



## POLICY BRIEF No. 52

Investing wisely to end hunger and strengthen agriculture, with no region left behind:

# Latin America

## Abstract

Latin America and the Caribbean economies began to slow down and stagnate during the 2008 economic crisis. This situation has been aggravated by the current health crisis, which is expected to set back regional development by almost ten years. Projected gross domestic product (GDP) was expected to shrink by 9.1% by the end of 2020, falling to values similar to those observed in 2010. In addition, poverty has increased like never before in only one year, reaching an estimated total of 231 million people, about 38% of all the population, with almost two out of every five poor people living in extreme poverty, and who are more exposed to food insecurity. However, the extent of the current economic crisis is quite heterogeneous among countries. For some, it is coupled with pre-pandemic conditions of political instability, social unrest, high poverty rates, and extreme food insecurity. Countries from the Dry Corridor (El Salvador, Nicaragua, Honduras, and Guatemala) were already facing a continuing exodus of people trying to escape from their precarious economic situations aggravated by environmental disasters such as the recent hurricanes. Countries facing political instability and social unrest are likely to suffer more from the uncertainty in their economic systems and their populations are prone to leave, while areas with erratic climate conditions have had to deal with high-risk agriculture and face similar consequences. If no immediate actions are taken, this problem could be exacerbated, creating an even greater flow of outward migration, risking the region's stability and its potential to become a major food producer for the world. Agriculture is one of the most relevant sectors for its potential to continue contributing to food security, poverty reduction, and resilience to counteract external shocks such as climate uncertainty or the current health crisis.

## KEY MESSAGES



Latin America's economy began stagnating in 2008 and was not well prepared when the health crisis hit, causing major impacts that have decreased gross domestic product and increased poverty rates like never before.



Latin America has the potential to become the largest food supplier for the world given its natural resource endowment but it requires strengthening of its productive capacity.



The region is facing its biggest out-migration flow in history (i.e., Central America and Venezuela), and, for those countries in the Dry Corridor, extreme climate change shocks will exacerbate migratory conditions if left unattended.



The region has heterogeneous agricultural R&D systems with innovative examples such as public-private alliances and a strong presence of international research centers.



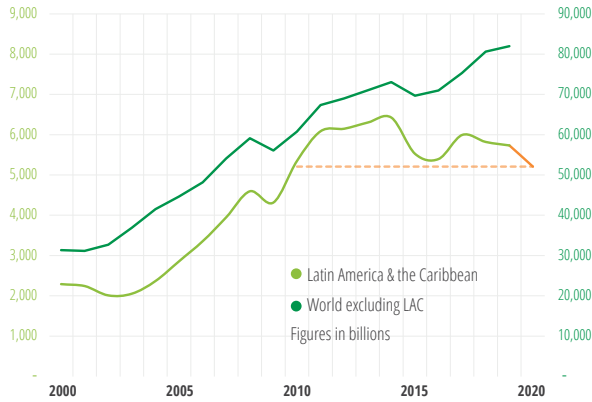
Agriculture continues to be one of the most relevant sectors for its potential to contribute to food security, poverty reduction, and resilience to counteract external shocks such as climate uncertainty and the current health crisis.

## KEY WORDS

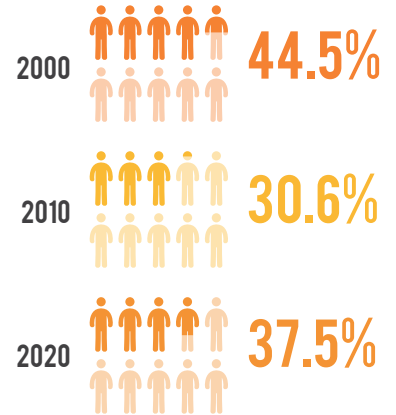
Agriculture, R&D investments, COVID-19, migration, climate change, poverty, Latin America.

# INVESTING WISELY TO END HUNGER AND STRENGTHEN AGRICULTURE, NO REGION LEFT BEHIND: LATIN AMERICA

IN 2020, GDP IS EXPECTED TO FALL BY 9.1%, REACHING LEVELS SIMILAR TO 2010



POVERTY INCREASED IN THE LAST YEAR AS NEVER BEFORE, REACHING 231 MILLION PEOPLE

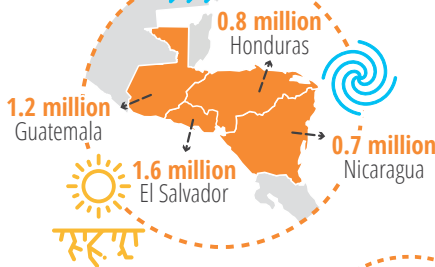


**CIMMYT**  
International Maize and Wheat Improvement Center



Epicenter of the **green revolution** led by Norman Borlaug, with the introduction of dwarf wheat varieties in 1971

**5 million** people fled these countries in 2019



Major **development hub** for advanced lines of biofortified rice, maize and beans delivered around the world

Alliance  
**Bioversity**  
**CIAT**  
International Center for Tropical Agriculture

**CIP**  
INTERNATIONAL POTATO CENTER



South-to-south technological spillovers, e.g., **cassava** multimillion industry in Asia

