



Building Resilient Value Chains After the Impact of the COVID-19 Disruption: Challenges for the Coffee Sector in Central America

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Coffee is an important agricultural sector in Central American, directly employing over 1.2 million people in Guatemala, Honduras, El Salvador, Nicaragua, and Costa Rica. Although export revenues from coffee trade have an overall positive effect on the gross domestic product (GDP) of these countries, poverty still prevails. The COVID-19 pandemic has placed additional pressure on the sector which is vulnerable to fluctuations in the international coffee prices, low productivity levels, and climate change effects and damages caused by pest and diseases. This paper examines the effects of the COVID-19 pandemic and analyzes if the sector is resilient to withstand unexpected external shocks such as the pandemic and the hurricanes which impacted the region in the last months of 2020. The capacity to absorb, adapt, and/or transform to these shocks was assessed from the perspective of small-scale coffee farmers, traders, exporters and the entire sector in two time periods—immediately after the start of the pandemic and after the coffee harvest. Although the actors in the coffee value chain absorbed these shocks and could withstand them, adaptation to the disruptions has been challenging for small-scale farmers. Despite the vulnerability to unexpected external shocks, results indicate that a long-term transformation of the sector to build resilience is likely to be slow.

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INTRODUCTION

Coffee (*Coffea arabica* L.) is one of the most important global agricultural commodities. For many developing countries, coffee is the top agricultural export, accounting for a substantial part of the gross domestic product (GDP). In Central American countries, coffee is one of the top agricultural sectors. In El Salvador, Honduras, and Nicaragua, coffee is the main agricultural export and second largest agricultural export in Guatemala and Costa Rica. In all countries, the coffee sector represents a main source of rural employment. It is estimated that 1.2 million people are directly employed in the coffee sector in Central America (ICO, 2018), and the figure would be larger if indirect employment would also be accounted (Bathrick, 2017). Most of the coffee production in Central America takes place in small-scale family farms. In rural areas where coffee is cultivated, poverty still prevails. The problem of poverty, hunger, and malnutrition in coffee growing regions in Central America has been documented for years (Lewin et al., 2004; Bacon et al., 2008; Caswell et al., 2012). Households normally receive only one annual paycheck for their crop which has to be distributed throughout the year until the next harvest season. Fluctuating market price patterns severely affect

farmers. When international coffee prices drop below production price, as it did in 2018 when the average price dropped 30% below the average, farmers in Central America face severe poverty. Additionally, coffee farmers in this region are facing climate change risks, which will affect their livelihood and in general, the future of coffee production (Watts, 2016). Donatti et al. (2019) point out that smallholder farmers in the region are particularly vulnerable to climate change events. The 2020 Atlantic hurricane season has been particularly devastating. Within a period of 2 weeks, two hurricanes hit Central America, causing massive loss in agriculture and infrastructure. Honduras, Guatemala, and Nicaragua have been particularly affected by floods and landslides.

Despite the problems and impending risks on the production side, global coffee consumption has steadily increased in the last decades. According to the ICO (2020), coffee consumption has increased by 2% annually since 1990. In recent years, coffee consumption has increased in Europe, North and South America, and Asia, while remaining stagnant in Central America, and decreasing in Africa. In industrialized countries, consumption patterns have changed as coffee has evolved from a plain cup of black coffee to a multitude of forms, flavors, and origins, stemming from the coffee shop culture which has dramatically evolved during this time frame. Consumers also tend to pay much more per cup of coffee than they did in 1990 (Meister, 2017). However, this increase in the price of a cup of coffee has not translated into increased farm gate prices paid to the farmers. If anything, coffee farmers have faced severe crises such as the coffee crisis of 2001 and the unstable international coffee prices since 2016. As farm incomes decline, livelihoods are increasingly at risk, since it becomes impossible to invest in the modernization of farms and in adaptation to the impact of climate change (ICO, 2020).

