and beverages are still sold, despite the fact that many consumers are being treated precisely for the diseases caused by inadequate diets.

Confronting overweight and obesity is something that consumers must undertake, in conjunction with regional organizations such as FAO, PAHO, and UNICEF, to influence the Parliamentary Fronts Against Hunger (PFH). One advantage is that consumer organizations maintain relationships with government authorities, but also with lawmakers, due to the role they play in advocating for consumers. ■


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BIBLIOGRAPHY

Agência Brasil. 2020. SP estende cartão-alimentação a todos os alunos da rede municipal [online]. [Cited 11 November 2020]. https://agenciabrasil.ebc.com.br/educacao/noticia/2020-07/sp-estende-cartao-alimentacao-todos-os-alunos-da-rede-municipal

Agostini, C., Corvalán, C., Cuadrado, C., Martínez, C. & Paraje, G. 2018. *Evaluación y aplicación de impuestos a los alimentos con nutrientes dañinos para la salud en Chile* [online]. [Cited 28 December 2020]. https://www.researchgate.net/publication/323692690_Evaluacion_y_Aplicacion_de_Impuestos_a_los_Alimentos_con_Nutrientes_Daninos_para_la_Salud_en_Chile

Aguilar, A.G. & López, F.M. 2014. *La Periurbanización y los Retos de su Organización Territorial. Capítulo 2 de Metrópolis: Estructura Urbana, Medio Ambiente y Política Pública* (ed. Graizbord, B.). Mexico. CEDUA-COLMEX.

Alemán, U. 2020. Pérdidas en verduras y frutas ya suman $300 000 por fallas en las aduanas. *El Mundo,* 10 May 2020 [online]. [Cited 28 October 2020]. https://diario.elmundo.sv/perdidas-en-verduras-y-frutas-ya-suman-300000-por-fallas-en-las-aduanas/

AMVO (Asociación Mexicana de Venta Online). 2020. Reporte 4.0: Impacto COVID-19 en Venta Online México. Análisis 8 Septiembre 2020 – Versión Pública. Mexico City.

ANVISA (Agencia Nacional de Vigilancia Sanitaria de Brasil). 2003. Resoluções n° 359 e n° 360, 23 December 2003. Brasilia.

ANVISA (Agencia Nacional de Vigilancia Sanitaria de Brasil). 2006. Consulta Pública 71, 10 November 2006. Brasilia.

ANVISA (Agencia Nacional de Vigilancia Sanitaria de Brasil). 2010. Resolução da Diretoria Colegiada n° 24, 29 June 2010. Brasilia.

ANVISA (Agencia Nacional de Vigilancia Sanitaria de Brasil). 2019. Resolução da Diretoria Colegiada (RDC) n° 332, 23 December 2019. Brasilia.

ANVISA (Agencia Nacional de Vigilancia Sanitaria de Brasil). 2020. Anvisa aprova norma sobre rotulagem nutricional [online]. [Cited 11 November 2020]. https://www.gov.br/anvisa/pt-br/assuntos/noticias-anvisa/2020/aprovada-norma-sobre-rotulagem-nutricional

Araújo, C. 2020. China suspendeu carne de frigorífico brasileiro por suspeita de coronavírus. *UOL Economia,* 9 October 2020 [online]. [Cited 1 December 2020]. https://economia.uol.com.br/colunas/carla-araujo/2020/10/09/inspecao-china-carne-brasileira-minerva-covid-suspeita-suspensao.htm?cmpid=copiaecola

Arrúa, A. *et al.* 2017. Warnings as a directive front-of-pack nutrition labelling scheme: comparison with the Guidelines of Dily Amonunt an traffic-light system. *Public Health Nutr.,* 2017: 2308-2317.

Asamblea Legislativa de la República de El Salvador. 2020. *Ley de protección al consumidor del 18 de octubre 2020*. San Salvador. (also available at: https://www.asamblea.gob.sv/decretos/details/313).

Aubin, A. 2020. El coronavirus no discrimina a las mujeres, las normas patriarcales de género sí. *Noticias ONU México,* 4 June 2020 [online]. [Cited 8 November 2020]. https://news.un.org/es/story/2020/06/1475492

Axciom. 2017. What is Identity Resolution? [online]. [Cited 14 December 2020]. https://www.acxiom.com/what-is-identity-resolution/

Azevedo Da Silva, C. 2009. La configuración de los circuitos "de proximidad" en el sistema alimentario: tendencias evolutivas. *Documents d'Anàlisi Geogràfica,* 54, 2009. Madrid.

Baird, M.F. 2016. O lobby na regulação da publicidade de alimentos da Agência Nacional de Vigilância Sanitária. *Revista de Sociologia e Política,* v. 24, n. 57, Mar. 2016 (also available at: https://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-44782016000100067).

Bank of Guatemala. 2020. *Producto Interno Bruto Trimestral: Segundo Trimestre 2020.* Guatemala City.

Barrionuevo, N., Albacete, M., García, D., Lindemann, R. & Quingaísa, E. 2020. *Circuitos alternativos de comercialización en el marco de la crisis del COVID-19. Análisis de Coyuntura en tiempos del COVID-19 n° 6,* June 5, 2020. Santiago. RIMISP.

Belik, W. & Siliprandi, E. 2010. Hábitos alimentares, segurança e soberanía alimentar. In: Vilarta, R., Gutierrez, G.L., Monteiro, M.I. (eds.), *Qualidade de vida: evolução dos conceitos e práticas no século XXI.* Campinas (Brazil). Ipes (also available at: https://www.fef.unicamp.br/fef/sites/uploads/deafa/qvaf/evolucao_cap20.pdf).

Belik, W. 2020. *Estudo sobre a cadeia de alimentos.* Río de Janeiro (Brazil). Ibirapitanga, ICS e Imaflora (also available at: https://www.ibirapitanga.org.br/wp-content/uploads/2020/10/EstudoCadeiaAlimentos_%C6%92_13.10.2020.pdf).

Berdegué J.A. & Favareto, A. 2019. *Desarrollo Territorial Rural en América Latina y el Caribe.* Santiago. FAO.

Berdegué, J.A. & Proctor, F.J. 2014. *Cities in the Rural Transformation*. Working Paper Series no. 122, Working Group: Development with Territorial Cohesion. Territorial Cohesion for Development Programme. Santiago. RIMISP.

Berdegué, J.A., Rosada, T. & Bebbington, A.J. 2014. The Rural Transformation. In *International Development: ideas experiences and prospects* (eds. Currie-Alder *et al.*). Oxford (UK). Oxford University Press.

Berterreche, M., Soares de Lima, J.M., Domínguez, G., Pivel, C. 2017. *Estudio prospectivo al año 2050: TIC y verticales.* Montevideo. ICT4V.

Bertholet, C. & Létourneau, L. 2017. *Ubérissons L'Etat avant que d'autres ne s'en chargent.* Paris. Ed. Armand Colin.

Best, S. 2010. *Desarrollo Tecnológico para la Gestión y el Manejo Predial: Línea de Base 2010 y Prospectiva 2030* (unpublished). Santiago. INIA.

Biblioteca del Congreso Nacional. 2011. Historia de la Ley 20 606 [online]. [Cited 22 June 2020]. https://obtienearchivo.bcn.cl/obtienearchivo?id=recursoslegales/10221.3/37370/1/HL20606.pdf

Blanco, M. & Riveros, H. 2005. Las rutas alimentarias, herramienta para valorizar productos de las agroindustrias rurales. El caso de la ruta del queso Turrialba, Costa Rica. *Perspectivas Rurales Nueva Época,* (17-18), 85-97.

Bourdieu, P. 1993. *Efectos de Lugar. La miseria del Mundo.* Madrid. Fondo de Cultura Económica.

Bourdieu, P. 2003. *Las estructuras sociales de la economía.* Buenos Aires. P. Imprenta.

Brazilian Ministry of Health. 2003. *Política Nacional de Alimentação e Nutrição.* Brasilia.

Brazilian Ministry of Health. 2006a. *Guía alimentaria para la población brasileña.* Brasilia.

Brazilian Ministry of Health. 2006b. *Política Nacional de Alimentação e Nutrição.* Brasilia.

Brazilian Ministry of Health. 2011. *Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis (DCNT) no Brasil: 2011-2022.* Brasilia.

Brazilian Ministry of Health. 2013. *Política Nacional de Alimentação e Nutrição.* Brasilia (also available at: https://bvsms.saude.gov.br/bvs/publicacoes/politica_nacional_alimentacao_nutricao.pdf).

Brazilian Ministry of Health. 2014a. *Estrategia intersectorial de prevención y control de la obesidad: promoción de modos de vida y alimentación adecuada y saludable para la población brasileña.* Brasilia.

Brazilian Ministry of Health. 2014b. *Guía alimentaria para la población brasileña.* Brasilia.

Brazilian Ministry of Health. 2020. Brasil registra 4 650 030 personas recuperadas [online]. [Cited 11 November 2020]. https://www.gov.br/saude/pt-br/assuntos/noticias/brasil-registra-4-650-030-de-pessoas-recuperadas

Brazilian Ministry of Justice. 2003. *Portaria no. 2658, de 22 de dezembro de 2003.* Brasilia.

Brown, C. & Miller, S. 2008. The Impacts of Local Markets: A Review of Research on Farmers Markets and Community Supported Agriculture (CSA). *American Journal of Agricultural Economics,* vol. 90, no. 5 (also available at: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-8276.2008.01220.x).

Buainain, M.A., Cavalcante, P. & Consoline, L. 2020. *Estado atual da agricultura digital no Brasil: inclusão da agricultores familiares e pequenos produtores rurais* (informe de proyecto). Brasilia. ECLAC.

Business Research Company, The. 2018. The growing pharmaceutical market experts forecasts and analysis [online]. [Cited 12 December 2020]. https://blog.marketresearch.com/the-growing-pharmaceuticals-market-expert-forecasts-and-analysis.

Businesswire. 2018. COFCO International Joins Initiative to Modernize Global Agricultural Commodity Trade Operations [online]. [Cited 12 December 2020]. https://www.businesswire.com/news/home/20181220005036/en/COFCO-International-Joins-Initiative-to-Modernize-Global-Agricultural-Commodity-Trade-Operations

Cabral, U. 2020a. 10,3 milhões de pessoas moram em domicílios com insegurança alimentar grave. Agência IBGE Notícias, 17 September 2020 [online]. [Cited 12 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/28903-10-3-milhoes-de-pessoas-moram-em-domicilios-com-inseguranca-alimentar-grave

Cabral, U. 2020b. Pesquisa Nacional de Saúde: um em cada quatro adultos do país estava obeso em 2019; Atenção Primária foi bem avaliada. Agência IBGE Notícias, 21 October 2020 [online]. [Cited 12 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/29204-um-em-cada-quatro-adultos-do-pais-estava-obeso-em-2019

Capra F. & Luisi, P.L. 2016. *The systems View of Life: A Unifying Vision.* Cambridge (UK). Cambridge University Press.

Castañeda, C., Martínez, J. & Puerta, N. 2016. *Pérdida y Desperdicio de alimentos en Colombia.* Bogota. Departamento Nacional de Planeación.

Cavalcanti, M., Souza Júnior, J. & de Carvalho, L.M. 2020. Atividade econômica: PIB no segundo trimestre de 2020. *Carta de Conjuntura, IPEA,* 1 September 2020 [online]. [Cited 13 November 2020]. https://www.ipea.gov.br/cartadeconjuntura/index.php/2020/09/atividade-economica-pib-no-segundo-trimestre-de-2020/

CCAFS, CIAT & MAGA. 2015. *Agricultura Sostenible Adaptada al Clima (ASAC): Alternativas para el Corredor Seco en Guatemala.* Cali (Colombia). CCAFS.

