PANDEMIC-ERA AGROECOLOGY IN GUATEMALA:
ECONOMIC SOLIDARITY AND SMALLHOLDER RESILIENCE
TO ECONOMIC SHOCK

By

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Abstract

The Covid-19 pandemic’s unprecedented market and mobility restrictions (2020-2021) created a distinct economic shock for Guatemalan smallholders, which arrived on the trails of other economic and environmental shocks. At the same time, farmer organizations have promoted agroecology in Guatemala for decades in order to strengthen rural livelihoods, develop food-sovereign communities, defend indigenous rights, and develop climate change adaptations. This study works with eight smallholder farmer organizations to document the pandemic’s impacts on smallholders, explore how agroecology affects smallholder resilience to economic shock, and to identify constraints and opportunities for agroecology in Guatemala with regards to market access and solidarity building. Analyses of qualitative and quantitative data show that agroecological practices and prior engagement with agroecology organizations are correlated with increased resilience to economic shock at the farm level, in terms of production and consumption. Farmer organizations that promote agroecology support social networks that increase farmer ability to respond to market shock and mobility restrictions. This study highlights collective actions that organizations took during the pandemic to support food and market access. The variation across organizations offers salient examples of farmers and movement organizers working toward economic solidarity within agroecology, while facing myriad constraints which may require structural change beyond resilience frameworks.

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List of Abbreviations

AMEDIPK - *Asociación de Mujeres Eulalenses para el Desarrollo Integral Pican Konob’*
ACPC - *Asociación de Comités de Productores Comunitarios*
GDP – Gross Domestic Product
GPPLU - *Grupo de Pequeños Productores La Unión*
IMF – International Monetary Fund
MCAC – *Movimiento Campesino a Campesino/Farmer to Farmer Movement*
MCEV - *Mujeres Caminando por la Esperanza de Vida*
MTC - *Movimiento de Trabajadores Campesinos*
ANAP - National Association of Small Farmers
REDSAG - *Red Nacional por la Defensa de la Soberanía Alimentaria*
1. Chapter 1: Why study agroecology as a social tool during crisis?

Introduction

At the onset of the Covid-19 pandemic (heretofore referred to as “the pandemic”) in March 2022, the Guatemalan government’s nation-wide quarantine, curfews and restrictions on mobility directly affected rural campesino families who depend on both subsistence and commercial food production. These unprecedented market restrictions created a distinct economic shock for Guatemalan smallholder producers, which arrived on the trails of multiple other economic and environmental shocks. Of concern for smallholders during the pandemic was the inability to purchase and sell agricultural and other goods at local and regional markets, loss of off-farm employment, a lack of access to agricultural inputs and other related factors.

At the same time, farmer organizations have been promoting agroecology – the science, movement, and practice of sustainable agriculture and resource management (Gliessman et al. 1998; Altieri 1989; Wezel et al. 2009) – in Guatemala for decades in order to strengthen rural livelihoods, develop food-sovereign communities, defend Indigenous rights to land and life, and develop adaptations to climate change. This study works with eight farmer organizations within agroecology movements to explore how agroecology affects resilience during economic shock and to identify constraints and opportunities for
agroecology in Guatemala as it relates to market access and solidarity building. I ask four research questions:

**RQ1:** How were smallholder farmers who are connected to agroecology organizations affected in terms of production, consumption and commercialization of food crops during the COVID-19 pandemic?

**RQ2:** How does agroecology affect smallholder resilience to the economic shocks associated with sudden shifts in access to formal markets?

**RQ3:** Given the variable and differentiated effects of the closure of municipal markets on smallholders’ ability to sell agricultural products, how did farmer organizations influence farmers’ responses to economic shock?

**RQ4:** How do organizations’ efforts to promote agroecology open up space for long-term solidarity building among farmers?