The challenges mentioned above already placed coffee farmers in Central America in a vulnerable situation prior to the outbreak of pandemic caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2, which will be referred to as COVID-19 in this paper) in early 2020. The coffee harvest was just about over when the first cases of COVID-19 were reported in the region. The pandemic itself, in addition to the sanitary and health measures imposed by the governments have affected the coffee sector on different levels. A second shock to the coffee sector came in the second half of 2020. In November 2020, Central America was devastated by hurricanes Eta and Iota, which brought severe flooding, landslides, and destroyed homes and infrastructure, displacing an estimated 7 million people in Honduras, Nicaragua, and Guatemala (ReliefWeb, 2020a). Landslides and loss of infrastructure in the region negatively impacted the coffee sector. How the sector will be impacted in the long run remains to be seen. Based on preliminary evidence and secondary data on exports and coffee prices, a discussion on resilience is presented.

The central question of this paper is how small-scale farmers in Central America can build resilience to cope with the disruptions caused by the COVID-19 pandemic and the extreme climatic events of 2020. Understanding and promoting smallholder resilience is critical for global food systems

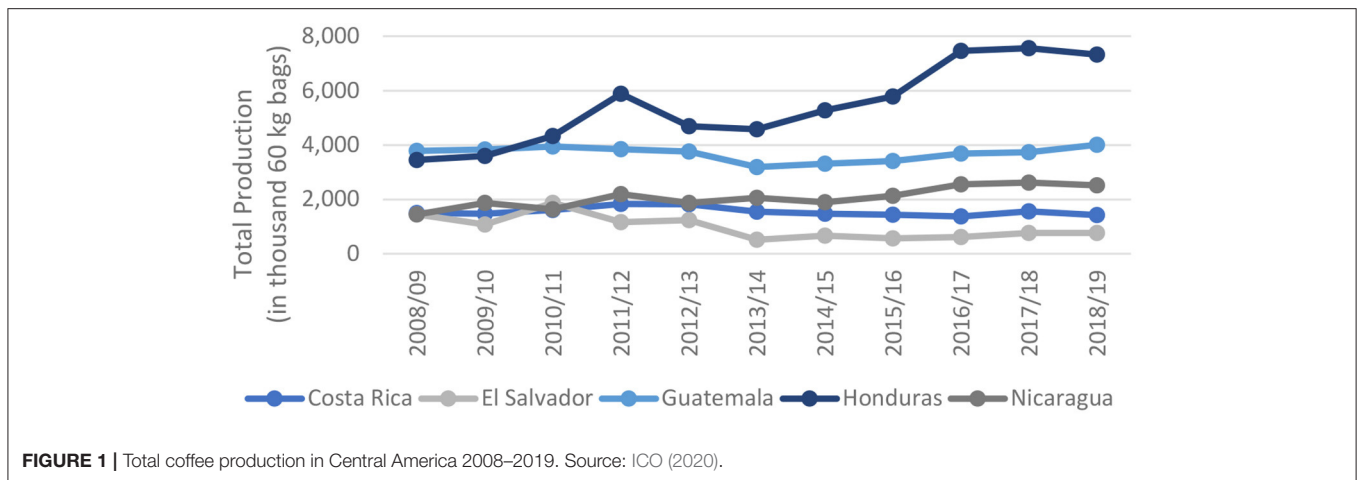
(Stratton et al., 2020). This paper analyzes the impact on small-scale farmers from two perspectives. First, the immediate impacts on coffee exports from Central America will be discussed. Second, price volatility and changes which affect could affect farmers in the subsequent harvest will be analyzed. Finally, options to build resilience will be addressed, using the framework proposed by Béné et al. (2014), where resilience is defined as the capacity to absorb, adapt, and/or transform to shocks or events, which are unexpected and have short or longer-term repercussions on the system.

THE COFFEE VALUE CHAIN IN CENTRAL AMERICA

Coffee has been a key economic sector in Central America for over a century. Since the introduction of coffee in the region in the mid-eighteenth century, Central America has become a favored origin for its full-bodied, fine flavored Arabica coffee. The political economy of Central America in the late nineteenth and early twentieth centuries was mainly centered around the economy of coffee cultivation and export (Paige, 1985). In El Salvador, for example, coffee production accounted for 50% of the GDP in the early 1980s. A dual system of coffee cultivation developed in Central America during the twentieth century: large plantations, run by landowners and small-scale farms, typically cultivated by peasant farmers. Historians attribute the historic and political conflicts of the 1980s in Central America largely to this duality where vast wealth was made and in parallel, harsh poverty prevailed in the coffee sector (Sedgewick, 2020). Although much has changed since the end of the guerilla conflicts in Central America, coffee cultivation still plays an important role in the livelihoods of rural families.