CCAFS. 2017. *Annual report 2016: Power of partnerships.* Wageningen (Netherlands). CCAFS.

CDC (Centro para la Defensa del Consumidor de El Salvador). 2017. El movimiento de consumidores de América Latina y el Caribe exige a los gobiernos medidas para establecer sistemas alimentarios sostenibles para la alimentación saludable [online] [Cited 19 November 2020]. http://www.cdc.org.sv/index.php/noticias/nacionales/610-el-movimiento-de-consumidores-de-america-latina-y-el-caribe-exige-a-los-gobiernos-medidas-para-establecer-sistemas-alimentarios-sostenibles-para-la-alimentacion-saludable).

CDC (Centro para la Defensa del Consumidor de El Salvador). 2018. *Análisis Comparado de las Canastas Básicas Alimentarias de Centroamérica* (coord. Danilo Pérez). San Salvador. Grupo Editorial Nueva Imagen.

CDC (Centro para la Defensa del Consumidor de El Salvador). 2019. *Costo de la vida y propuesta de mejora para un salario mínimo.* San Salvador. MC Impresores.

Ceballos, F., Kramer, B. & Robles, M. 2019. The feasibility of picture-based insurance (PBI): Smartphone pictures for affordable crop insurance. *Development Engineering,* no. 4: 100042 (also available at: https://www.sciencedirect.com/science/article/pii/S2352728518300812).

Cencosud. 2020. *Presentación de Resultados: Segundo trimestre 2020.* Santiago.

Central Bank of Barbados. 2020. *Review of Barbados' Economic Performance: January to June 2020.* Bridgetown.

Central Bank of Belize. 2020. *Quarterly Review,* Vol. 44, no. 2 (June 2020). Belize City (Belize).

Central Bank of Chile. 2020. *Cuentas Nacionales de Chile: Evolución de la actividad económica –2° trimestre 2020.* Santiago.

Central Bank of Honduras. 2020. *Producto Interno Bruto: II Trimestre de 2020.* Tegucigalpa.

Central Bank of the Dominican Republic. 2020. *Resultados Preliminares de la Economía Dominicana: enero-junio 2020.* Santo Domingo.

Cervera, M. & Rangel J.W. 2015. *Distribución de la Población por tamaño de localidad.* Mexico. INEGI.

CI (Consumers International). 2020. El refuerzo de la colaboración con la FAO pretende ayudar a resolver problemas claves de alimentación en la protección al consumidor en todo el mundo [online] (also available at: https://es.consumersinternational.org/news-resources/news/releases/strengthened-partnership-with-fao-aims-to-help-solve-key-global-consumer-protection-issues-on-food). [Cited 30 September 2020.

Ciccolella, P. 2012. Revisitando la metrópolis latinoamericana más allá de la globalización. *Revista Iberoamericana de Urbanismo,* no 8. Catalonia (Spain). Ed. RIURB.

CNC (Cámara Nacional de Comercio, Servicios y Turismo de Chile). 2020. *Indicador de Comida de Servicio Rápido: Segundo Trimestre 2020.* Santiago.

Coca-Cola Company, The. 2020a. *Coca-Cola Reports Second Quarter 2020 Results; Provides Update on Strategic Actions in Rapidly Evolving Business Climate.* Atlanta (United States of America).

Coca-Cola Company, The. 2020b. *Coca-Cola Reports Third Quarter 2020 Results, Provides Update on Strategic Actions to Emerge Stronger from the Pandemic.* Atlanta (United States of America).

Colussi, J. 2020. Pandemia aumenta uso de internet no campo, mas falta de conexão e alto custo são barreiras, aponta pesquisa. *Globo Rural, Pesquisa e Tecnología,* 6 August 2020 [online]. [Cited 11 November 2020]. https://revistagloborural.globo.com/Noticias/Pesquisa-e-Tecnologia/noticia/2020/08/pandemia-aumenta-uso-de-internet-no-campo-mas-falta-de-conexao-e-alto-custo-sao-barreiras-aponta-pesquisa.html

CONAB (Companhia Nacional de Abastecimento). 2020a. *Aspectos do setor hortigranjeiro durante a pandemia do COVID-19.* Brasilia.

CONAB (Companhia Nacional de Abastecimento). 2020b. *Boletim Hortigranjeiro.* Vol. 6, no. 7 (July). Brasilia.

CONAB (Companhia Nacional de Abastecimento). 2020c. *Boletim Hortigranjeiro.* Vol. 6, no. 8 (August). Brasilia.

CONAB (Companhia Nacional de Abastecimento). 2020d. Estoques por produto. Série histórica de estoques públicos, 3 October 2020 [online]. [Cited 13 November 2020]. https://www.conab.gov.br/estoques/estoques-por-produto

CONANDA (Conselho Nacional dos Direitos da Criança e do Adolescente). 2014. *Resolución 163, del 13 de marzo 2014.* Brasilia.

CONAPO (Consejo Nacional de Población de México). 2012. *Catálogo Sistema Urbano Nacional 2012.* Mexico.

CONEVAL (Consejo Nacional de Evaluación de la Política de Desarrollo Social de México). 2016. Coneval informa la evolución de la pobreza 2010-2016. Press release no. 9, 30 August 2017 [online]. [Cited 5 February 2021]. https://www.coneval.org.mx/SalaPrensa/Comunicadosprensa/Documents/Comunicado-09-Medicion-pobreza-2016.pdf

CONEVAL (Consejo Nacional de Evaluación de la Política de Desarrollo Social de México). 2020. Evolución de las líneas de pobreza por ingresos [online]. [Cited 21 December 2020]. https://www.coneval.org.mx/Medicion/MP/Paginas/Lineas-de-bienestar-y-canasta-basica.aspx

CONFECOOP. 2019. *Informe de Desempeño 2018.* Bogota.

Conteúdo, E. 2020. "Para nós, não existe alimento bom ou ruim", dizem representantes da industria. *IstoÉ Dinheiro,* 19 September 2020 [online]. [Cited 11 November 2020]. https://www.istoedinheiro.com.br/para-nos-nao-existe-alimento-bom-ou-ruim-dizem-representantes-da-industria/

Cortes Neri, M. (ed.). 2008. *A nova classe média.* Rio de Janeiro (Brasil). CPS, Fundação Getúlio Vargas e Instituto Brasileiro de Economía. (also available at: https://www.cps.fgv.br/ibrecps/M3/M3_ANovaClasseMedia_Port_2.pdf).

CREA. 2020a. El impacto del COVID-19 en el agro [online]. [Cited 28 September 2020]. https://www.crea.org.ar/el-impacto-del-covid-19-en-el-agro/

CREA. 2020b. *Reporte de Actualidad Agro CREA: Agosto 2020.* Buenos Aires.

Cruz, S. 2020. *Análisis de las políticas públicas e iniciativas privadas que apoyan el uso de las plataformas digitales por las MYPIMES agrícolas y agroindustriales en México y El Salvador, Guatemala y Honduras* [project report]. Mexico. ECLAC.

CSO (Central Statistical Office of Saint Lucia). 2020. *Quarterly GDP by economic activity in constant prices.* Castries.

Cuadrado, C. & García, J.L. 2015. *Estudio sobre el cálculo de indicadores.* Santiago. Ministerio de Salud de Chile.

DANE (Departamento Administrativo Nacional de Estadística). 2018. *Boletín Técnico: Indicadores básicos de tenencia y uso de tecnologías de la información y comunicación – TIC en hogares y personas de 5 y más años.* Bogota.

DANE (Departamento Administrativo Nacional de Estadística). 2020. *Encuesta Nacional de Servicios: Agosto 2020.* Bogota.

Dansby, N., Grennell, Z., Leppek, M., Mcnaughton, S., Phillips, M., Sieloff, K. & Wilke, C. 2012. *Food innovation districts: A land use tool for communities seeking to create and expand a regional food industry.* East Lansing (United States of America). Michigan State University.

DC (Defensoría del Consumidor de El Salvador). 2015. *Institucionalidad y derecho de consumo en El Salvador.* San Salvador. Equipo Maíz.

De Janvry, A. & Sadoulet, E. 2016. *Develompent Economics.* New York (United States of America). Routledge.

De La O Campos, A.P., Villani, C., Davis, B. & Takagi, M. 2018. *Ending extreme poverty in rural areas – Sustaining livelihoods to leave no one behind.* Rome. FAO.

De Paoli, L., Rodríguez Fazzone, M., Urrea, J. & Zuluaga Orrego, J. 2016. *Sistemas de Abastecimiento Alimentario-Bases para la inclusión de la Agricultura Familiar.* Bogota. FAO & Government of Antioquia.

Del Grossi, M.E. 2020a. *Agricultura familiar ampliada. Boletim do Centro de Gestão e Inovação da Agricultura Familiar – CEGAFI/UnB.* Brasilia. UnB.

Del Grossi, M.E. 2020b. *Análise nacional. Boletim do Centro de Gestão e Inovação da Agricultura Familiar – CEGAFI/UnB.* Brasilia. UnB.

Department of Health and Social Care. 2020. New obesity strategy unveiled as country urged to lose weight to beat coronavirus (COVID-19) and protect the NHS [online]. [Cited 16 December 2020]. https://www.gov.uk/government/news/new-obesity-strategy-unveiled-as-country-urged-to-lose-weight-to-beat-coronavirus-covid-19-and-protect-the-nhs

DGA-MOP. 2015. *Cuenca Choapa. Información Hídrica de las Cuencas Priorizadas, Fichas Temáticas.* Santiago.

Diario Financiero. 2008. Empresarios en alerta por rotulación de alimentos no van a cumbre de salud. *Diario Financiero,* 25 March 2008: 6. Santiago.

Diario Financiero. 2011. Chilealimentos y Sofofa piden al Senado no aprobar ley de etiquetado. *Diario Financiero,* 13 April 2011: 11. Santiago.

Diario Financiero. 2014a. AB Chile: "Nos oponemos a toda discriminación en términos tributarios". *Diario Financiero,* 29 April 2014: 5. Santiago.

Diario Financiero. 2014b. ABChile advierte impactos por reglamento de etiquetado de alimentos. *Diario Financiero,* 20 August 2014: 8. Santiago.

Diario Financiero. 2014c. Ley de etiquetado: restricciones en publicidad obligarían cambios en el modelo de negocios. *Diario Financiero,* 30 September 2014: 10. Santiago.

Diario Financiero. 2014d. Etiquetado: Economía asume rol clave para acercar posiciones con industria alimenticia. *Diario Financiero,* 10 October 2014: 8. Santiago.

Diario Financiero. 2015. Etiquetado de alimentos: CCS solicita a embajadas que intercedan ante autoridades. *Diario Financiero,* 1 de 10 de 2015: 10. Santiago.

Diario Financiero. 2016. AB Chile tras voto en contra de Coca-Cola: "La campaña fue aprobada por la mayoría del gremio". *Diario Financiero,* 23 December 2016: 7. Santiago.

Diaz-Bonilla, E. & Callaway, V. 2018. *The G20, global trade and investment regimes, and a sustainable food future. How the G20 Can Help Sustainably Reshape the Global Trade System: A Compilation of Analysis.* Geneva (Switzerland). International Centre for Trade and Sustainable Development (ICTSD) (also available at: https://www.ictsd.org/themes/global-economic-governance/research/how-the-g20-can-help-sustainably-reshape-the-global-trade).