**5.4 million** have fled **Venezuela** between 2015-2020



THE REGION IS FACING ITS LARGEST MIGRATION CRISIS, IN ADDITION TO AN INCREASE IN THE SEVERITY OF EXTREME CLIMATE EVENTS



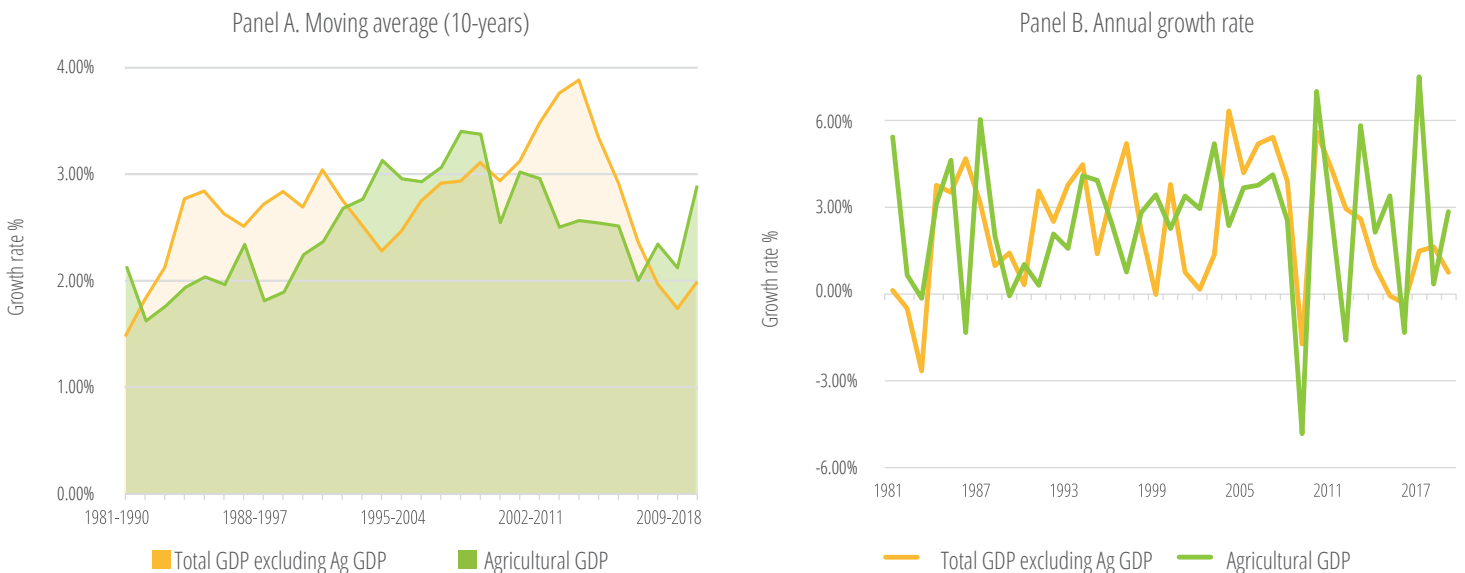
Successful public-private research models that contribute to developing and scaling up technologies, creating impactful interventions e.g. **FLAR's role in rice research**



# Introduction

Latin America and the Caribbean (LAC) has a relevant endowment of natural resources, and agriculture is one of the most dynamic and resilient sectors that depends on them. Although LAC has just 8% of the world's population, it accounts for 14% to 16% (around 7.5 million sq. km.) of all global agricultural land (The World Bank, 2021a; FAO, 2021a), 23% of the potentially arable land (FAO, 2016), and 35% of the world's renewable water resources (FAO, 2021a). The region also represents 45% of the net exports of agricultural food products globally (Trivelli and Berdegué, 2019), and it is set to become the main food exporting region in the world by 2028 (OECD and FAO, 2019). For several countries (e.g., Argentina, Brazil, Chile, Colombia, Ecuador, and Peru), agriculture and agro-industrial production represent a major item in their economic systems. Furthermore, this sector must guarantee food

security for almost 650 million people living in the region (The World Bank, 2021b), although availability is not a concern (except for the Caribbean); rather, access to diversified healthy food remains a problem (Intini et al., 2019). The contribution of agriculture to the region's economic growth, significant progress in diverse socioeconomic indicators, and its key contribution throughout time are undeniable. Currently, the sector represents 5% of the total GDP and 14% of the regional labor force. During the past decade, its moving average annual growth rate was higher than the total GDP growth rate that in contrast with agriculture has declined (Figure 1, Panel A). However, the agricultural GDP growth rate has wide variations year by year, making evident the sector's sensitivity to external shocks (e.g., climate change, market instability, social unrest, world health crisis) (Figure 1, Panel B).



**Figure 1: Annual growth rate of agricultural GDP and total GDP excluding agricultural GDP in Latin America.**

**Note:** Calculated and prepared by authors. Data source: World Bank open-access datasets.

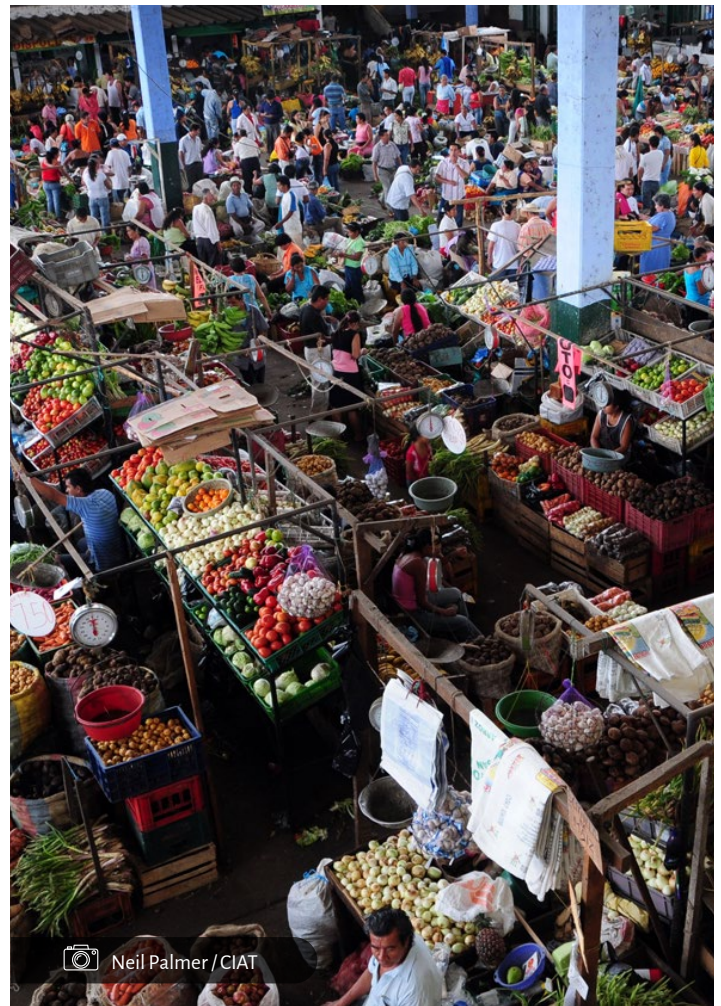
This dynamic agricultural sector results from years of agricultural research and development (R&D) investments that have contributed to the reaping of such benefits. LAC was investing in agricultural R&D merely 1.5% of the total agricultural GDP, and this represented almost 9% of the total agricultural R&D shared worldwide in 2011 (Pardey et al., 2016). It was estimated that agricultural R&D investments have a median annual internal rate of return of 39% and a median benefit-cost ratio of 10.7 (Hurley et al., 2016). Nevertheless, maintaining these high returns requires consistent investments in agricultural R&D.