Coffee production in Central America in the last two decades has been challenging. Agronomic aspects pose difficulties to producers. A reduction in coffee production was caused by the coffee rust epidemic (Avelino et al., 2015). The resurgence of coffee rust (*Hemileia vastarix*) caused 31% loss in Colombia between 2008 and 2011 and 16% loss in Central America in the 2012 and 2013 season (Avelino et al., 2015). These losses in production came after the recovery from the aftermath of Hurricane Mitch, which hit Central America in October 1998. Honduras, Nicaragua, Guatemala, and El Salvador were mostly affected and according to FAO (2001) estimates, between 20 and 30% percent of the harvest was lost during that season. Only a few years after, the coffee crisis hit the sector, when it was barely recovering. Since then, coffee production has increased in Central America, reaching a peak in production this last season (Figure 1). Honduras has reported the highest increase in production in the last decade and surpassed Guatemala as the largest coffee producer in the region. In November 2020, the region has again experienced losses in coffee production due to Hurricanes Eta and Iota (ReliefWeb, 2020b).

Although coffee production volumes have increased steadily in the region, fluctuating international coffee prices have hit some low points over the past two decades (Figure 2). The coffee crisis of 2001 negatively impacted coffee producers in the region. The



increasing concentration of the coffee industry brought lower and more unstable prices, especially for producers (Wyss et al., 2012). Although prices picked up and reached a high in the 2010–2011 seasons, prices have decreased since then. At the farm level, international price fluctuations have a larger effect, as farmers might not even be able to cover production costs if the prices fall below a certain threshold. In particular, small-scale farmers producing in small plots of land of <2 ha are vulnerable to these changes in the international markets.

At the farm level, and in smaller-scaled farms, which are commonly found throughout the Central American region, poverty, and food insecurity places thousands of farms in a vulnerable situation. However, poverty and food insecurity cannot be attributed to a single cause (SCAA, 2013). Unstable international coffee prices can have an immediate and severe impact on coffee livelihoods when prices plummet. Because farmers are paid upon harvest, they have one income per year, if there are no other sources to supplement this income. The risks of relying solely on the coffee income to sustain an entire household, motivate farmers also plant other crops for household consumption. Additional food production is often not sufficient to protect against the risks and it is rarely enough to support families through the months when no income flows into the household, even when coffee yields and prices are favorable (Morris et al., 2013).

In addition to the income problem, coffee farmers in Central America must cope with climate change risks such as more severe droughts, erratic rain patterns, and outbreaks of fungal coffee rust and pests. In this context, seasonal hunger among coffee communities has become more prevalent. Bacon et al. (2008) address the issue of seasonal hunger and smallholder affiliation to organizations. Virtually all coffee producing countries suffer from institutional voids. These include major gaps in infrastructure, weak legislative systems and poor governance, poor access to and/or quality of education, and restricted access to finance. This weak enabling environment plays a fundamental role in preventing rural smallholders from advancing out of poverty (SCAA, 2013). Local institutions and producers' cooperatives can create programs to help small-scale coffee farmers adapt to the

changes in the global marketplace and cope with issues such as adaptation to environmental risks and food insecurity.