Díaz-Bonilla, E. & Del Campo, M.V. 2010. *A Long and Winding Road: The Creation of the Inter-American Development Bank.* Washington, D.C. IFPRI. (also available at: https://www.ifpri.org/sites/default/files/a_long_and_winding_road_the_creation_of_the_inter_american_development_bank.pdf).

Díaz-Bonilla, E. & Fernández-Arias, E. 2019. *Políticas públicas y mercados financieros para el desarrollo rural y del sistema agroalimentario en América Latina y el Caribe. LAC Working Paper 2.* Washington, D.C. IFPRI. (also available at: https://doi.org/10.2499/p15738coll2.133331).

Diaz-Bonilla, E. & Saravia-Matus, S. 2019. Los objetivos de desarrollo sostenible y el desarrollo rural en América Latina y el Caribe: Reflexiones sobre costos y financiamientos. *2030 – Alimentación, agricultura y desarrollo rural en América Latina y el Caribe,* no. 33. Santiago. FAO. (also available at: http://www.fao.org/3/ca5438es/ca5438es.pdf).

Díaz-Bonilla, E. 2015. *Macroeconomics, agriculture, and food security: A guide to policy analysis in developing countries.* Washington, D.C. IFPRI. (also available at: http://dx.doi.org/10.2499/9780896298590).

Díaz-Bonilla, E. 2018a. El financiamiento de 'Un futuro alimentario sostenible': Algunas reflexiones para el G-20. *Agenda Internacional,* no. 40: 24. Lima. IDEI-PUCP.

Díaz-Bonilla, E. 2018b. Financing 'a sustainable food future': some thoughts for the G20. *Economics Discussion Paper,* no. 2018-73. Kiel (Germany). Kiel Institute for the World Economy. (also available at: http://www.economics-ejournal.org/economics/discussionpapers/2018-73).

Diaz-Bonilla, E. 2019. América Latina y el Caribe en la economía verde y azul. *Pensamiento Iberoamericano,* no. 7: 94-105. Madrid. SEGIB. (also available at: https://issuu.com/segibpdf/docs/09-ed).

Diaz-Bonilla, E. 2020. Fiscal and monetary responses to the COVID-19 pandemic: Some thoughts for developing countries and the international community. In *COVID-19 and global food security* (eds. Johan Swinnen & John McDermott). Washington, D.C. IFPRI (also available at: https://doi.org/10.2499/p15738coll2.133762_22).

Díaz-Bonilla, E., Centurión M. & Paz F. (forthcoming). *Políticas Fiscales Para Mejorar El Acceso Económico A Dietas Saludables.* Washington, D.C. IFPRI.

Diaz-Bonilla, E., Fernández-Arias, E., Piñeiro, V., Prato, B. & Arias, J. 2019. *Foro de análisis financiamiento e inclusión financiera para el desarrollo agropecuario, rural y de sistemas alimentarios en América Latina y el Caribe: Documento resumen. LAC Working Paper 5. Washington, D.C. IFPRI. (also available at: https://doi.org/10.2499/p15738coll2.133448).*

Díaz-Bonilla, E., Loboguerrero, A.M., Verchot, L., Viglizzo, E. & Mirzabaev, A. 2018. *Financiamiento de 'Un futuro alimentario sostenible'.* Buenos Aires. Consejo Argentino para las Relaciones Internacionales (CARI). (also available at: https://t20argentina.org/wp-content/uploads/2018/06/TF3-3.5-Task-Force-3-FINAL-v4-EDB-revised-after-peer-review.pdf).

ECLAC. 2018. *Estado de la banda ancha en América Latina y el Caribe 2017.* Santiago.

ECLAC. 2019. *Panorama Social de América Latina 2019.* Santiago.

ECLAC. 2020A. *Dimensionar los efectos del COVID-19 para pensar en la reactivación. Informe Especial COVID-19 No. 2.* Santiago.

ECLAC. 2020a. *Enfrentar los efectos cada vez mayores del COVID-19 para una reactivación con igualdad: nuevas proyecciones. Informe Especial COVID-19 No.5.* Santiago.

ECLAC. 2020b. Impactos de la pandemia en los sectores productivos más afectados abarcarán a un tercio del empleo y un cuarto del PIB de la region [online]. [Cited 13 September 2020]. https://www.cepal.org/es/comunicados/impactos-la-pandemia-sectores-productivos-mas-afectados-abarcaran-un-tercio-empleo-un

ECLAC. 2020c. *Medidas de recuperación del sector turístico en América Latina y el Caribe: Una oportunidad para promover la sostenibilidad y la resiliencia. Informes COVID-19,* July 2020. Santiago.

ECLAC. 2020d. *Universalizar el acceso a las tecnologías digitales para enfrentar los efectos del COVID-19. Informe Especial COVID-19 No. 7.* Santiago.

El País. 2017. Valle del Cauca, la segunda región donde más se produce fruta en Colombia. *El País.com.co,* 23 July 2017 [online]. [Cited 5 January 2021]. https://www.elpais.com.co/economia/valle-del-cauca-la-segunda-region-onde-mas-se-produce-fruta-en-colombia.html

EMBRAPA (Empresa Brasileña de Investigación Agropecuaria). 2020. Comercialização e consumo de hortaliças durante a pandemia do novo coronavírus [online]. [Cited 18 October 2020]. https://www.embrapa.br/en/busca-de-noticias/-/noticia/52561599/artigo---comercializacao-e-consumo-de-hortalicas-durante-a-pandemia-do-novo-coronavirus

Ericksen, P.J. 2008. Conceptualizing food systems for global environmental change research. *Global Environmental Change,* vol. 18, no. 1, February 2008.

Escobar, G., Penagos, A.M., Albacete, M. & García, D. 2020. *Los efectos del COVID-19 en el abastecimiento de alimentos: Un primer análisis. RIMISP, Análisis n° 2.* Santiago.

Extra.globo.com. 2008. Governo e indústria fecham acordo para reduzir gordura trans em alimento [online]. [Cited 11 November 2020]. https://extra.globo.com/noticias/brasil/governo-industria-fecham-acordo-para-reduzir-gordura-trans-em-alimentos-628325.html

EY. 2020. El 78% de los consumidores ha disminuido sus compras, ¿Cómo será el consumo después del COVID-19?, 3 August 2020 [online]. [Cited 30 September 2020]. https://www.ey.com/es_co/covid-19/como-sera-el-consumo-despues-del-covid-19

Fajardo Montana, D. 1996. Fronteras, colonizaciones, y construcción social del espacio. In *Frontera y poblamiento: Estudios de Historia y Antropología de Colombia y Ecuador* (eds. Caillavet, C. & Pachón, X.). Lima. IFEA.

Fan, S., Díaz-Bonilla, E., Cho, E.E. & Rue, Christopher. 2018. SDG 2.1 and SDG 2.2: Why open, transparent, and equitable trade is essential to ending hunger and malnutrition sustainably. In *Achieving Sustainable Development Goal 2: Which Policies for Trade and Markets?* (eds. Jonathan Hepburn & Christophe Bellmann). Washington, D.C. IFPRI.

FAO & ECLAC. 2020a. *Cómo evitar que la crisis del COVID-19 se transforme en una crisis alimentaria: Acciones urgentes contra el hambre en América Latina y el Caribe.* Santiago. FAO.

FAO & ECLAC. 2020b. *Sistemas alimentarios y COVID-19 en América Latina y el Caribe: Comportamiento del comercio durante la crisis. Boletín no. 12.* Santiago. FAO.

FAO & ECLAC. 2020c. *Sistemas alimentarios y COVID-19 en América Latina y el Caribe: Hábitos de consumo de alimentos y malnutrición. Boletín no. 10.* Santiago. FAO.

FAO & ECLAC. 2020d. *Sistemas alimentarios y COVID-19 en América Latina y el Caribe: La oportunidad de la transformación digital. Boletín no. 8.* Santiago, FAO.

FAO & FLAMA. 2020. *Mercados mayoristas: Acción frente al COVID-19. Boletín no. 3.* Santiago. FAO.

FAO & IDB. 2019. *Aplicación de Tecnologías de la Información y Comunicación en el Sector Agropecuario Hondureño* (Programa Cooperativo FAO – IDB). Tegucigalpa. FAO.

FAO & PAHO. 2017. *Panorama de la seguridad alimentaria y nutricional en América Latina y el Caribe 2017.* Santiago. FAO.

FAO, IFAD, PAHO, UNICEF & WPF. 2020. *Panorama de la seguridad alimentaria y nutricional en América Latina y el Caribe 2020.* Santiago. FAO.

FAO, IFAD, UNICEF, WFP & WHO. 2019. *El Estado de la seguridad alimentaria y la nutrición en el mundo 2019.* Rome. FAO.

FAO, IFAD, UNICEF, WFP & WHO. 2020. *The State of Food Security and Nutrition in the World 2020.* Rome. FAO.

FAO, PAHO, UNICEF & WFP. 2019. *Panorama de la seguridad alimentaria y nutricional en América Latina y el Caribe 2019.* Santiago. FAO.

FAO. 1996. *Declaración de Roma sobre la Seguridad Alimentaria Mundial.* Rome.

FAO. 2000. Garantizar la calidad y la inocuidad de los alimentos vendidos en la vía pública. *Boletín Alimentos para las Ciudades,* 1 July 2000 [online]. [Cited 22 September 2020]. http://www.fao.org/tempref/docrep/fao/011/ak003s/ak003s09.pdf

FAO. 2002a. Alimentos de venta callejera [online]. [Cited 28 September 2020]. http://www.fao.org/fcit/food-processing/street-foods/es/

FAO. 2002b. Comida rápida, económica y también sana: FAO ayuda a mejorar la calidad de la comida de los puestos callejeros [online] [Cited 29 September 2020]. http://www.fao.org/spanish/newsroom/action/es_street.htm

FAO. 2002c. Datos y cifras: El Codex Alimentarius y la venta ambulante [online]. [Cited 1 October 2020]. http://www.fao.org/spanish/newsroom/action/facts_es_street.htm

FAO. 2016a. *Mejorar los sistemas de protección social para fomentar el desarrollo rural y la seguridad alimentaria.* Rome.

FAO. 2016b. *Memorias de la reunión de trabajo para para avanzar en la implementación del Plan SAN de la CELAC Seguridad alimentaria y cambio climático: Desafíos y oportunidades en América Latina y el Caribe* (memoria). Santiago de Los Caballeros (Dominican Republic).

FAO. 2016c. Pérdidas y desperdicios de alimentos en América Latina y el Caribe [online]. [Cited 20 November 2020]. http://www.labamerex.com/newsletter/news16/FAO-2016-Desperdicios-de-alimentos-en-Latinoamerica-Caribe.pdf

FAO. 2017a. *El estado mundial de la agricultura y la alimentación 2017.* Rome.

FAO. 2017b. *Frentes Parlamentarios contra el Hambre e iniciativas legislativas para el derecho a una alimentación y nutrición adecuadas: La experiencia de América Latina y el Caribe 2009-2016.* Rome.

FAO. 2017c. Nueva alianza reconoce el papel de los consumidores para impulsar el hambre cero, 11 April 2017 [online]. [Cited 30 September 2020]. http://www.fao.org/news/story/es/item/880827/icode/

FAO. 2017d. *Social protection for forest-dependent communities.* Rome.

FAO. 2018a. *El estado mundial de la agricultura y la alimentación 2018.* Rome.

FAO. 2018b. *FAO and Cash+. How to maximize the impacts of cash transfers.* Rome.

FAO. 2019a. Comienza el Decenio de la Agricultura Familiar, 29 May 2019 [online]. [Cited 21 September 2020]. http://www.fao.org/americas/noticias/ver/es/c/1196035/

FAO. 2019b. *Disruptive technologies for agriculture in Latin America and the Caribbean.* Concept Note. Rome.