Currently, a heavy concentration of R&D capacity exists. Countries such as Brazil, Argentina, and Mexico account for 76% of the R&D funding in the region and 74% of the total agricultural production value in recent decades, but during recent years, Brazil has cut its investments in agricultural R&D dramatically (Dehmer et al., 2019; Pardey et al., 2018). Other countries, such as Chile, Uruguay, and Colombia, have implemented policies to encourage private-public partnerships for R&D in earlier stages that lead to R&D systems in which private farmers' associations actively participate in the agenda (Trigo et al., 2013). These countries account for almost one-tenth of R&D funding and a similar percentage of agricultural production value (Dehmer et al., 2019; Pardey et al., 2016; Pardey et al., 2018). The remaining group of countries (22) accounts for the remaining percentage, but many have the potential to improve and strengthen their national R&D systems. For instance, Venezuela had strong research institutions that were decimated by their economic crisis but could recover, eventually building upon what was already available. Other countries, such as Peru, lack a strong public system for R&D; economic growth has led universities and others to take on the role to carry out R&D (Stads and Beintema, 2009; Chaherli and Nash, 2013). On the other hand, some regions have stagnated like most of the Caribbean countries that account for small agricultural production and do not have robust research systems, instead heavily depending on R&D spillover technologies from other countries and regions.

Besides the regional R&D context, since the 2008 global financial crisis, most LAC economies have slowed down and stagnated. This situation has been aggravated by the current health crisis, which is expected to set back regional development by almost ten years. Projected GDP was expected to shrink by 9.1% by the end of 2020, falling to values similar to those observed in 2010 (CEPAL, 2020a). In addition, poverty has increased like never before in only one year, reaching an estimated total of 231 million people, about 38% of all the regional population, with almost two out of every five poor people living in extreme poverty, and who are more exposed to food insecurity (CEPAL, 2020a). However, the extent of the current economic crisis is quite heterogeneous among countries. For some, it is coupled with pre-pandemic conditions of political instability, social unrest, huge poverty rates, and extreme food insecurity. For example, countries such as Venezuela and those in the Central American

Dry Corridor (El Salvador, Guatemala, Honduras, and Nicaragua) were already facing a continuing exodus of people trying to escape from precarious economic situations, which has aggravated socioeconomic conditions around the region (Soto and Saramago, 2019).

Under this challenging context, the region faces a crossroads to invest in short-term policies, but also to consider adequate long-term measures that would strengthen regional conditions and maintain food sovereignty. Laborde et al. (2020) advise an estimated investment in agricultural R&D of an additional US\$14 billion per year on average until 2030 to end hunger and increase small-scale producers' income in low- and middle-income countries across the globe. No specific recommendations exist for the region, but it is relevant to strengthen regional R&D investments in view of the aforementioned heavy concentration of R&D funds in only a few countries and the economic problems that most governments face.



# Dissecting the region's problems

## Hunger and the urban/rural poor

Over the past five years, LAC has faced a continuous deterioration in its food security conditions: a significant increment in hunger, with almost one in every three persons affected by moderate or severe food insecurity by 2020. During this period, the number of undernourished people increased by more than 13 million, and it is expected that the zero-hunger goal (Sustainable Development Goal 2) might not be met in 2030 if this trend continues. Estimates calculate that 67 million people will suffer from hunger by 2030, and that value has not yet taken into consideration the current health crisis. It is also worrisome that almost 75% of all deaths (2.8 million people) in 2016 were attributed to non-communicable diseases (FAO et al., 2021), which are avoidable with good nutrition and preventive measures.

Stunting and overweight in children under five years old remain a prevalent concern, even though in the past three decades stunting decreased by more than half (to 9% in 2019) and overweight barely increased (7.5% in 2019). These issues have a specific prevalence related to both the rural and urban population. For example, the former population has higher stunting levels, while the latter population is more affected by overweight, especially those poorer people that lack financial means to obtain healthier diets (FAO et al., 2021; FAO and CEPAL, 2020a). Besides children, several studies demonstrate that females are more vulnerable to food insecurity. In LAC, food insecurity prevails in 32% of all females, with only 26% for males, representing almost 20 million more females affected than males (FAO et al., 2021).