PRE-COVID-19 CHALLENGES

Farm-Level Productivity and Sustainability

Coffee production in Central America typically takes place in smaller farms with an area of <5 ha, although this figure can vary, depending on the country. How a smallholder farmer is defined differs from one country to another. According to the International Coffee Organization, in Honduras, 95% of the coffee farmers are smallholders with <7 ha, and they produce over half of the total coffee production. In Nicaragua, over 60% of farmers are small-scale farmers holding <2 ha. By contrast, in El Salvador, small-scale producers are considered to be those farmers that have <35 hectares (ICO, 2020). The variability in yields also varies significantly. In some areas, yields can be as low as 400 kg/ha and in other areas, they reach 1,200 kg/ha (ICO, 2020). This can be due to different agricultural practices, such as variability in the use of farm inputs, aging coffee plantations, different coffee varieties, damages caused by insect pests and diseases, and financial aspects which may limit the investments made by some farmers more than others. Some small-scale farms in areas where access to extension services is available, might have higher yields than those farmers in the periphery of these services. In addition, some cooperatives may have better support for the farmers, such as extension services, loans to farmers in the form of agricultural inputs or information services which can help farmers cope with impediments such as disease management.

Climate Change Risks

Empirical evidence suggests that coffee production in Central America will become more difficult due to higher temperature, increasing extreme weather events, and other climate change effects (Baca et al., 2014; Rossing et al., 2014; Reyes et al., 2016; Läderach et al., 2017; Pham et al., 2019). In the dry corridor of Central America, most of the coffee is grown under rainfed conditions. Floods and landslides in these mountainous regions will likely increase, as the drastic variation in temperature,

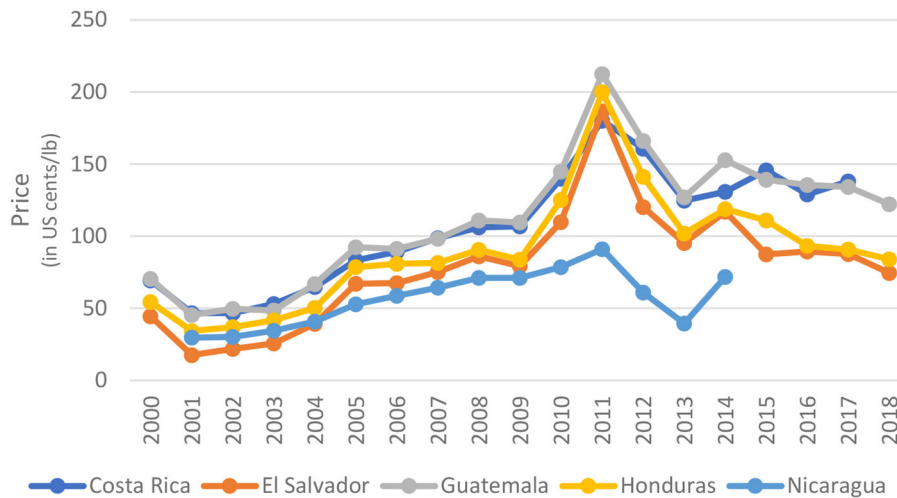


FIGURE 2 | Coffee prices in Central America 2000–2018. Source: ICO (2020).

amount of precipitation, and extreme climatic events. Because of the economic dependence of farmers on coffee exports, they increasingly face food insecurity (World Bank and CIAT, 2015; Martínez-Valle et al., 2017). These changing climate patterns in Central America are posing an additional challenge in the control of diseases like coffee rust and an increase in pests such as the coffee berry borer (*Hypothenemus hamperi*) and coffee leaf miner (*Leucoptera coffeella*) (Reyes et al., 2016). Coffee rust did not affect coffee production in higher altitudes, but with the increase in temperature in areas over 1,000 m above sea level, integrated pest management has become more challenging.

One of the main challenges for coffee production worldwide is the rising global temperature (ICO, 2020). In Central America, more specifically, elevated temperature is a serious challenge for Arabica coffee production. These coffee production systems require relatively specific ecological and meteorological conditions to produce high quality beans. Within a temperature range between 15 and 23°C, Arabica bean quality is optimal. IHCAFE (2020) reported that in 2019, hydric stress reported from May until August severely affected fruit formation in coffee farms in Honduras, thus lowering yields. Because of elevated temperatures reported in the last decades, a lot of high-altitude coffee in the region will no longer find the ecological conditions needed to maintain that quality, thus pushing the agricultural frontier to higher-altitude regions, which are already scarce and in countries like Costa Rica, these are protected areas. In Honduras and Nicaragua, coffee production has expanded in higher altitude areas and in 20 years, the coffee production has doubled in Honduras. Coffee production has increased significantly in recent years. This increase in production and productivity may be a direct effect of an improved supply chain, where significant improvements in infrastructure were made. On the other hand, agricultural practices have been a focus of many research and extension programs, which have resulted in better control of phytopathogenic outbreaks (Herrell et al., 2017).