FAO. 2019c. *Latin America and the Caribbean.* Concept Note. Rome.

FAO. 2020a. Food security indicators [online]. [Cited 26 August 2020]. http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/#.X3eqAWgzbIU

FAO. 2020b. GIEWS Country Brief: Cuba, 3 June 2020 [online]. [Cited 8 November 2020]. http://www.fao.org/giews/countrybrief/country.jsp?code=CUB&lang=en

FAO. 2020c. Global shrimp prices plummet. GLOBEFISH - Information and Analysis on World Fish Trade, 9 September 2020 [online]. [Cited 28 October 2020]. http://www.fao.org/in-action/globefish/market-reports/resource-detail/en/c/1306837/)

FAO. 2020d. *Seguridad alimentaria bajo la pandemia COVID-19.* Santiago.

FAO. 2020e. *The State of Agricultural Commodity Markets 2020. Agricultural markets and sustainable development: Global value chains, smallholder farmers and digital innovations.* Rome.

FAO. 2020f. *Using the Food Insecurity Experience Scale (FIES) to monitor the impact of COVID-19.* Rome. (also available at: http://www.fao.org/3/ca9205en/ca9205en.pdf).

Fernández, M.C., Tinghitella, G., Bert, F., Trigo, E., Demichelis, F. & Méndez, J.C. 2018. *La revolución Agrotech en Argentina. Financiamiento, oportunidades y desafíos.* Buenos Aires. IDB.

Flores, P., López, A., Fenoll, J., Helln, P. & Kelly, S. 2013. Classification of organic and conventional sweet peppers and lettuce using a combination of isotopic and bio-markers with multivariate analysis. *Journal of food composition and analysis,* 31, 217–225 (2013).

Flórez Espinosa, F. 2020. *Plan de Abastecimiento Alimentario de la Región Central de Colombia.* Bogotá. Región Administrativa y de Planeación Especial (RAPE).

FMM (Fundación Manuel Mejía). 2017. *Informe de Gestión 2017.* Bogota.

Food Empowerment Project. 2020. Desiertos Alimentarios. [online]. [Cited 22 September 2020]. https://foodispower.org/es/acceso-salud/desiertos-alimentarios/

Food Ethics Council. 2008. *Food Distribution. An ethical agenda.* Brighton (UK).

Forbes Central America. 2020. Pasarían de 4 a 8 años para recuperar remesas del 2019, 8 May 2020 [online]. [Cited 12 September 2020]. https://forbescentroamerica.com/2020/05/08/pasarian-de-4-a-8-anos-para-recuperar-remesas-del-2019/

G1 Paraná RPC. 2020. Agricultores ampliam rede de contatos e usam criatividade para contornar a crise provocada pela pandemia. *Caminhos do Campo,* 24 May 2020 [online]. [Cited 11 November 2020]. https://g1.globo.com/pr/parana/caminhos-do-campo/noticia/2020/05/24/agricultores-ampliam-rede-de-contatos-e-usam-criatividade-para-contornar-a-crise-provocada-pela-pandemia.ghtml

G1 Sul de Minas. 2020. Prefeituras doam alimentos da merenda para alunos carentes após suspensão de aulas em MG [online]. [Cited 11 November 2020]. https://g1.globo.com/mg/sul-de-minas/noticia/2020/04/02/prefeituras-doam-alimentos-da-merenda-para-alunos-carentes-apos-suspensao-de-aulas-em-mg.ghtml

García, Leslie. 2020. COVID-19: Nestlé donó más de 200 mil litros de leche y equipos de cómputo, 24 April 2020 [online]. [Cited 18 September 2020]. https://www.guatemala.com/noticias/sociedad/covid-19-nestle-dono-mas-200-mil-litros-leche-equipos-computo.html

GFK-Adimark. 2019. Chile come sano. GFK, February 2019 [online]. [Cited 5 January 2021] .https://cdn2.hubspot.net/hubfs/2405078/cms-pdfs/fileadmin/user_upload/country_one_pager/cl/images/estudio_jumbo_come_sano_2019.pdf

Gil Zapata, P. *et al.* 2011. *Presentación del Diagnóstico y diseño del plan de abastecimiento y distribución de alimentos para la ciudad de Medellín.* Medellin (Colombia). Alcaldía de Medellín.

Girardi, G. & Uauy, R. 2011. ¿Enfermar a las generaciones futuras? *El Mercurio,* 13 April 2011: 2. Santiago.

Goldman Sachs. 2016. Precision Farming: Cheating Malthus with digital agriculture. Profiles in innovation. Equity Research, July 13, 2016 (also available at: https://www.gspublishing.com/content/research/en/reports/2016/07/13/6e4fa167-c7ad-4faf-81de-bfc6acf6c81f.pdf).

Gomes, I. 2020. Pandemia deixa 9,7 milhões de trabalhadores sem remuneração em maio. *Agência IBGE Notícias,* 9 July 2020 [online]. [Cited 13 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/28038-pandemia-deixa-9-7-milhoes-de-trabalhadores-sem-remuneracao-em-maio

Google LLC. 2020. COVID-19 Community Mobility Reports [online]. [Cited 9 November 2020]. https://www.google.com/covid19/mobility/

Government of Antioquia. 2017. *Plan de Ordenamiento Territorial Agropecuario de Antioquia.* Medellin (Colombia).

Government of Colombia & FAO. 2020. *Coyuntura del abastecimiento alimentario en el marco del COVID-19 – Colombia.* Bogota. FAO.

Government of Mexico. 2020. *Estrategia Nacional de Ordenamiento Territorial (ENOT).* Mexico.

GPA. 2020. *Results: 2nd Quarter of 2020. 29 July 2020.* São Paulo (Brazil).

Grupo Carrefour Brasil. 2020. Resultados do 2T 2020. 28 July 2020. São Paulo (Brazil).

GSMA. 2019. The Mobile Economy Latin America 2019 [online]. [Cited 7 January 2021]. https://www.gsma.com/mobileeconomy/latam/

Haddad, L., Fanzo, J., Godfrey, S., Hawkes, C., Morris, S. & Neufeld, L. 2020. The COVID-19 Crisis and Food Systems: addressing threats, creating opportunities [online]. [Cited 5 January 2021]. https://www.gainhealth.org/media/news/covid-19-crisis-and-food-systems-addressing-threats-creating-opportunities

Hazell, P. & Rahman, A. 2014. *New Directions for Smallholder Agriculture.* Oxford (UK). Oxford University Press.

Hernández, M., Robles, M., Ceballos, F., García Martínez, M. & Britos, B. 2016. *Informe final de evaluación de impacto del plan del pacto hambre cero.* Washington, D.C. IFPRI. (also available at: http://www.siinsan.gob.gt/siinsan/wp-content/uploads/Informe-Final-Evaluacion-Impacto-PPH0.pdf).

Hill, J. 2012. Making the circular economy a reality [online]. [Cited 7 January 2021]. http://greenallianceblog.org.uk/2012/05/24/making-the-circular-economy-a-reality

HLPE. 2018. *La nutrición y los sistemas alimentarios. Un informe del Grupo de alto nivel de expertos en seguridad alimentaria y nutrición del Comité de Seguridad Alimentaria Mundial.* Roma. FAO (also available at: http://www.fao.org/3/I7846ES/i7846es.pdf).

Iannotti, L. & Robles, M. 2011. Negative Impact on Calorie Intake Associated with the 2006–08 Food Price Crisis in Latin America. *Food and Nutrition Bulletin*, 2011; 32(2):112-123.

IBGE (Instituto Brasileiro de Geografía y Estadística). 2020a. *Estatística da Produção Pecuária: abr.-jun. 2020.* Brasilia.

IBGE (Instituto Brasileiro de Geografía y Estadística). 2020b. POF 2017-2018: proporção de domicílios com segurança alimentar fica abaixo do resultado de 2004. *Agência IBGE Notícias,* 17 September 2020 [online]. [Cited 12 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-sala-de-imprensa/2013-agencia-de-noticias/releases/28896-pof-2017-2018-proporcao-de-domicilios-com-seguranca-alimentar-fica-abaixo-do-resultado-de-2004

IBGE (Instituto Brasileiro de Geografía y Estadística). 2020c. PNAD Contínua: taxa de desocupação é de 14,4% e taxa de subutilização é de 30,6% no trimestre encerrado em agosto de 2020. *Agência IBGE Notícias,* 20 de outubre de 2020 [online]. [Cited 13 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-sala-de-imprensa/2013-agencia-de-noticias/releases/29322-pnad-continua-taxa-de-desocupacao-e-de-14-4-e-taxa-de-subutilizacao-e-de-30-6-no-trimestre-encerrado-em-agosto-de-2020

IBGE (Instituto Brasileiro de Geografía y Estadística). 2020d. POF 2017-2018: brasileiro ainda mantém dieta à base de arroz e feijão, mas consumo de frutas e legumes é abaixo do esperado. *Agência IBGE Notícias,* 21 October 2020 [online]. [Cited 13 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-sala-de-imprensa/2013-agencia-de-noticias/releases/28646-pof-2017-2018-brasileiro-ainda-mantem-dieta-a-base-de-arroz-e-feijao-mas-consumo-de-frutas-e-legumes-e-abaixo-do-esperado

IDB & INTAL. 2018. La automatización en la región: actualidad y perspectivas. *Ideas de integración,* No. 264.

IDB, CIRAD, ECLAC, IICA, FONTAGRO & PROCISUR. 2016. *Encadenamientos productivos y circuitos cortos: innovaciones en esquemas de producción y comercialización para la agricultura familiar Análisis de la experiencia internacional y latinoamericana.* Santiago. ECLAC.

IDB. 2020. *Cómo acelerar el crecimiento económico y fortalecer la clase media: América Latina* (eds. de la Cruz, R., Manzano, O. & Loterszpil, M.) [online]. [Cited 11 September 2020]. https://publications.iadb.org/es/publications/spanish/document/Como-acelerar-el-crecimiento-economico-y-fortalecer-la-clase-media-America-Latina.pdf

IDEC (Instituto Brasileño de Protección al Consumidor). 2014. *Redução de sódio em alimentos: uma análise dos acordos voluntários no Brasil* (ed. Bortoletto Martins, A.P.). São Paulo (Brazil).

IDEC (Instituto Brasileño de Protección al Consumidor). 2019. Anvisa abre consulta pública sobre Rotulagem Nutricional. *IDEC Notícias,* 23 September 2019 [online]. [Cited 11 November 2020]. https://idec.org.br/noticia/anvisa-abre-consulta-publica-sobre-rotulagem-nutricional

IFPRI. 2021. *Agricultural Science and Technology Indicators (ASTI) Database* [online]. [Cited 5 January 2021]. http://www.asti.cgiar.org

IICA, IDB & Microsoft. 2020. *Conectividad rural en América Latina y el Caribe. Un puente al desarrollo sostenible en tiempos de pandemia.* San Jose. IICA.

ILO. 2020. México y la crisis de la COVID-19 en el mundo del trabajo: respuestas y desafíos. Nota técnica país (ed. Noémie Feix) [online]. [Cited December 2020]. https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---ilo-mexico/documents/publication/wcms_757364.pdf

ILO. 2020a. *Observatorio de la OIT: El COVID-19 y el mundo del trabajo.* Third edition. Geneva (Switzerland).

ILO. 2020b. *Observatorio de la OIT: El COVID-19 y el mundo del trabajo.* Sixth edition. Geneva (Switzerland).