Another relevant aspect of ending hunger relates to the composition of diets. Traditionally in the region, most countries rely on cereals, roots, and tubers as the main sources of energy (39% of the average calorie intake), but with notorious differences across countries. Even though cereals remain the main source of energy, most countries have evolved their diets to incorporate other products into them, and have diversified energy sources, with heterogeneous diets across countries. For example, in Bolivia, Haiti,



## HISTORY OF AGRICULTURAL R&D IN LAC

The origins of agricultural R&D in Latin America trace back at least two centuries, when the Portuguese established the first botanical garden in Rio de Janeiro, Brazil, in 1808. However, it wasn't until the beginning of the twentieth century that R&D systems became institutionalized in the region, primarily led by the public sector, with incipient efforts that lacked cohesion. It was not until World War II that the region revamped its agricultural R&D efforts with the support of the United States, which considered the region a strategic target given its natural resource endowment and food production capacity during periods of conflict. Countries such as Mexico (1943) invited the Rockefeller Foundation to support and guide the innovation process in agriculture. Similar events took place in Costa Rica, El Salvador, and Nicaragua (1942); Bolivia, Ecuador, and Paraguay (1943); Guatemala (1944); Chile (1948); Panama (1953); Colombia (1955); and the Dominican Republic (1962). The United States government and private foundations (e.g., Rockefeller and Ford) helped create 23 new research institutions to strengthen R&D capacity in the region. During the 1960s, LAC became the epicenter of the Green Revolution led by Norman Borlaug and the introduction of dwarf wheat varieties. In 1971, global initiatives focused on food security and hunger reduction, which led to the consolidation of the Consultative Group on International Agricultural Research (CGIAR). Two of the four founding centers, the Centro Internacional de Mejoramiento de Maíz y Trigo and the Centro Internacional de Agricultura Tropical (CIMMYT and CIAT), were based in LAC, and a third one, the Centro Internacional de la Papa (CIP), joined the consortium one year later (Byerlee, 2016; Lynam and Byerlee, 2017). The region's historical contribution to global R&D in agriculture is undeniable, and it continues to have critical potential to provide lessons and innovations for all the world.



Nicaragua, and Peru, cereals and roots and tubers provide more than half of the calorie intake (Rapallo and Rivera, 2019).

Most countries should focus on investing in agriculture to diminish hunger and its related problems. They should take immediate actions and keep in mind that R&D investments generate returns in the long term, and an integrated portfolio of solutions will be required. Usually, it takes decades before returns are sought, but not investing could have extreme lag effects on the whole system. It is also important that future investments be concentrated in supporting small-scale producers since they are responsible for about one-third of the global food supply (Laborde et al., 2020) and have been undercapitalized during the current health crisis.

## **Social unrest, political instability, and climate change**

Migration in LAC is not a recent problem, but it is quickly becoming one of the most pressing concerns to be addressed. While the millions who have left Central America (El Salvador, Guatemala, Honduras, and Nicaragua) have headed for the United States (and Costa Rica in the case of Nicaragua), the millions who have fled Venezuela have settled in other countries within LAC. These countries already had high levels of poverty and food insecurity, which has exposed them to a greater risk under the current exodus and health crisis (FAO et al., 2021). In addition to these migratory events between countries, an important migratory component within countries is related to seasonal migration for agriculture. Although national figures are not available, the flow of people is mainly composed of females and children, with even entire families confronting informal labor and lower wages, and exposing themselves to health risks (Soto and Saramago, 2019).

In the case of Venezuela, its migration process is considered the largest migratory flow in history. It is estimated that almost 5.4 million people fled Venezuela from 2015 to 2020, moving mainly into Colombia, Peru, Chile, Brazil, and Ecuador (WFP, 2020). Most of these migrants work informally and are therefore often excluded from national social protection and health systems, which deteriorates their conditions and exposes them to acute food insecurity (WFP, 2020). It is therefore urgent to find alternatives that offset

or diminish the effects of migration on food systems. To do this, it is necessary to have more sustainable and dynamic food systems that integrate better the different actors in the value chain and benefit small-scale producers by providing them with innovations.

In addition, in 2016, after four decades of internal conflict, Colombia signed a peace agreement with the Revolutionary Armed Forces of Colombia (FARC). One crucial chapter was rural development and the substitution of illicit crops. Four years later, around 60,000 hectares continue under these types of crops, with all the consequences that illegal activities have brought to rural communities (UNODC, 2020).

Another major migration hotspot is the Central American Dry Corridor, where El Salvador, Guatemala, Honduras, and Nicaragua face a double burden of problems related to highly unpredictable climate, political instability, and violence. In 2019, 1.6, 1.2, 0.8, and 0.7 million migrants left from El Salvador, Guatemala, Honduras, and Nicaragua, respectively, mainly heading to the United States (WFP, 2020). Also, agricultural production is of high risk because of the erratic climate conditions, with smallholders being the most vulnerable. Members of families affected by drought in the Dry Corridor are 1.5% more likely to emigrate than similar households elsewhere, in addition to the clear link between food insecurity and migrating communities, with a higher propensity to migrate among the younger and more vulnerable people (WFP et al., 2017). Furthermore, the region was recently hit by hurricanes Eta and Iota, affecting about 8 million people in Guatemala, Honduras, and Nicaragua and causing devastating effects on the production of staples. FAO is pledging US\$14.4 million to support 333,000 smallholders in these countries (FAO, 2021b). Hence, investing in agricultural innovations to cope with the extreme climatic conditions and to increase food availability and access for the population is urgent, especially when considering that the region's food supply relies on imports (FAO and CEPAL, 2020b).

## **The COVID-19 ripple effect**

The region was not well prepared for the current world health crisis. Most countries had decreasing GDP growth rates during the past decade (Figure 1, Panel A) and many were suffering from political instability, social unrest, and harsh natural disasters before the

pandemic. Under these fragile conditions, COVID-19 disrupted the whole economic system, challenging governments to take immediate action and rethink their policy approaches. The latest series reports suggest that the agricultural sector has been the most resilient during this health crisis. In the short run, there was no direct evidence of food shortages, and good harvests in the South and previous stocks assured the food supply during the strictest quarantine period (FAO and CEPAL, 2020c). Nonetheless, it is necessary to be cautious since agriculture is most likely to be affected in the long term because of its biological processes. Every minor effect can have harmful impacts that compromise food security in the region, with small-scale producers being the most vulnerable (FAO and CEPAL, 2020d).