However, recent outbreaks of coffee rust (*Hemileia vastatrix*), a fungal disease, has negatively impacted coffee production in the region.

The El Niño weather phenomenon, where a variation of weather patterns is observed, represents another challenge to coffee production in the dry corridor of Central America. This phenomenon is especially harsh in this region because productivity is severely affected by rain patterns, which can also be a main factor in the incidence of pests and diseases (ICO, 2020). Severe weather patterns also affect the farm-level productivity and is a factor that combined with poor infrastructure and limited good agricultural practices, can reduce farmers' income. According to ICAFE (2020), severe climatic events forecasted for the 2020 rainy season in Costa Rica will have an impact on the dissemination of fungal rust in coffee. By far, the 2020 hurricane season has been one of the most active in recent history (WMO, 2020). Although the harvest season is not yet over and estimates of the total loss are not yet reported, the effects of hurricanes Eta and Iota will be negative.

To understand the impact of the COVID-19 pandemic on the small-scale coffee farmers in Central America, various sources were consulted. Data on coffee exports and prices published by the International Coffee Organization (ICO) were the main source of information. Two time periods were reviewed. Data on the first 3 months after sanitary and confinement measures were implemented (April, May, and June 2020) by the governments of Honduras, Guatemala, Nicaragua, Costa Rica, and El Salvador was reviewed. The second time period consulted was early 2021, after the harvest ended in the region. Secondary, qualitative data was used to analyze resilience. Official reports, briefing papers and bulletins from the main coffee associations in each of the countries were studied. To understand resilience, the framework proposed by Béné et al. (2014) was used, where “resilience is defined by three factors—the capacity to absorb, adapt and/or transform to shocks or events, which are unexpected and have short

or longer-term repercussions on the system.” In this framework Béné et al. (2014) understands absorptive capacity as “the ability of a system to prepare for, mitigate or prevent the impacts of negative events using predetermined coping responses in order to preserve and restore essential basic structures and functions.” Finally, Béné et al. (2014) defines adaptive capacity as “the ability of a system to adjust, modify or change its characteristics and actions to moderate potential, future damage and to take advantage of opportunities, to continue functioning without major qualitative changes in function or structural identity.” Finally, transformative capacity is explained as the ability to create a fundamentally new social-ecological system when ecological, political, social, or economic conditions make the existing system untenable (Béné et al., 2014).

COVID-19 DISRUPTIONS

Immediate Effects

Analyzing the ICO price composite price indicator for the first half of 2020, some impacts of the COVID-19 pandemic begin to emerge. From January to March 2020, exports decreased by 5.8% to 29.01 million bags compared to 30.78 million bags in 2018/19 season. Arabica coffee exports fell by 10.1%. On this same time frame, global production fell by 0.9% to 168.71 million bags of coffee. Total consumption was projected at 169.34 million bags, but this level was not reached by 0.63 million bags for 2019/20. In the first seven months of coffee year 2019/20, exports from Central America declined by 4.9%. From October 2019 to April 2020, shipments from Honduras fell by 6.7%. Guatemala also experienced a decrease in exports, reporting a decline of 3.1%, while Nicaragua's exports during this period rose by 16.7% (ICO, 2020).

Because of the lockdown measures implemented throughout the main coffee consuming countries (i.e., Europe, North America) out-of-home sales drop, as most cafés and restaurants closed. In the first weeks of the COVID-19 lockdown, sales surged as a result of stockpiling to replace the out-of-home consumption. However, in a joint ICO and IFPRI report (ICO and IFPRI, 2020), a looming global recession was forecasted, which could impact overall coffee consumption. The report pointed out that lower household incomes due to increased unemployment would make consumers more price sensitive, resulting in reduced sales in the high-end market segment (including specialty coffee and some certified sustainable coffees) as consumer demand shifted to adapt to external shocks.