ILO. 2020c. *Panorama Laboral en tiempos de la COVID-19: Impactos en el mercado de trabajo y los ingresos en América Latina y el Caribe.* Lima. ILO Regional Office for Latin America and the Caribbean.

IMF. 2020a. *Perspectivas de la Economía Mundial,* October 2020. Washington, D.C.

IMF. 2020b. Policy Responses to COVID-19, Policy Tracker [online]. [Cited December 2020]. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

INAC (Instituto Nacional de Carnes). 2020. *Sector Cárnico Uruguayo: Resultados al 3er. Trimestre 2020.* Montevideo.

INDEC (Instituto Nacional de Estadística y Censos). 2002. *Censo Nacional Agropecuario 2002.* Buenos Aires.

INDEC (Instituto Nacional de Estadística y Censos). 2020a. *Encuesta de supermercados y autoservicios mayoristas: Agosto 2020.* Vol. 4, no. 197. Buenos Aires.

INDEC (Instituto Nacional de Estadística y Censos). 2020b. *Encuestas cualitativas de comercio durante la emergencia sanitaria: Septiembre-Octubre 2020.* Buenos Aires.

INDEC (Instituto Nacional de Estadística y Censos). 2020c. *Producto Interno Bruto: Series por sector de actividad económica.* Buenos Aires.

INDECOPI (Autoridad Nacional de Protección del Consumidor del Perú). 2010. *Código de Protección y Defensa del Consumidor (Ley No. 29571).* Lima.

Industrias Pesqueras. 2020. La pesca argentina, ante el riesgo de paralización "inminente" por la COVID-19. *Industrias Pesqueras*, 30 March 2020 [online]. [Cited 8 December 2020]. https://industriaspesqueras.com/noticia-60435-seccion-Pol%C3%ADtica%20de%20Pesca

INEGI (Instituto Nacional de Estadística y Geografía de México). 2007. Censo Agrícola, Ganadero y Forestal 2007 [online]. [Cited 21 December 2020]. https://www.inegi.org.mx/programas/cagf/2007/

INEGI (Instituto Nacional de Estadística y Geografía de México). 2014. Encuesta Nacional Agropecuaria 2014, Conociendo el campo de México: Resultados [online]. [Cited 17 December 2020]. https://www.inegi.org.mx/contenidos/programas/ena/2014/doc/ena2014_pres.pdf

INEGI (Instituto Nacional de Estadística y Geografía). 2020. *Sistema de Cuentas Nacionales de México: Producto Interno Bruto Trimestral.* Mexico.

INEI (Instituto Nacional de Estadística e Informática). 2020a. *Encuesta Mensual de los Servicios – Agosto 2020. Informe Técnico no. 10,* October 2020. Lima.

INEI (Instituto Nacional de Estadística e Informática). 2020b. *Producto Bruto Interno Trimestral: Cuentas Nacionales Año Base 2007 – Junio 2020. Informe Técnico no. 12*, August 2020. Lima.

Infocampo. 2020. Agtech: se reglamentó la ley de promoción de economía de conocimiento, 12 October 2020 [online]. [Cited 8 December 2020]. https://www.infocampo.com.ar/agtech-se-reglamento-la-ley-de-promocion-de-economia-de-conocimiento/

Instituto Comida do Amanhã. 2020. *Online Food Systems Dialogues – Brazil* (ed. José Graziano Da Silva) [online]. [Cited 9 January 2021]. https://en.comidadoamanha.org/fsd-brasil-2020

IRENA (International Renewable Energy Agency). 2019. *Renewable Power Generation Costs in 2018.* Abu Dabi.

Izabela Hendrix Methodist University Center. 2015. Estado aprova lei que proíbe a venda de alimentos gordurosos em cantinas [online]. [Cited 12 November 2020]. http://izabelahendrix.edu.br/noticias/estado-aprova-lei-que-proibe-a-venda-de-alimentos

Jacquet, B. 2020. El impacto de la COVID-19 en la seguridad alimentaria de República Dominicana [online]. [Cited 28 September 2020]. https://blogs.iadb.org/sostenibilidad/es/el-impacto-de-la-covid-19-en-la-seguridad-alimentaria-de-republica-dominicana/

JUNAEB (Junta Nacional de Auxilio Escolar y Becas). 2020. Mapa Nutricional 2019 [online]. [Cited 21 December 2020]. https://www.junaeb.cl/wp-content/uploads/2013/03/Mapa-Nutricional-2019-1.pdf

Kamel, M.A., de Montgolfier, J., Caine, S., Ringer, S. & Puzio, S. 2020. *How to Ramp Up Online Grocery – without Breaking the Bank.* Boston (United States of America). Bain & Company.

Keep it Pure & Simple. 2014. Desiertos alimentarios, 23 April 2014 [online]. [Cited 22 September 2020]. https://keepitpureandsimple.wordpress.com/2014/04/23/desiertos-alimentarios/

Khan, M.H. & Blankenburg, S. 2009. The political economy of industrial policy in Asia and Latin America. In *Industrial Policy and Development* (eds. Cimoli, M., Dosi, G. & Stiglitz, J.E.). New York (United States of America). Oxford University Press.

Kolodinsky, J., Sitaker, M., Chase, L., Smith, D. & Wang, W. 2020. Food Systems Disruptions: Turning a Threat into an Opportunity for Local Food Systems. *Journal of Agriculture, Food Systems, and Community Development*, 9(3), 5-8 (also available at: https://doi.org/10.5304/jafscd.2020.093.013).

Kreter, A.C., Servo, F., Almeida, A.C. & Souza Júnior, J. 2020. Exportações de proteína animal. *Carta de Conjuntura,* no. 23 October 2020. Brasilia. IPEA.

Kreter, A.C., Souza Júnior, J.R.C. & Servo, F.R. 2020. Economía Agrícola. *Carta de Conjuntura,* no. 46, 2nd quarter 2020. Brasilia. IPEA.

LaBerge, L., O'Toole, C., Schneider, J. & Smaje, K. 2020. How COVID-19 has pushed companies over the technology tipping point- and transformed business forever. Survey by McKinsey & Company [online]. [Cited 9 January 2021]. https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever

Larrín, L. 2011. Quitarle un caramelo a un niño. *El Mercurio,* 12 April 2011: 2. Santiago.

Lefebvre, H. 1970. *De lo rural a lo urbano.* Paris. Editions Anthropos.

Llobera Serra, F. & Arandilla, M.R. 2015. *Economía circular y agroecología: Integrando alimentos km 0 y gestión de biorresiduos.* España. Ministerio de Agricultura, Alimentación y Medio Ambiente (also available at: https://www.tierrasagroecologicas.es/wp-content/uploads/2015/01/Manual-Economia-circular-vweb-v7.pdf).

López-Noriega, C.D. 2011. *La configuración territorial y el desarrollo local: aproximación a las relaciones funcionales en el caso de los sistemas productivos locales en el Oriente Antioqueño* (Master's thesis). Medellin (Colombia). Universidad de Antioquia.

Loschi, M. 2019. Comer fora de casa consome um terço das despesas das famílias com alimentação. *Agência IBGE Notícias,* 4 October 2019 [online]. [Cited 12 November 2020]. https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/25607-comer-fora-de-casa-consome-um-terco-das-despesas-das-familias-com-alimentacao

Luiselli, C. 2017. *Agricultura y Alimentación en México: Evolución, desempeño y perspectivas.* Mexico. Siglo XXI Editores.

Luiselli, C. 2018. *Territorios, ciudades y pequeños productores: estrategia para el crecimiento y la seguridad alimentaria.* Mexico. CEDRSSA.

Luiselli, C. 2020. *Reflexiones sobre el Desarrollo a partir de la Pandemia del COVID-19.* Mexico. PUED-UNAM.

Luiselli, C. 2021 (forthcoming). El concepto de sistema alimentario: evolución y análisis. In *El Sistema Alimentario Global: una visión conceptual, prospectiva y propositiva* (ed. Piñeiro, M.).

Lustig, N. *et al.* 2020. *The Impact of COVID-19 lockdowns and expanded Social Assistance on Inequality, Poverty and Mobility in Argentina, Brazil, Colombia and Mexico. CEQ Working Paper 92.* New Orleans (United States of America) Tulane University.

MAGYP (Ministerio de Agricultura, Ganadería y Pesca de Argentina). 2020a. *Boletín Porcino: Septiembre 2020.* Buenos Aires.

MAGYP (Ministerio de Agricultura, Ganadería y Pesca de Argentina). 2020b. *Indicadores Oferta y Demanda – Carne Aviar.* Buenos Aires.

MAGYP (Ministerio de Agricultura, Ganadería y Pesca de Argentina). 2020c. *Principales Indicadores del Sector Bovino: Septiembre 2020.* Buenos Aires.

Malassis, L. 1979. *Economie Agro-Alimentaire: Economie de la consommation et de la production agro-alimentaire.* Paris. Ed. Cujas.

MAPA (Ministerio de Agricultura, Ganadería y Abastecimiento de Brasil). 2020. Nota Técnica n° 42/2020/DAEP/SPA, 15 September 2020 [online]. [Cited 5 January 2021]. https://ojoioeotrigo.com.br/wp-content/uploads/2020/09/SEI_21000-090207_2019_56-SolicitacaoRevisaoGuiaAlimentar-Sept2020.pdf

Marinoudi, V., Sørensen, C.G., Pearson, S. & Bochtis, D. 2019. Robotics and Labour In Agriculture. A Context Consideration. *Biosystems engineering,* v. 184, pp. 111-121.

Martínez Lomelí, L. 2017. Desiertos alimentarios: la polémica entre alimentos frescos disponibles. *El Economista,* 7 November 2017 [online]. [Cited 22 September 2020]. https://www.eleconomista.com.mx/opinion/Desiertos-alimentarios-la-polemica-entre-alimentos-frescos-disponibles-20171107-0045.html).

Martínez, H. 2019. *Propuesta de estrategia para el desarrollo y adopción de la eAgricultura en Chile.* Santiago. UTI.

Matson, J. & Thayer, J. 2013. The role of Food Hubs in Food Supply Chain. *Journal of Agriculture Food Systems and Community Development,* 3(4):1-5.

Mazzucato, M. 2020. La triple crisis del capitalismo. Project Syndicate [online]. [Cited 5 January 2021]. https://www.project-syndicate.org/commentary/covid19-crises-of-capitalism-new-state-role-by-mariana-mazzucato-2020-03/spanish

McCullough, E.B., Pingali, PL. & Stamoulis, K.G. 2008. Small Farms and the Transformation of Food Systems: An Overview. In *The Transformation of Agri-Food Systems: Globalization, Supply Chains and Smallholder Farmers.* London. FAO & Earthscan.

McKinsey Global Institute. 2011. Resource Revolution: Meeting the world's energy, materials, food, and water needs [online]. [Cited December 2020]. http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/resource-revolution

McKinsey. 2020. Brazilian farmers' approach to digital: Embracing digital [online]. [Cited December 2020]. https://www.mckinsey.com/industries/agriculture/our-insights/brazilian-farmers-approach-to-digital

MDA (Ministerio de Desarrollo Agropecuario de Brasil). 2010. *The Fome Zero (Zero Hunger) Programme: The Brazilian experience* (eds. da Silva, JG., Del Grossi, ME. & de França, CG.). Brasilia (also available at: https://grazianodasilva.com/wp-content/uploads/2020/01/a-i3023e.pdf).