In the region, most farmers have not reported major limitations to their production and harvesting systems. Still, they have warned that selling became a significant hurdle for certain crops because of transportation restrictions, while others took this crisis as an opportunity to improve their exports (CEPAL, 2020c; Salazar et al., 2020; Urioste et al., 2020). It has been mentioned that most of the effects are heterogeneous across countries and more information is needed to assess the impact of COVID-19 on the food systems. Nevertheless, it is important to be alert that some farmers (small-scale producers) have started to report liquidity constraints for the next planting season. Labor shortage (for large-scale producers/intensive crops such as fruits and vegetables) and lack of inputs for the next cycle are other relevant aspects already affected (FAO and CEPAL, 2020e; Salazar et al., 2020). This could further shrink the road to food availability in several countries and threaten national food systems, thus transforming the current health crisis into a food and humanitarian crisis.

Besides COVID-19 effects on agriculture, the pandemic measures have threatened economic conditions and food security. Unemployment is projected to increase to 11.5% (3.4% more than in 2019) and the total value of remittances is expected to contract by 10% to 15%. This puts the capability of affected families to access safe and nutritious food at great risk, with the urban poor and migrant communities being particularly vulnerable (FAO and CEPAL, 2020b; 2020c; 2020f). Beyond the evident effect that quarantine measures have had on informal employment and income availability, there has been a substantial dent in children's food security in the region. With the closure of many

schools, 85 million children have ceased to receive their governmental school meals, although some countries have compensated for these programs through other measures (CEPAL, 2020b). Nonetheless, children's nutrition is compromised in most of these countries.

Most institutions consider that the current health crisis is an opportunity to reshape our current production systems in all areas, especially by strengthening intra-regional relations and supporting small-scale farms. Family farming accounts for 81% of all farms and generates around 50% of employment in agriculture in the region (FAO and CEPAL, 2020e). It is important to deal with the short-term problems. It is relevant to invest in medium- and long-term solutions through a green recovery based on social equity and economic sustainability, taking into account a multi-dimensional approach to find solutions. It is necessary that investments in R&D respond to users' needs and consider the importance of combating climate change and improving ecosystem conditions (CEPAL and OPS, 2020; FAO and CEPAL, 2020e; Laborde et al., 2020). The pandemic hit particularly hard the most vulnerable populations and territories, where there are a significant number of informal jobs, lower incomes, and limited access to safe and nutritious food. The COVID-19 pandemic's impact on the economy suggests a substantial increase in hunger, food insecurity, and malnutrition in the coming years.



JP Marín/CIAT

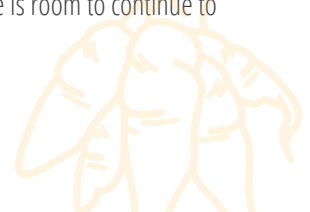
# EXPERIENCE MATTERS




## THE “RAMBO ROOT” WAR IN THE REGION

Cassava is a crop with high potential to attain environmental and socioeconomic targets, including several Sustainable Development Goals (SDGs). Cassava resilience to extreme climate conditions, its potential to restore degraded lands, and its multiple uses for the industry make it a perfect, simple, and low-cost solution (Villarino et al., 2020). An excellent example is how cassava became one of the most important cash crops in Asia. Producers have largely benefited from adopting innovations such as improved varieties, specifically KU50, a material bred jointly by the Alliance of Bioversity and CIAT and Kasetsart University in Thailand. The adoption of KU50 generated almost US\$400 million in Vietnam and Thailand from 1992 to 2010. These economic returns to agricultural R&D increased farmers’ gross annual income per family by US\$51 in Vietnam and by US\$460 in Thailand (CGIAR, 2021).

The industry in LAC is not yet that advanced. Nonetheless, processors and farmers have a growing interest in strengthening the cassava value chain. Recent agreements signed between Ingredion and the Alliance to develop a new generation of waxy cassava varieties confirm that regional interest (Alliance Bioversity-CIAT, 2020). In Colombia, the industrial cassava area planted increased almost twofold from 2010 to 2018. Furthermore, LAC has 8.3% of the world cassava area and represents 9.7% of the production. In the region, cassava covers 1.3% of the crop area and is the seventh most consumed plant-based food. Regarding yield, LAC has had an average yield of 11.2 t/ha in the past five years, similar to the world average (11.1 t/ha) but still quite far from Asia’s average of 21.7 t/ha, showing that there is room to continue to improve in this sector.



 C. Hershey / CIAT







## NUTRITION AND HEALTH BECAME BIOFORTIFIED

Iron (Fe) deficiency is one of the most prevalent forms of malnutrition worldwide. In 2019, it had a global prevalence of 14%, accounting for 28.5 million disability-adjusted life years (DALYs) globally (IHME, 2021a). One of the many consequences of iron deficiency is anemia, which affects 33% of the world's population (Pasricha et al., 2021), especially pre-school children (aged 0–5 years), women of childbearing age, and pregnant women. Another relevant micronutrient is zinc (Zn), which is necessary for normal pregnancy and child growth, immune system function, and neurobehavioral development (Hotz and Brown, 2004). However, millions of people have inadequate zinc contents in their diets because of limited access to foods rich in zinc. It is estimated that 17% of the global population is at risk of inadequate zinc intake (Wessells and Brown, 2012). In 2019, zinc deficiency was responsible for 0.3 million DALYs and almost 3,000 deaths (IHME, 2021b). Iron and zinc deficiencies are prevalent because of inadequate food sources and dietary factors that inhibit absorption of the two nutrients (Gupta et al., 2020). Therefore, their control should represent a global health priority.

There is strong evidence that biofortified crops can significantly diminish nutrient deficiencies and improve the health of consumers (Bouis et al., 2011; Finkelstein et al., 2017). Moreover, biofortification has the potential to help offset decreases in the nutritional quality of plants due to climate change. For these reasons, since 2004, CIAT (now part of the Alliance of Bioversity and CIAT) has included germplasm of beans with more iron and rice with more zinc in its breeding programs for LAC. In 2010, the maize breeding program of CIMMYT (for all of the breeding programs based in Latin America) began to contribute sustainably to decreasing nutritional deficiencies through the development of biofortified germplasm with high iron and zinc contents.