Laborde et al. (2020) suggest the global economy faced a deep recession in 2020—at least as severe as the one following the global financial crisis of 2008–2009. A downturn in global economic growth of 5% was projected for 2020. This analysis, based on IFPRI modeling scenarios, indicate that developing countries face significantly greater adversity, negatively affecting their economies, not only because of the economic slowdown caused by lockdown measures, but also because of the restrictions in labor supply for farming and other business activity. Many developing countries cannot rely on social and economic

mitigation measures such as fiscal stimulus and expansion of social safety nets used by EU countries, for example.

Post-harvest Effects

Coffee exports from Central America have decreased in the first part of the 2020/2021 season, which starts in October and ends in September each year. The 2019/20 coffee season began with a decline in exports of 17.5% in comparison to the previous year, which meant that 2.62 million less bags were exported. This is a direct effect of hurricanes Iota and Eta. When observing the export numbers from the most affected countries, they all experienced declines in exports. Exports from Honduras, the region's largest producer, decreased by 40%, while those from Nicaragua fell by 20.2% and Guatemala by 15.7% (ICO, 2021). In El Salvador, exports also declined in the first 2 months of 2021. In comparison to the previous season, only a fifth of the export volume was reached (CVS, 2021). Coffee exports from Costa Rica also fell by 22% in the first months of the year (ICAFE, 2020).

The evidence collected so far indicates that although the COVID-19 pandemic has posed challenges to the coffee sector in Central America, the losses due to Hurricanes Eta and Iota have been much more severe. In fact, if the hurricanes had not struck the Central American regions, all countries would have had a favorable harvest in the 2020/2021 season and could have benefited from the recent increases in the coffee prices. Lockdown measures implemented at the onset of the pandemic in Europe and North America caused a drop in demand as coffee shops and restaurants closed, but this effect was rather short and as home consumption of coffee increased, so did the demand.

The 2020 Atlantic hurricane season has been unprecedented. Within a period of two weeks, two hurricanes, categories 4 and 5 hit Central America, causing massive devastation in agriculture and infrastructure. Honduras, Guatemala, and Nicaragua have been particularly affected by floods and landslides. Both hurricanes hit Central America in November, which is a month short of the start of the picking season. Severe loss of coffee cherries was reported (Anacafé, 2020; CLAC, 2020; IHCAFE, 2020), decimating the harvest. Climate-related impacts are likely to significantly affect the region in the long-term. The most recent Coffee Development Report (ICO, 2020) highlights how the coffee sector is highly sensitive to climate variations. Alternatives such as shifting production are limited for smallholder farmers who do not have the resources, ability, and flexibility to relocate and may be forced to abandon coffee production. Such is the case of thousands of coffee farmers in the northern triangle of Central America. Lynch (2019) explored the nexus between climate change impacts and migration and reports that thousands of people who depend on coffee production in Guatemala, Honduras, and El Salvador have been forced to migrate as a result of impacts on their livelihoods. According to the ICO (2020), potential strategies to improve resilience to climate change include access to information, technologies, financial support, and research and development for improved and agricultural practices and climate-resistant varieties.

TABLE 1 | Assessment of resilience by type (source: own findings).