Medina, B. & Vargas, J. 2020. Aumento de la Pobreza en México, otro golpe derivado del COVID-19. Reporte del Centro de Investigaciones Económicas de la Universidad Autónoma de Nuevo León [online]. [Cited 5 January 2021] https://puntou.uanl.mx/expertos-uanl/aumento-de-la-pobreza-en-mexico-otro-golpe-derivado-del-covid-19/

Méndez, A. & Vélez, J.P. 2018 (unpublished). *Evolución de la Agricultura de Precisión en Argentina durante 20 años.*

Mendoza, O., Pérez, R., Estrada, M. & Condori, M. 2020. *Diagnóstico efectos COVID-19 en la producción agropecuaria y seguridad alimentaria.* La Paz. FAO Bolivia.

Mercurio, El. 2010. Lanzan campaña educativa para leer etiquetado de comidas. *El Mercurio,* 18 August 2010: C 5. Santiago.

Mercurio, El. 2011. Gobierno quita apoyo a proyecto sobre venta y publicidad de alimentos. *El Mercurio,* 13 April 2011: C8. Santiago.

Mercurio, El. 2013. Norma de etiquetado de alimentos dejaría sin advertencias a bebidas y cereales. *El Mercurio,* 7 June 2013: C 13. Santiago.

Mercurio, El. 2016a. INTA y McDonald's se enfrentan por análisis a la "cajita feliz". *El Mercurio,* 29 June 2016: C 6. Santiago.

Mercurio, El. 2016b. Ministerio de Salud tilda como "agresiva" campaña contra Ley de Etiquetado de Alimentos. *El Mercurio,* 22 December 2016: C 8. Santiago.

Mercurio, El. 2019a. La ley de etiquetado está cambiando los hábitos de consumo de las madres chilenas. *El Mercurio,* 25 February 2019: A 13. Santiago.

Mercurio, El. 2019b. Seis de cada diez chilenos declaran que sellos de alimentos influyen en su decisión de compra. *El Mercurio,* 21 January 2019b: B 5. Santiago.

Míguez, D. 2015. Gestión integrada de recursos hídricos en Uruguay en el contexto internacional. *Revista del Laboratorio Tecnológico del Uruguay, INNOTEC* 2015, 10 (71 - 81).

MINAGRI (Ministerio de Agricultura y Riego). 2020a. *Indicadores Productivos: Sub Sector Industrial 2019–2020.* Lima.

MINAGRI (Ministerio de Agricultura y Riego). 2020b. *Principales Indicadores de la Actividad Avícola: 2019–20.* Lima.

MINSAL (Ministerio de Salud de Chile). 2017. Encuesta Nacional de Salud 2016-2017 [online]. [Cited January 2021]. https://www.minsal.cl/wp-content/uploads/2017/11/ENS-2016-17_PRIMEROS-RESULTADOS.pdf

MINSAL (Ministerio de Salud de Chile). 2019a. Directriz para la Vigilancia y Fiscalizacion de la Composicion Nutricional de los Alimentos y su Publicidad, de acuerdo al Reglamento Sanitario de los Alimentos [online]. [Cited January 2021]. https://www.minsal.cl/wp-content/uploads/2018/05/Directriz-Fiscalizaci%C3%B3n-y-Vigilancia-Decreto-VWW.pdf

MINSAL (Ministerio de Salud de Chile). 2019b. Evaluación Ley de Alimentos N°20.606 [online]. [Cited January 2021]. https://www.minsal.cl/wp-content/uploads/2019/08/EVALUACION-LEY-DE-ALIMENTOS_julio-2019_02.pdf

MINSAL (Ministerio de Salud de Chile). 2019c. *Manual de Etiquetado Nutricional de Alimentos* (segunda edición). Santiago (also available at: https://www.minsal.cl/wp-content/uploads/2019/07/2019.07.18_MANUAL-DE-ETIQUETADO_ACTUALIZADO-2019.pdf).

MINTIC. 2019. *Plan de acción para el aceleramiento de la digitalización del sector agropecuario.* Bogota.

MIT. 2011. *The Third Revolution: the convergence of the life sciences, physical sciences and engineering.* Washington, D.C.

Mogues, T. 2020. *Los mercados de alimentos durante la COVID-19. Serie especial sobre la COVID-19.* Washington, D.C. IMF.

Montes, R. 2020. Julio Berdegué, representante regional de la FAO: "En América Latina podemos tener un retroceso histórico en la lucha contra el hambre". *El País,* 8 June 2020 (also available at: https://elpais.com/sociedad/2020-06-08/en-america-latina-podemos-tener-un-retroceso-historico-en-la-lucha-contra-el-hambre.html).

Mostrador, El. 2011. Anuncian manifestaciones hasta que Gobierno retire veto contra ley que regula la comida chatarra. *El Mostrador,* 13 June 2011. Santiago.

Mostrador, El. 2017. Girardi arremete contra Evercrisp: "Quieren seguir poniendo ganchos para envenenar a los niños". *El Mostrador,* 31 May 2017. Santiago.

Nabarro, D. 2019. *The Food Systems Dialogues: Emerging Themes 2018 –19. V4: 11th December 2019* [online]. [Cited 20 January 2021]. https://foodsystemsdialogues.org/wp-content/uploads/2020/04/191218_Red-Thread-themes-synthesis.pdf

Nación, La. 2016. Girardi y Conadecus acusan que Nestlé no cumple con Ley de Etiquetado. *La Nación,* 28 June 2016 (also available at: http://www.lanacion.cl/noticias/pais/salud/girardi-y-conadecus-acusan-que-nestle-no-cumple-con-ley-de-etiquetado/2016-06-28/152249.html).

Nascimento, W.M., Carvalho, H.M.G., Siqueira, K.B. 2020. *O consumo de hortaliças na pandemia.* Brasilia. Embrapa Hortaliças.

National Academy of Sciences. 2019. *Science Breakthroughs to Advance Food and Agricultural Research by 2030.* Washington, D.C.

NCD Alliance. 2020. New report details hundreds of examples of unhealthy commodity industries led by big alcohol big food and big soda leveraging the COVID 19 pandemic, 10 September 2020 [online]. [Cited 15 September 2020]. https://ncdalliance.org/news-events/news/new-report-details-hundreds-of-examples-of-unhealthy-commodity-industries-leveraging-the-covid-19-pandemic

Nestlé Central America. 2020. Nestlé El Salvador distribuye más de 2 millones de porciones de alimentos para albergues y familias afectadas, 8 May 2020 [online]. [Cited 10 January 2021]. https://www.nestle-centroamerica.com/media/pressreleases/allpressreleases/nestl%C3%A9-el-salvador-distribuye-m%C3%A1s-de-2-millones-de-porciones-de-alimentos-para

Nielsen. 2020a. COVID-19 afectará más a los consumidores de bajos ingresos en Latinoamérica, 2 July 2020 [online]. [Cited 30 September 2020]. https://www.nielsen.com/co/es/insights/article/2020/covid-19-afectara-mas-a-los-consumidores-de-bajos-ingresos-en-latinoamerica/

Nielsen. 2020b. La vida más allá del COVID-19: Lo que los fabricantes y retailers deben comenzar a preparar, 6 July 2020 [online]. [Cited 30 September 2020]. https://www.nielsen.com/co/es/insights/article/2020/la-vida-mas-alla-del-covid-19/

Nkonya, E., Mirzabaev, A. & von Braun, J. (eds.). 2016. *Economics of land degradation and improvement- A global assessment for sustainable development.* Cham (Switzerland). Springer International Publishing (also available at: http://dx.doi.org/10.1007/978-3-319-19168-3).

Nutritional Health Alliance. 2014. *Información alimenticia de productos industriales puede ser engañosa* [online]. [Cited 28 December 2020]. https://alianzasalud.org.mx/2014/02/informacion-alimenticia-de-productos-industriales-puede-ser-enganosa/

Nutritional Health Alliance. 2020. El Impuesto Saludable [online]. [Cited 2 October 2020]. https://impuestosaludable.org/

OCDE. 2018. *How digital technologies are impacting the way we grow and distribute food.* Paris.

OCDE. 2019. *Digital oportunities for better agricultural policies.* Paris.

OCLAC. 2020. Coronavirus COVID-19 ¡Los gobiernos tienen que actuar ya! Informational pamphlet. (also available at: http://www.launionuyc.org.ar/wp-content/uploads/2020/03/72EACACB-65B3-4D3C-9491-D9D43507AC83-768x964.jpeg).

OCOTE (Agencia Ocote). 2020. ¿Qué medidas de aislamiento tomaron los países de América Latina durante la crisis por el coronavirus? *OCOTE,* 8 May 2020 [online]. [Cited 12 September 2020]. https://www.agenciaocote.com/blog/2020/05/08/que-medidas-de-aislamiento-tomaron-los-paises-de-america-latina-durante-la-crisis-por-el-coronavirus/

ODNI (US Office of the Director of National Intelligence). 2012. Global Water Security. Intelligence Community Assessment. ICA 2012-08, 2 February 2012 [online]. [Cited 19 October 2020]. https://www.dni.gov/files/documents/Newsroom/Press%20Releases/ICA_Global%20Water%20Security.pdf

Orjuela, J. 2020. *Desarrollo de cadenas logísticas cortas alimentarias para Bogotá Región, una propuesta más allá de la coyuntura del COVID-19.* Working paper. Bogota. Universidad Distrital Francisco José de Calda.

Ovalle Favela, J. 2005. Los derechos de los consumidores. *Revista de Derecho Privado,* year IV, No. 12: 75-111.

PAHO (Pan American Health Organization). 2015. Los alimentos ultra procesados son motor de la epidemia de obesidad en América Latina, señala un nuevo reporte de la OPS/OMS, 1 September 2015 [online]. [Cited 18 September 2020]. https://www.paho.org/hq/index.php?option=com_content&view=article&id=11180:ultra-processed-foods&Itemid=1926&lang=es

PAHO (Pan American Health Organization). 2019. *Las ENT de un vistazo: Mortalidad de las enfermedades no transmisibles y prevalencia de sus factores de riesgo en la Región de las Américas.* Washington, D.C.

Palacios-Argüello, L., Morganti, E. & González-Feliu, J. 2017. Food hub: una alternativa para alimentar las ciudades de manera sostenible. *Revista Transporte y Territorio,* (17), 10-33.

Parente L., M.A. 2020. Inflação por faixa de renda – Outubro/2020. *Carta de Conjuntura,* 11 November 2020 [online]. [Cited 13 November 2020]. https://www.ipea.gov.br/cartadeconjuntura/index.php/tag/inflacao-por-faixa-de-renda/

Pavan, L.C. 1997. *La protección del consumidor en el Mercosur: Análisis comparativo de los sistemas de Argentina, Brasil y Chile.* Buenos Aires. INAP.

Peña Gil, H.A., Cuartas Castro, K.A. & Tarazona Bermudez, G.M. 2017. La brecha digital en Colombia: Un análisis de las políticas gubernamentales para su disminución. *Redes de Ingeniería,* special edition, January – June 2017.

Petrova, D., Slamanca-Fernández, E., Rodriguez Barranco, M., Navarro Pérez, P., Jiménez Moleón, J.J., y Sánchez, M.J. 2020. La obesidad como factor de riesgo en personas con COVID-19: posibles mecanismos e implicaciones. *Atención Primaria,* May 2020: 496-500.

PIADAL (Panel Independiente sobre la Agricultura para el Desarrollo de América Latina). 2013. *Agricultura y desarrollo en América Latina: gobernanza y políticas públicas.* Buenos Aires. Teseo (also available at: https://www.rimisp.org/wp-content/files_mf/1374521421Libro_PIADAL.pdf).

Pinstrup-Andersen, P. & Watson II, D.D. (eds.). 2011. *Food Policy for Developing Countries.* Ithaca (United States of America) and London. Cornell University Press.