The Alliance has been the hub for sending material to various countries beyond the LAC region. A total of 47 highly competitive advanced lines were sent for registration and commercial release in 14 countries around the world (e.g., Bolivia, Brazil, Burundi, Colombia, DR Congo, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Rwanda, Uganda, Tanzania, and Zimbabwe) representing 61% of the world's iron-biofortified beans. In addition, 6,000 experimental rice lines are developed and evaluated every year at the Alliance and sent to national breeding programs in Latin America and Africa. Three highly competitive advanced lines are currently ready for commercial release in Bolivia, Colombia, and Nicaragua. CIMMYT's maize breeding program has developed biofortified maize germplasm with high zinc content. Every year, 4,000 experimental biofortified maize lines are developed and evaluated. These advanced lines are sent to national breeding programs in Africa, Asia, Latin America, and North America. In fact, all the biofortified maize materials in the world with zinc have been developed in LAC.





## PRIVATE-PUBLIC PARTNERSHIPS, HAND IN HAND

The introduction of variety IR8 in LAC in the late 1960s is one of the main rice research milestones in the region. The legacy of semi-dwarf IR8-related varieties being widely adopted by farmers throughout the continent catapulted rice production across the continent. CIAT, alongside local partners and under the guidance of Peter Jennings, laid the groundwork for a new approach to delivering this germplasm through the national agricultural research and extension systems (NARES) in LAC, with the stepwise participation of breeding programs from the private sector over the years.

Under the umbrella of the International Network for Genetic Evaluation of Rice (INGER), this initiative established a strong network of rice breeding programs throughout the region, which was affected by shortages of funding for rice research in the early 1990s. This, along with the noticeable effects of the ongoing transformation toward irrigated rice production in LAC to increase yields, led to the creation in 1995 of the Latin American Fund for Irrigated Rice (FLAR) (<https://flar.org/>), a public-private partnership of rice-related institutions, with CIAT as a strategic partner. Through FLAR, LAC public and private rice research programs maintained and strengthened their network of scientists, with a focus on inter-institutional collaboration, a bottom-up approach to define priorities, and a collaborative model to fund research. To date, FLAR members in 17 LAC countries have released 86 rice varieties, in addition to a broad set of technologies to improve production and the establishment of a strong network of professionals who were trained for the goodwill of the sector. Furthermore, by 2017, it was estimated that nearly 300 varieties based on CIAT advanced lines had been released in LAC (Lynam and Byerlee, 2017). In 2017, the adoption of CIAT-related rice varieties in the region was estimated to have generated US\$10.8 billion in economic benefits.

THIS REPRESENTS **US\$3.06**  
IN RETURNS FOR EVERY DOLLAR INVESTED  
IN CIAT RICE RESEARCH  
FOR LAC  
(LABARTA ET AL., 2017).



## Lessons for the future

Latin America is set to become the next big supplier of food in the world. The availability of natural resources and a great potential to improve could transform the region into a major agricultural power; however, important improvements need to be made. Production gaps themselves represent a big space for improvement. Gaps in adoption of technologies, land tenure, availability and access to services, access to markets and information, improved supply chains, and financial opportunities are areas for intervention where differences should be assessed.

Guaranteeing the region's food security is more important than ever. LAC is facing its biggest out-migration flow in history and is particularly vulnerable to the effects of climate change. Being one of the epicenters of the COVID-19 pandemic and considering the impact that it has had on the economy, millions in the region could fall into poverty and suffer from hunger if no immediate actions are implemented. Although smallholders remain vulnerable, special attention should be given to the urban poor, particularly the migrant communities, women, children, and indigenous communities.

Countries characterized by political instability and social unrest are likely to suffer more from the uncertainty in their economic systems and their people are prone to leave, while areas with erratic climate conditions have to deal with high-risk agriculture and face similar consequences. If no immediate actions are taken, the problem could be exacerbated, creating an even greater flow of outward migration, thus risking the region's stability and its potential to become a major food producer for the world.

Furthermore, this becomes an opportunity to change to more sustainable, inclusive, and climate-resilient food systems. There is no need to start from scratch. A growing agricultural sector, successful cases of public-private partnerships for agricultural R&D funding, already established institutions through the national research systems and private endeavors, active and continuous presence of CGIAR in the region, and close collaboration with research centers and donors from the United States and around the world are important pillars upon which investments can be made.

Even though LAC lost some of its relevance for international donors during the past decade, undeniably LAC has played a significant role in developing and disseminating agricultural innovations that have spillover around the world, generating larger impacts on producer and consumer well-being. These achievements result from years of investments that strengthen and transform the research sector, and under current conditions the region cannot let its guard down.

*Agriculture continues to be one of the most relevant sectors for its potential to continue contributing to food security, poverty reduction, and resilience to counteract external shocks such as climate uncertainty and the current health crisis.*

The innovations developed in this sector are still far from being fully exploited and they have to ensure the lives of 650 million people in the region and contribute to benefiting many more around the world.