	Small-scale farmers	Local traders	Exporters	Entire sector
Absorb	<ul style="list-style-type: none"> • Early 2020 change in market prices did not significantly affect farmers as harvest had concluded when COVID-19 pandemic started • Significant loss of crop prior to harvest due to impact of Eta and Iota, especially in Honduras, Guatemala, and Nicaragua 	<ul style="list-style-type: none"> • No major shocks for middlemen and local traders as COVID-19 measures implemented after harvest concluded • Landslides, loss of infrastructure made access to coffee farms difficult in Honduras, Guatemala, and Nicaragua 	<ul style="list-style-type: none"> • Initial uncertainty with regards to drops in market price, but as market price increased, more capacity to absorb shocks • Loss of infrastructure in Honduras, Guatemala, and Nicaragua after hurricanes also impacted cooperatives and exporters 	<ul style="list-style-type: none"> • COVID-19 pandemic created disruptions which sector could absorb, as harvest had concluded when confinement measures were implemented • Hurricane impacts were severe in Honduras, Guatemala, Nicaragua, difficulties absorbing shock
Adapt	<ul style="list-style-type: none"> • Farmers, cooperatives, NGOs worked together to implement sanitary measures to adapt to new restrictions and protect workers, especially hired labor. In small-scale family farms, this assessment was not possible • Adaptation to cope with climate change effects not evident in all countries and within countries, it is still a challenge for the majority of farmers 	<ul style="list-style-type: none"> • Middlemen and traders face access challenges due to loss of infrastructure caused by hurricanes. Adaptation contingent on governments' ability to quickly restore roads and improve access. 	<ul style="list-style-type: none"> • Exporters and cooperatives supported the implementation of sanitary measures to adapt to new restrictions and protect workers, especially hired labor. In Costa Rica, these measures include the protection of migrant hired workers from Nicaragua and Panama • Online coffee auctions were an adaptation mechanism 	<ul style="list-style-type: none"> • Evidence of institutional coordination to improve agricultural practices, but process will require time before effects are seen
Transform	<ul style="list-style-type: none"> • Transformation at farm-level is slow. Agricultural practices such as renovating plantations with new varieties or hybrids adapted to pests and drought takes time and resources not available to all. Access to credit still reported as a major hurdle for coffee farmers 	<ul style="list-style-type: none"> • No evidence of longer-term transformation • Access to coffee plantations difficult, especially if infrastructure must be rebuilt in Honduras, Guatemala, and Nicaragua 	<ul style="list-style-type: none"> • Guatemala reports higher sales of roasted coffee at the regional level, opportunity to transform coffee value chain. Costa Rica has similar strategy, also focusing on direct trade • In the future, online auctions likely to remain and exports can benefit 	<ul style="list-style-type: none"> • Slow change in international trade patterns, although direct trade, blockchain technologies offer opportunity to transform • Central America extremely vulnerable to climate change effects • Transformation of sector remains challenging

IS IT POSSIBLE TO BUILD RESILIENCE?

Resilience, understood as the ability to absorb, adapt, and/or transform to shocks or events, which are unexpected, such as climate change impacts and the COVID-19 pandemic was analyzed. As of early 2021, the COVID-19 infection rate in the Central American region is increasing. Quarantine and confinement measures have been taken in all Central American countries. These measures did not have an effect on the 2019–2020 coffee harvest, which was over when the first cases of COVID-19 were reported in the region. Some *ad-hoc* measures were implemented by farmer cooperatives to mitigate the negative effects of price speculation and the lockdown in industrialized countries where most of the Central American coffee is consumed. Some coffee cooperatives kept drying and storing coffee in order to mitigate income loss of their members, but with a high risk of production loss if coffee is not sold and exported (AgriCord, 2020).

Table 1 summarizes the ability to build resilience, from the perspective of small-scale coffee farmers, the middlemen or local traders, the coffee cooperatives/exporters, and the entire sector. The analysis was conducted using secondary, qualitative data sourced from reports, expert panels, interviews, and newsletters published by Instituto Hondureño del Café (IHCAFE),

Asociación Nacional del Café de Guatemala (Anacafé), Instituto del Café de Costa Rica (ICAFC), Consejo Salvadoreño del Café (Consejo Salvadoreño del Café, 2021), and for information on Nicaragua, the reports from Latin American and Caribbean Network of Fairtrade Small Producers and Workers (CLAC) were consulted.

For coffee farmers in the Central American region to build resilience and be in a more favorable situation to cope with impacts and externalities, innovation in the field is critical, and it requires a concerted effort at different levels. Coffee is arguably the most important agricultural export in the region and different stakeholders are involved at all levels. Institutional coordination is important to help coffee farmers adapt and cope with the challenges that have been outlined in this paper. Research organizations, local government institutions, producer associations, traders, exporters, buyers, and civil society organizations all have a specific role and sphere of action. Bringing about innovation requires the active participation of all stakeholders. For example, one of the best alternatives to mitigate climate change impacts at the farm level is to work with drought tolerant hybrids.