Popkin, B. & Reardon, T. 2018. Obesity and the food system transformation in Latin America. *Obesity Reviews,* 19(8): 1028–1064.

Popkin, B., Du, S., Green, W.D., Beck, M.A., Algaith, T., Herbst, C.H., Alsukait, R.F., Alluhidan, M., Alazemi, N. y Shekar, M. 2020. Individuals with obesity and COVID-19: A global perspective on the epidemiology and biological relationships. *Obesity Reviews,* 21(11). (also available at: https://doi.org/10.1111/obr.13128).

Porter, M. & Kramer, M. 2006. Strategy & society: the link between competitive advantage and corporate social responsibility. *Harvard Business Review,* no. 1680.

Presidency of the Republic of Brazil. 2010. *Brasil 2003 a 2010.* Brasilia. (also available at: http://www.balancodegoverno.presidencia.gov.br/sintese-politica/sintese-politica-versao-impressa).

Presidency of the Republic of Brazil. 2020. Auxílio Emergencial: mais de 63,5 milhões de brasileiros já receberam o benefício do Governo Federal. Portal da Presidência da República, Casa Civil, 19 June 2020 [online]. [Cited 13 November 2020]. https://www.gov.br/casacivil/pt-br/assuntos/noticias/2020/junho/auxilio-emergencial-mais-de-63-5-milhoes-de-brasileiros-ja-receberam-o-beneficio-do-governo-federal

Pym, H. 2020. Coronavirus prompts PM into obesity crackdown. *BBC News,* 24 July 2020 [online]. [Cited 27 October 2020]. https://www.bbc.com/news/uk-53522492

Quiñonez, L. 2020. Comer menos carne y reducir el desperdicio de alimentos, dos estrategias contra el cambio climático ignaradas por los países. *Noticias ONU,* 1 September 2020 [online]. [Cited 7 September 2020]. https://news.un.org/es/story/2020/09/1479802

Rabobank. 2020. *Sugar Quarterly: Q3 2020.* Utrecht (Netherlands).

Rastoin, J.L. & Ghersi, G. 2012. Le système alimentaire mondial: concepts et méthodes, analyses et dynamiques. *Économie rurale,* 329, March-June 2012. (also available at: http://journals.openedition.org/economierurale/3444).

Rede Brasil Atual. 2020. Municípios do semiárido não entregam cestas básicas durante a pandemia [online]. [Cited 11 November 2020]. https://www.redebrasilatual.com.br/cidadania/2020/10/municipios-do-semiarido-nao-entregam-cestas-basicas-durante-a-pandemia/

Revista Summa. 2020. Pobreza e inequidad amenazan el Derecho Humano a la alimentación adecuada en Centroamérica, 25 February 2020 [online]. [Cited 20 November 2020]. https://revistasumma.com/pobreza-e-inequidad-amenazan-el-derecho-humano-a-la-alimentacion-adecuada-en-centroamerica/

Reyes, M., Smith Taillie, L, Popkin, B., Kanter, R., Vandevijvere, S. & Corvalán, C. 2020. Changes in the amount of nutrient of packaged foods and beverages after the initial implementation of the Chilean Law of Food Labelling and Advertising: A nonexperimental prospective study. *PlosMedicine 17,* no. 7. San Francisco (United States of America).

Rocha, C. 2020. Como a pandemia causa um estrago na agricultura familiar. *Nexo Jornal,* 11 May 2020 [online]. [Cited 11 November 2020]. http://sociovet.sites.uff.br/wp-content/uploads/sites/11/2020/05/Pandemia-e-a-agricultura-familiar.pdf

Rodríguez Fazzone, M. *et al.* 2018. *Sistema de abastecimiento alimentario subregiones de Bajo y Medio Putumayo.* Bogota. FAO & Ministerio de Justicia de Colombia.

Rodríguez Fazzone, M., Ortiz, S. *et al.* 2020. *Los activos intangibles de la agricultura familiar en los sistemas agroalimentarios. Programa Mesoamérica Sin Hambre.* Rome. AMEXCID & FAO.

Rodríguez Fazzone, M., Ramírez-Gomez, CJ., Tribin, J.P. & Santos, D. 2018. *Sistemas de abastecimiento agroalimentario del departamento Nariño.* Bogota. FAO, AECID & Ministerio de Justicia de Colombia.

Rodríguez, A., Rodrigues, M., Sotomayor, O. & Wander, P. 2019. *Plataformas co-gestionadas y red de redes: nuevas formas de prestación de servicios para implementar la Agenda 2030.* Santiago. FAO.

Rodríguez, T., Torres, R.M., Gómez, L., Bayres, K. & Velásquez, D. 2013. *Agricultura Familiar en Nicaragua. Serie Documentos de Trabajo, documento no. 15.1.* Santiago. RIMISP.

Rojas, K. 2020. El hambre aumenta mientras un alto volumen de alimentos se desperdicia. *La Estrella de Panamá,* 16 March 2020 (also available at: https://www.laestrella.com.pa/cafe-estrella/cultura/200316/hambre-aumenta-alto-volumen-alimentos).

Rotondi, V., Billari, F., Pesando, L.M. & Kashyap, R. 2020. *Desigualdad digital de género en América Latina y el Caribe.* San Jose. IICA.

Ruiz, S. 2020. *¿Quién paga la cuenta? Gravar la riqueza para enfrentar la crisis de la COVID-19 en América Latina y el Caribe.* Oxfam Internacional Reports and Publications, July 2020 [online]. [Cited 15 September 2020] https://www.oxfam.org/es/informes/quien-paga-la-cuenta-gravar-la-riqueza-para-enfrentar-la-crisis-de-la-covid-19-en-america

Ruiz-Roso, M.B., de Carvalho Padilha, P., Mantilla-Escalante, D.C., Ulloa, N., Brun, P., Acevedo-Correa, D., Arantes Ferreira Peres, W. *et al.* 2020. Covid-19 Confinement and Changes of Adolescent's Dietary Trends in Italy, Spain, Chile, Colombia and Brazil. *Nutrients,* 12, 1807. (also available at: https://www.mdpi.com/2072-6643/12/6/1807).

Sacchet de Carvalho, S. 2020. Os efeitos da pandemia sobre os rendimentos do trabalho e o impacto do auxílio emergencial: os resultados dos microdados da PNAD COVID-19 de julho. *Carta de Conjuntura, IPEA,* no. 48, 3. trim. 2020 (also available at: https://www.ipea.gov.br/portal/images/stories/PDFs/conjuntura/200826_cc48_resultados_pnda_julho.pdf

Sadler, M.P., Millan Arredondo, A., Swann, S.A., Vasileiou, I., Baedeker, T., Parizat, R., Germer, L.A. & Mikulcak, F. 2016. *Making climate finance work in agriculture.* Washington, D.C. World Bank (also available at: http://documents.worldbank.org/curated/en/986961467721999165/Making-climate-finance-work-in-agriculture).

Salazar, L., Schling, M., Palacios, A.C. & Pazos, N. 2020. *Retos para la agricultura familiar en el contexto del COVID-19: Evidencia de productores en ALC.* Washington, D.C. IDB.

Salcedo, S. & Guzmán, L. (eds.). 2014. *Agricultura Familiar en América Latina y el Caribe, Recomendaciones de Política.* Santiago. FAO.

Sampaio, C. 2020. Estoque de alimentos está abaixo dos 20% necessários ao país, alerta especialista. *Brasil de Fato,* 24 June 2020 [online]. [Cited 13 November 2020]. https://www.brasildefato.com.br/2020/06/24/estoque-de-alimentos-esta-abaixo-dos-20-necessarios-ao-pais-alerta-especialista

Sánchez Legrán, P. & Murillo, P.L. 2011. *El movimiento de defensa de los consumidores en América Latina y el Caribe.* Santiago. Fundación FACUA.

Sánchez Legrán, P., Trímboli Vercesi, J., Flores Alemán, A., Cáceres Valle, C., Larenas Riobó, S., Rodríguez Arias, P.V.S., Calderón

Ruiz, H. *et al.* 2020. *El fomento de organizaciones de consumidores sostenibles social y financieramente en América Latina y el Caribe.* Sevilla (Spain). Fundación FACUA.

Santos, M. & Silveira, M.L. 2001. *O Brasil. Território e sociedade no início do século XXI.* Rio de Janeiro (Brazil). Editora Record.

Santos, M. 2000. *La naturaleza del espacio: Técnica y tiempo, razón y emoción.* Barcelona (Spain). Ariel.

Scarpitta, N. 2019. Grupos de discusión por Whatsapp en la regional Este, otra herramienta para hacer extensión. *Revista del Plan Agropecuario,* no. 171, September 2019. Montevideo.

Schaverien, A. 2020. Boris Johnson's New Tactic Against the Virus: Urge Britons to Lose Weight. *The New York Times,* 27 July 2020 (also available at: https://www.nytimes.com/2020/07/27/world/europe/uk-boris-johnson-coronavirus-obesity.html).

Schmidhuber, J. & Qiao, B. 2020. *Comparing Crises: "Great Lockdown" vs "Great Recession".* Rome. FAO.

School of Public Health Dr. Salvador Allende G. – University of Chile. 2018. Consumo de bebidas azucaradas disminuyó 21% tras impuesto, 4 July 2018 [online]. [Cited 1 October 2020]. http://www.saludpublica.uchile.cl/noticias/144788/consumo-de-bebidas-azucaradas-disminuyo-21-tras-impuesto

Secretaría de Defensa Nacional. 2020. ¡Promesa cumplida! Más de 742 mil familias hondureñas, en promedio han recibido alimentos a través de las tres fases de la Operación Honduras Solidaria [online]. [Cited 28 October 2020]. https://sedena.gob.hn/2020/08/21/promesa-cumplida-mas-de-742-mil-familias-hondurenas-en-promedio-han-recibido-alimentos-a-traves-de-las-tres-fases-de-la-operacion-honduras-solidaria/

Segunda, La. 2008. Salud pide urgencia para proyecto sobre comida chatarra. *La Segunda,* 18 March 2008: 7.

Segunda, La. 2011. Ministro de Economía: Proyecto de etiquetado de alimentos puede afectar "competitividad y empleo". *La Segunda,* 13 April 2011: 5.

Segunda, La. 2013. Ley de Etiquetado en cuenta regresiva: la industria advierte riesgos para comercio exterior, pero sobrevive la "Cajita Feliz". *La Segunda,* 26 January 2013: 14-15.

Senauer, B. 2001. *The Food Consumer in the 21st Century: New Research Perspectives.* The Food Industry Center, Working Papers. Minneapolis (United States of America). University of Minnesota.

Shah, P. 2020. *Digital Agriculture for a Sustainable and Resilient Agriculture.* Lecture given at the XXXVI FAO Regional Conference for Latin America and the Caribbean, 19–21 October 2020, Managua, Nicaragua.

Shamah-Levy, T., Mundo Rosas, V., Flores-De la Vega, M. & Luiselli Fernández, C. 2017. Food Security governance in México: How can it be improved? *Global Food Security,* vol. 14, September 2017.

Shekar, M. & Popkin, B. 2020. *Obesity: Health and Economic Consequences of an Impeding Global Change.* Washington, D.C. World Bank.

SIB (Statistical Institute of Belize). 2020. *Economy contracts 23.3% in second quarter: Economic activity down across all three sectors.* Belmopan.

SIMCI (Sistema Integrado de Monitoreo de Cultivos Ilícitos). *2020. Informe Completo de Monitoreo de Territorios Afectados por Cultivos Ilícitos en Colombia 2019.* Bogota.