## References

- Alliance Bioversity-CIAT. 2020. CIAT and Ingredion Inc. signed an agreement to develop next-generation waxy cassava varieties for the North Coast of Colombia. News and Blog:1. Available at <https://bit.ly/3ulNkXr> [Accessed 17 February 2021].
- Bouis HE; Hotz C; McClafferty B; Meenakshi JV; Pfeiffer WH. 2011. Biofortification: A new tool to reduce micronutrient malnutrition. *Food and Nutrition Bulletin* 32(1 SUPPL.):31–40.
- Byerlee D. 2016. The birth of CIMMYT: Pioneering the idea and ideals of international agricultural research. Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), Mexico, D.F., Mexico.
- CEPAL. 2020a. Enfrentar los efectos cada vez mayores del COVID-19 para una reactivación con igualdad: nuevas proyecciones. Available at <https://bit.ly/3nIRpII>
- CEPAL. 2020b. América Latina y el Caribe ante la pandemia del COVID-19: Efectos económicos y sociales. Available at <https://bit.ly/3tpfuzv>
- CEPAL. 2020c. Los efectos del COVID-19 en el comercio internacional y la logística. Available at <https://repositorio.cepal.org/handle/11362/45877>
- CEPAL and OPS. 2020. Salud y economía: una convergencia necesaria para enfrentar el COVID-19 y retomar la senda hacia el desarrollo sostenible en América Latina y el Caribe. Available at <https://bit.ly/3xDcFxQ>
- CGIAR. 2021. Cassava to support a multibillion-dollar industry. CGIAR at 50:1. Available at <https://bit.ly/3efDzUP> [Accessed 18 February 2021].
- Chaherli N; Nash J. 2013. Agricultural Exports from Latin America and the Caribbean: Harnessing Trade to Feed the World and Promote Development. Available at <https://openknowledge.worldbank.org/handle/10986/16048>
- Dehmer SP; Pardey PG, Beddow JM; Chai Y. 2019. Reshuffling the global R&D deck, 1980-2050. *PLoS ONE* 14(3):1–12.
- FAO. 2016. Ministros de América Latina y el Caribe trazan una ruta hacia la agricultura sostenible. Oficina Regional de la FAO para América Latina y el Caribe:1. Available at <https://bit.ly/3bf4NsG> [Accessed 22 February 2021].
- FAO. 2021a. AQUASTAT. FAO's Global Information System on Water and Agriculture:1. Available at <https://bit.ly/3euSmls> [Accessed 17 February 2021].
- FAO. 2021b. FAO hace llamamiento de emergencia para apoyar a 333 mil personas afectadas por huracanes en Nicaragua, Guatemala y Honduras. Oficina Regional de la FAO para América Latina y el Caribe:1. Available at <https://bit.ly/3o0JLDD> [Accessed 22 February 2021].
- FAO and CEPAL. 2020a. Sistemas alimentarios y COVID-19 en América Latina y el Caribe: Hábitos de consumo de alimentos y malnutrición. Available at <https://bit.ly/33eCwhz>
- FAO and CEPAL. 2020b. Sistemas alimentarios y COVID-19 en América Latina y el Caribe: Comportamiento del comercio durante la crisis. Available at <https://bit.ly/33eqp44>

- FAO and CEPAL. 2020c. Análisis y respuestas de América Latina y el Caribe ante los efectos de COVID-19 en los sistemas alimentarios. Available at <https://bit.ly/3nK1Bua>
- FAO and CEPAL. 2020d. Sistemas alimentarios y COVID-19 en América Latina y el Caribe No. 16: Actualización de los impactos y respuestas. Available at <https://doi.org/10.4060/cb1433es>
- FAO and CEPAL. 2020e. Sistemas alimentarios y COVID-19 en América Latina y el Caribe: Impactos y oportunidades en la producción de alimentos frescos. Available at <https://bit.ly/3tgQn1t>
- FAO and CEPAL. 2020f. Sistemas alimentarios y COVID-19 en América Latina y el Caribe: El rol de las medidas de protección social. Available at <https://bit.ly/3h0Ftuu>
- FAO, PAHO, WFP, UNICEF, IFAD. 2021. Regional Overview of Food Security and Nutrition in Latin America and the Caribbean. Food security and nutrition for lagging territories. Available at [www.fao.org/publications](http://www.fao.org/publications)
- Finkelstein JL; Haas JD; Mehta S. 2017. Iron-biofortified staple food crops for improving iron status: a review of the current evidence. *Current Opinion in Biotechnology* 44:138–145. Available at <http://dx.doi.org/10.1016/j.copbio.2017.01.003>
- Gupta S; Brazier AKM; Lowe NM. 2020. Zinc deficiency in low- and middle-income countries: prevalence and approaches for mitigation. *Journal of Human Nutrition and Dietetics* 33(5):624–643.
- Hotz C; Brown KH. 2004. Assessment of the risk of zinc deficiency in populations and options for its control. *Food and Nutrition Bulletin* 25(n. 1 (supplement 2)):S94–S200.
- Hurley TM; Pardey PG; Rao X; Andrade RS. 2016. Returns to Food and Agricultural R & D Investments Worldwide, 1958-2015. Briefs 249356. University of Minnesota, International Science and Technology Practice and Policy.
- IHME. 2021a. Dietary iron deficiency - Level 3 cause. Global Health Metrics:1. Available at <https://bit.ly/2Sg4wiC> [Accessed 17 February 2021].
- IHME. 2021b. Zinc deficiency - Level 3 risk. Global Health Metrics:1. Available at <https://bit.ly/3ugA5aj> [Accessed 17 February 2021].
- Intini J; Jacq E; Torres D. 2019. Transformar los sistemas alimentarios para alcanzar los ODS. Available at <http://www.fao.org/documents/card/en/c/ca5130es/>
- Labarta R; Andrade R; Marin D; Rivera T; Orrego M; Pinillos J. 2017. The Impacts of CIAT's Collaborative Research. Impact Brief. International Center for Tropical Agriculture (CIAT). Cali. 12 p. Available at <https://hdl.handle.net/10568/89160>
- Laborde D; Murphy S; Parent M; Porciello J; Smaller C. 2020. Ceres2030: Sustainable Solutions to End Hunger. Summary Report. Cornell University, IFPRI, and IISD. 35 p.
- Lynam J; Byerlee D. 2017. Forever Pioneers CIAT: 50 years contributing to a sustainable food future and counting. International Center for Tropical Agriculture (CIAT), Cali, Colombia. Available at <https://hdl.handle.net/10568/89043>
- OECD and FAO. 2019. OECD-FAO Agricultural Outlook 2019-2028. Paris, France, and Rome, Italy: Food and Agriculture Organization of the United Nations (FAO); Organisation for Economic Co-operation and Development (OECD). Available at [https://doi.org/10.1787/agr\\_outlook-2019-en](https://doi.org/10.1787/agr_outlook-2019-en)
- Pardey PG; Chan-kang C; Dehmer SP; Beddow JM. 2016. Agricultural R&D is on the Move. *Nature* (April):301–303.
- Pardey PG; Alston JM; Chan-kang C; Hurley TM; Andrade RS; Dehmer SP; Lee K; Rao X. 2018. The Shifting Structure of Agricultural R&D: Worldwide Investment Patterns and Payoffs. In: Kalaitzandonakes N; Carayannis E; Grigoroudis E; Rozakis S (eds.). From Agriscience to Agribusiness: Innovation, Technology, and Knowledge Management. Springer, p 13–39. Available at [https://doi.org/10.1007/978-3-319-67958-7\\_2%0A13](https://doi.org/10.1007/978-3-319-67958-7_2%0A13)
- Pasricha SR; Tye-Din J; Muckenthaler MU; Swinkels DW. 2021. Iron deficiency. *The Lancet* 397(10270):233–248. Available at [http://dx.doi.org/10.1016/S0140-6736\(20\)32594-0](http://dx.doi.org/10.1016/S0140-6736(20)32594-0)
- Rapallo R; Rivera R. 2019. Nuevos patrones alimentarios, más desafíos para los sistemas alimentarios. Available at <http://www.fao.org/3/ca5449es/ca5449es.pdf>
- Salazar L; Schling M; Palacios AC; Pazos N. 2020. Retos para la agricultura familiar en el contexto del COVID-19: Evidencia de productores en ALC. Available at <https://bit.ly/3vCydca>
- Soto F; Saramago A. 2019. Migración y desarrollo rural en América Latina y el Caribe. 2030 – Alimentación, agricultura y desarrollo rural en América Latina y el Caribe, No. 26. FAO, Santiago, Chile. 24 p.
- Stads G-J; Beintema NM. 2009. Public Agricultural Research in Latin America and the Caribbean: Investment and Capacity Trends. ASTI Synthesis Report. International Food Policy Research Institute, Washington, D.C. 26 p.
- The World Bank. 2021a. Agricultural Land. World Bank Open Data:1. Available at <https://data.worldbank.org/indicator/> [Accessed 17 February 2021].
- The World Bank. 2021b. Population. World Bank Open Data:1. Available at: <https://data.worldbank.org/indicator/SP.POP.TOTL> [Accessed 17 February 2021].
- Trigo EJ; Mateo N; Falconi CA. 2013. Agricultural Innovation in Latin America and the Caribbean: Institutional Scenarios and Mechanisms. Technical Note No. 528, Inter-American Development Bank. Washington D.C. 83 p.