According to IHCAFE (2020), the coffee sector in Central America urgently needs to adopt strategies to help farmers build resilience to cope with climate change effects. Through

the coordinated efforts of different stakeholders in the value chain, new technology could be adopted. It's important to keep conducting research at the farm-level, to determine which methods could help farmers innovate and address issues such as diminishing water resources, manage pests and diseases, conserve soils, and implement early warning systems to cope with high temperature or water stress. Using hybrids that are better adapted to hydric stress will be part of the solution. Digital technologies such as early warning systems and the adaptation of these technologies to the local context and the needs of coffee farmers will also help build resilience in the sector.

Building resilience to cope with harsh impacts such as the COVID-19 pandemic require more than simply addressing issues around the disruptions caused by lockdown measures around the world. A contingency plan for the coffee sector in Central America should be built around measures and a concerted effort to help farmers cope with the already drastic effects of volatile markets and international price fluctuations, low productivity at the farm level, slow technology adoption by small-scale farmers, and the climate change effects which are already placing coffee farmers in Central America in such a vulnerable position. Investments should be made in innovation, R&D, and technology to help the sector become more resilient. In a World Coffee Research Consultation (WCR, 2020), stakeholders addressed the need for next-generation weather forecasting systems and the dissemination of advice to farmers. Communication platforms, where data and news on production volumes, prices, and environmental events such as frosts would be shared was also highlighted by the local stakeholders as a priority.

At the local level, it is also important to work together with local cooperatives and stakeholder and at the same time with international traders and buyers to strengthen a differentiation strategy for the region, while promoting coffee trade which is transparent and pays a fair price for high quality coffee. Promoting the payment of decent and fair prices to the farmers should be an integral part of such a strategy.

The Central American coffee sector has traditionally been an export sector. Most, if not all, of the highest quality and specialty coffee is exported. Local demand for this type of coffee is still low. There is still much room for growth in consumption. The new trend of barista courses and coffee academies opening in Central America are a clear indication that specialty there is potential growth in the coffee consumption culture, which could translate to higher prices to producers if top-quality coffee is sources for this sector. In urban centers, new coffee shops are opening, offering customers a taste of the local coffee range, also offering traceable coffee where the qualities of a particular region or farm can be tasted.

Finally, it is important to consider local solutions when addressing the question of resilience.

Resilience in agriculture is a topic which merits in-dept analysis. Implementing a framework where resilience is analyzed by type allows for better strategic decisions to be made. Coffee producers in Central America are likely to face more severe climate change impacts in the next years (Furer et al., 2021). More extreme temperatures and more days without rainfall will affect coffee production and e right mitigation strategies must be devised for the coffee sector in Central America to be resilient.

CONCLUSION

At this point in time, it is difficult to have an idea of the long-term impact the COVID-19 crisis will have on the coffee value chain and how Central American coffee farmers will be affected. However, given the vulnerable position they are currently in, it is likely that any additional difficulty will have a negative impact at the farm level. Throughout the entire coffee value chain, it is clear that no business is immune to the impact of the COVID-19 disruptions. Cafés and coffee shops, big or small, located in Europe, Asia, or the Americas, have had to incur in loss due to the lockdown measures. Small businesses face similar uncertainties as the coffee farmers in terms of economic loss.

Building resilience entails a number of strategies and interventions on different points in the coffee value chain. New business and trade models can help build resilience. Direct trade schemes, for instance, could help farmers, especially because this model is built around strong relationships between the farmer and the buyer. Furthermore, coffee farmers selling certified coffee through cooperatives will likely be able to keep receiving a premium price for the sale of their coffee. These initiatives also help farmers in improving their farming practices and promote good agricultural practices. The detrimental effects of unprecedented events such as the devastating hurricanes which struck Central America in November 2020 could also be minimized with better producer prices, in addition to financial schemes (i.e., agricultural insurance, low-interest loans, and recovery subsidies) which could help small-scale farmers recover from these impacts. Finally, it is also important to consider the growth of local consumption, which could widen the market for value-added coffee at the local level, as a strategy to increase resilience in the coffee sector in Central America.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

IF: conception, review of evidence, synthesizing, and writing.

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