Singapore Guide. 2020. Hawker Food [online]. [Cited 2 October 2020]. https://www.guiadesingapur.com/que-y-donde-comer/hawker-food/

Slow Food. 2012. La centralidad del alimento: Documento congresual 2012-2016 [online]. [Cited 9 January 2021]. http://slowfood.com/filemanager/official_docs/SFCONGRESS2012_La_centralidad_del_alimento.pdf

Soto Baquero, F., Falconi, C. & Rodríguez Fazzone, M. (eds.). 2007. *Políticas para la Agricultura Familiar en América Latina y el Caribe.* Santiago. FAO & IDB.

Sotomayor, O., Rodríguez, A. & Rodrigues, M. 2011. *Competitividad, sostenibilidad e inclusión social en la agricultura: nuevas direcciones en el diseño de políticas en América Latina y el Caribe.* Santiago. ECLAC.

Souza Júnior, J., Cavalcanti, M., Mansur Levy, P. & de Carvalho, L. 2020. Visão geral da conjuntura. *Carta de Conjuntura, IPEA, n. 48, 3. Trim. 2020* (also available at: https://www.ipea.gov.br/portal/images/stories/PDFs/conjuntura/201001_cc_48_visao_geral.pdf).

Spósito, E.S. 1999. A Teoria dos dois circuitos da economia urbana nos países desenvolvidos: seu esquecimento ou sua superação. *Caderno Prudentino de Geografía,* vol. 1, no. 21.

Stott, D., Lee, E. & Nichols, E. 2014. Feasibility Study. Small/Medium farm product distribution in the lower Mainland. Part 1, Requeriments for a Local Food Distribution System [online]. [Cited 5 January 2021]. https://www.refbc.com/sites/default/files/FFCF-Report-1-Requirements-for-food-distribution.pdf

Swinburn, B.A., *et al.* 2019. The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet Commission report. *The Lancet,* 2019: 791-846.

Taillie L.S., Reyes, M., Colchero, M.A., Popkin, B., Corvalán, C. 2020. An evaluation of Chile's Law of Food Labeling and Advertising on sugar-sweetened beverage purchases from 2015 to 2017: A before-and-after study. *PLOS Medicine,* 17(2): e1003015 (also available at: https://doi.org/10.1371/journal.pmed.1003015).

Tan, M., Feng H. & MacGregor, G.A. 2020. Obesity and COVID-19: the role of the food industry. *BMJ,* June 2020: 369.

Tercera, La. 2010a. Ministerio de Salud desecha uso de "semáforo" en etiquetado de alimentos. *La Tercera,* 31 August 2010: 10.

Tercera, La. 2010b. Expertos critican etiquetado de la industria de alimentos por entregar información errónea. *La Tercera,* 2 September 2010: 11.

Tercera, La. 2010c. Salud presenta reclamo al Conar por etiquetado en alimentos. *La Tercera,* 4 September 2010: 15.

Tercera, La. 2015. Gremio de alimentos pide que Ley de Etiquetado se aplique sólo a productos que salen a la venta. La Tercera, 29 December 2015: 18.

Tercera, La. 2016. Kellogg's recurre a la justicia por Ley de Etiquetado de Alimentos. *La Tercera,* 12 October 2016: 14.

Teutsch, B. 2019. *100 Under $100: Tools for Reducing Postharvest Losses.* La Pine, Oregon (United States of America). Postharvest Education Foundation. (also available at: https://www.jotform.com/form/916518378498 76).

Thompson, M. 2011. Antibiotic crisis grows while drugs companies make lifestyle meds. *The Conversation,* 21 November 2011 [online]. [Cited 5 December 2020]. https://theconversation.com/antibiotic-crisis-grows-while-drug-companies-make-lifestyle-meds-4373

Toledo, V.M. 2008. El paradigma biocultural: crisis ecológica, modernidad y culturas tradicionales. *Sociedad y Ambiente,* vol. 1, no. 1, March-June, 2013.

Torero, M. 2020. COVID-19 and Food Supply: A Four-Pronged Battle Plan for Countries [online]. [Cited 7 January 2021]. (also available at: https://maximotorero.com/2020/03/23/covid-19-and-food-supply-a-four-pronged-battle-plan-for-countries/

Trigo, E. & Elverdin, P. 2019. Los sistemas de investigación y transferencia de tecnología agropecuaria de América Latina y el Caribe en el marco de los nuevos escenarios de ciencia y tecnología. *Serie 2030 – Alimentación, agricultura y desarrollo rural en América Latina y el Caribe,* no. 19. Santiago. FAO.

Trivelli, C. & Berdegué, J. 2019. Transformación rural. Pensando el futuro de América Latina y el Caribe. *Serie 2030: Alimentación, agricultura y desarrollo rural en América Latina y el Caribe,* no. 1. Santiago. FAO.

Trivelli, C. 2019 (unpublished). Más y mejores servicios rurales a partir de las nuevas tecnologías.

UCTACAM. 2018. Pedreño, presidente de COCETA valora positivamente la contribución del cooperativismo frente a los objetivos de desarrollo sostenible [online]. [Cited 9 January 2021]. http://uctacam.coop/noticias/1892/pedreno-presidente-de-coceta-valora-positivamente-la-contribucion-del-cooperativismo-frente-a-los-objetivos-de-desarrollo-sostenible

UN Women. 2020. Valorar el trabajo que sustenta a familias y sociedades: La demanda de las trabajadoras domésticas de América Latina, 9 September 2020 [online]. [Cited 13 September 2020]. https://www.unwomen.org/es/news/stories/2020/9/feature-value-domestic-workers-across-latin-america

UNCTAD. 2018. *Manual sobre protección del consumidor.* Geneva (Switzerland). United Nations.

UNESCO. 2017. Adaptarse al cambio climático podría costar hasta 100 mil millones de dólares al año dentro de unas décadas [online]. [Cited 28 December 2020]. http://www.unesco.org/new/es/natural-sciences/environment/water/wwap/facts-and-figures/all-facts-wwdr3/fact-12-cost-of-adaptation/

UNICEF, WHO & World Bank. 2020. *Levels and trends in child malnutrinion: Key findings of the 2020 Edition of the Joint Child Malnutrition Estimates.* Geneva (Switzerland). WHO.

UNICEF. 1989. *Convención sobre los Derechos del Niño.* Madrid.

UNICEF. 2015. *Estudio exploratorio sobre la promoción y publicidad de alimentos y bebidas no saludables dirigida a niños en América Latina y el Caribe* (ed. Paola Letona). Panama.

UNICEF. 2020. *UNICEF: El etiquetado frontal de alimentos y bebidas aprobado en México*, "de los mejores del mundo". Press release, 5 February 2020 [online]. [Cited 1 October 2020]. https://www.unicef.org/mexico/comunicados-prensa/unicef-el-etiquetado-frontal-de-alimentos-y-bebidas-aprobado-en-m%C3%A9xico-de-los

United Nations General Assembly. 2015. Resolución 70/186 sobre protección del consumidor, 22 December 2015 [online]. [Cited 17 November 2020]. https://undocs.org/es/A/RES/70/186

United Nations. 2020. Cumbre sobre los Sistemas Alimentarios: Acerca de la Cumbre [online]. [Cited February 2021]. https://www.un.org/es/food-systems-summit/about

University of Toronto. 2017. Overview of Argentina's G20 Presidency 2018. Building consensus for fair and sustainable development [online]. [Cited 27 December 2020]. http://www.g20.utoronto.ca/2018/2018-Overview-en.html

Vasconcellos, H. 2020. Brasil esvazia estoques de alimentos e perde ferramenta para segurar preços. *UOL Economia,* 21 September 2020 [online]. [Cited 13 November 2020]. https://economia.uol.com.br/noticias/redacao/2020/09/19/estoques-publicos-conab-alimentos-reducao.htm

Vilela, PR. 2020. Governo zera imposto de importação do arroz até o final do ano. *Agência Brasil,* 9 September 2020 [online]. [Cited 13 November 2020]. https://agenciabrasil.ebc.com.br/economia/noticia/2020-09/governo-zera-imposto-de-importacao-do-arroz-ate-o-final-do-ano

Wallace, A. 2020. Coronavirus: las cuestionadas prácticas de los fabricantes de leche de fórmula acusados de utilizar la pandemia de COVID-19 (y qué ocurre en América Latina). *BBC News Mundo,* 16 July 2020 [online]. [Cited 9 January 2021]. https://www.bbc.com/mundo/noticias-53305532

WHO. 1981. *Código Internacional de Comercialización de Sucedáneos de la Leche Materna.* Geneva (Switzerland).

WHO. 2016. Global Health Observatory indicator views [online]. [Cited 12 November 2020]. https://apps.who.int/gho/data/node.imr

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A. *et al.* 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet Commissions,* vol. 393: 10170, p447-492.

Winder, N. 2018. *Protección social: Sinergias con agricultura y resiliencia.* Lecture given at the Conference on "Social Innovation: formulas for better social protection and productive inclusion in Central America and the Dominican Republic", April 9–12, 2018, Punta Cana, Dominican Republic.

Winpenny, J.. 2003. *Financing Water for All. Report of the World Panel on Financing Water Infrastructure* (ed. Michel Camdessus). Paris. World Water Council. (also available at: http://www.worldwatercouncil.org/fileadmin/world_water_council/documents_old/Library/Publications_and_reports/CamdessusReport.pdf).

World Bank. 2007. *Informe del Desarrollo Mundial.* Washington, D.C. Oxford University Press.

World Bank. 2017. *La base de datos global Findex 2017. Medición de la inclusión financiera y la revolución de la tecnología financiera.* Washington, D.C.

World Bank. 2018. Comer fuera: para muchos significa ir a un puesto de comida callejera [online]. [Cited 14 November 2020]. https://www.bancomundial.org/es/news/feature/2018/01/10/comer-fuera-para-muchos-significa-ir-a-un-puesto-de-comida-callejera

World Bank. 2019. *Future of Food: Harnessing Digital Technologies to Improve Food System Outcomes.* Washington, D.C.

World Bank. 2020. El Banco Mundial prevé la mayor caída de remesas de la historia reciente [online]. [Cited 16 September 2020]. https://www.bancomundial.org/es/news/press-release/2020/04/22/world-bank-predicts-sharpest-decline-of-remittances-in-recent-history

World Bank. 2021. Global Findex [online]. [Cited 9 January 2021]. https://globalfindex.worldbank.org/#data_sec_focus).

World Economic Forum. 2017. *World Economic Forum Annual Meeting 2017. System Initiative on Shaping the Future of Food Security and Agriculture. Summary Report.* Davos-Klosters (Switzerland). (also available at: http://www3.weforum.org/docs/IP/2016/NVA/AM17_FSA_summaryreport.pdf?ET_CID=1648402&ET_RID=001b0000002mX9HAAU).

Zeinstra, G., van der Haar, S. & van Bergen, G. 2020. *Drivers, barriers and interventions for food waste behaviour change: a food system approach.* Wageningen (Netherlands). Wageningen Food & Biobased Research.

Zuluaga O., J. & Santini, G. 2019. *Evaluación y planificación del Sistema Agroalimentario Ciudad-Región Medellín (Colombia).* Rome. FAO & Fundación RUAF.

Zuluaga O., J. 2020. *Transformación del espacio floricultor: un territorio de la globalización en el Cercano Oriente de Antioquia*. Medellin (Colombia). Universidad de Antioquia.

Zuluaga O., J. *et al.* 2018. *Sistema de abastecimiento alimentario desde la producción hasta el consumo, para elaborar una propuesta de estructura al modelo de comercio local sostenible para la ciudad de Medellín.* Medellin (Colombia). FAO & Alcaldía de Medellín.

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