Trivelli C; Berdegú JA. 2019. Transformación rural: Pensando el futuro de América Latina. 2030 – Alimentación, agricultura y desarrollo rural en América Latina y el Caribe. Documento No. 1. FAO, Santiago, Chile. 80 p.

UNODC. 2020. Informe No. 20, Programa Nacional Integral de Sustitución de Cultivos Ilícitos – PNIS. Available at <https://bit.ly/2SpVf7V>

Urioste SA; Graterol Matute E; Álvarez MF; Tohme J; Escobar MX; González C. 2020. Efecto de la pandemia del COVID-19 en el sector arrocero de América Latina y El Caribe: Un diagnóstico participativo. Available at <https://hdl.handle.net/10568/108967>

Villarino MEJ; Da Silva M; Becerra Lopez-Lavalle LA; Castro-Nuñez A. 2020. 'Rambo root' to the rescue: How a simple, low-cost solution can lead to multiple sustainable development gains. *Conservation Science and Practice* (January 2020):1–5.

Wessells KR; Brown KH. 2012. Estimating the global prevalence of zinc deficiency: Results based on zinc availability in national food supplies and the prevalence of stunting. *PLoS ONE* 7(11).

WFP. 2020. Populations at risk: Implications of COVID-19 for hunger, migration and displacement. An analysis of food security trends in major migration hotspots. World Food Programme. Rome. 64 p. Available at <https://bit.ly/3b2f8s9>

WFP, DB, IFAD, IOM, OAS. 2017. Food Security and Emigration: Why people flee and the impact on family members left behind in El Salvador, Guatemala and Honduras. *Food Security and Emigration* (August):24.





## Acknowledgments

This brief is part of the research series documents developed by the Foresight and Applied Economics for Impact Unit, part of the Alliance of Bioversity International and CIAT (International Center for Tropical Agriculture). The views expressed in this document cannot be taken to reflect the official opinions of the organizations.

## About the authors

**Robert Andrade**, Postdoctoral Fellow, Alliance of Bioversity International and CIAT

**Diana Lopera**, Research Associate, Alliance of Bioversity International and CIAT

**Tatiana Rivera**, Research Associate, Alliance of Bioversity International and CIAT

**Sergio Urioste**, Visiting Researcher, Alliance of Bioversity International and CIAT / Latin American Fund for Irrigated Rice (FLAR)

**Joe Tohme**, Research Director, Crops for Nutrition and Health, Alliance of Bioversity International and CIAT

**Carolina González**, Theme Leader of Foresight and Applied Economics for Impact, Alliance of Bioversity International and CIAT

## Correct citation

Andrade R; Lopera D; Rivera T; Urioste S; Tohme J; González C. 2021. Investing wisely to end hunger and strengthen agriculture, with no region left behind: Latin America. Policy Brief. No. 52. International Center for Tropical Agriculture (CIAT). Cali, Colombia. 14 p.

### Contact

**Robert Andrade**

Alliance of Bioversity International  
and CIAT

✉ [r.s.andrade@cgiar.org](mailto:r.s.andrade@cgiar.org)

Alliance