Qualitative and quantitative data from this study suggest that although agrarian change is spatially differentiated, many rural smallholder farmers who engage in agroecology continued their agricultural production despite the global economic shutdowns associated with the pandemic. Study participants maintained production and consumption to higher degrees than sales during the pandemic, given the difficulties of maintaining intra-community and regional market connections. Data also suggest that agroecological practices and prior engagement with agroecology organizations are correlated with increased resilience to the pandemic’s economic shock at the farm level, with regards to production and consumption. Overall, existing vulnerabilities and challenges to livelihoods, which may require structural change beyond resilience frameworks, were exacerbated
during the pandemic with regards to smallholders’ production, consumption, sales and income.

Farmer organizations that promote agroecology may play a role in supporting farmers’ resilience to extreme economic shock. Besides facilitating market integration and training in agroecological practices, organizations support social networks that increase producers’ agroecological practices and their ability to respond to market shocks. This study highlights the collective actions that farmer organizations took during the pandemic to support food access and both formal and informal market access. The variation across organizations offers a set of salient examples of people working toward economic solidarity within agroecology, while facing myriad structural constraints.

Chapter 1 begins with background on the pandemic in Guatemala, then situates this study with regards to land inequality and the theoretical tensions between resilience and transformation. I then review literature that contextualizes the political economy of smallholder agriculture in Guatemala as a set of preconditions for vulnerability, summarizes smallholder responses to previous shocks, and addresses the relationships between agroecology movements and market functioning, with an eye towards the importance of collective action and farmer organizations. I provide background on the eight partner organizations and detail the mixture of methods used in the study. Chapter 1 concludes with reflections on my positionality as a white American female researcher and how I approach remote research in Guatemala.

Chapter 2 addresses research questions 1 and 2, first addressing farmers’ varied experiences of changing production, consumption and sales through qualitative data.
Statistical analysis of agroecological engagement and these livelihood outcomes during the pandemic suggests that agroecology plays a role in building resilience with regards to production and consumption during economic shock. Chapter 3 addresses research questions 3 and 4, first addressing the varied constraints faced by organizations, and then the actions taken that shaped market access and response to economic shock during the pandemic. I identify key themes, or ways in which organizations mediated localized marketing alternatives, and discuss the implications of these actions for building economic solidarity.

The term campesino, or “person of the country” in Spanish, refers to rural people throughout Latin America who subsist off of a variety of economic activities, including farming, who center horizontal social relationships and have come to share the burdens of resource poverty. While campesino captures the smallholder participants of this study more holistically than the term “peasant” and situates them in a post-modern Latin American context (Loker, 1996), this paper uses campesino and smallholder producer or farmer to refer to the study participants in relation to different discussions and literatures.

1.1. Background

1.1.1. The Covid-19 Pandemic in Guatemala

The global spread of the novel Coronavirus (Covid-19) in the first few months of 2020 led to the introduction of strict social and economic measures in Guatemala. On March 11, 2020, the World Health Organization (WHO) declared a global pandemic, and Guatemala implemented international travel restrictions. Guatemala reported its first case of Covid-19
on March 13 (Escobar et al., 2020), and on March 15 the Ministry of Public Health (Ministerio de Salud Pública y Asistencia Social or MSPAS) banned sporting events, suspended public school classes and prohibited gatherings of more than 100 people (Ministerio de Salud Pública y Asistencia Social, 2020). On March 21, President Alejandro Giammattei and his ministries announced a nationwide curfew effective March 22 that required all citizens to stay at home between 4:00pm and 4:00am, closed public transportation and halted public and private sector activities (Decreto Gubernativo Numero 6-2020, 2020). Municipal open-air markets that sell fresh produce and other agricultural products closed completely during the initial curfew, with localized exceptions where government decrees were not enforced¹. Starting April 12 essential stores such as supermarkets and open-air markets were allowed to open with limited hours on certain weekdays (“Emergencia Mundial por el COVID-19,” 2020), while public transportation remained closed and group meetings prohibited. On April 19 the curfew was slightly eased (to 6pm – 4am), and by May 3 the restrictions on individual and local commercial activity were eased (Disposiciones Normativas a Raíz Del COVID-19 En Guatemala, 2020). The limitations on transportation and a lack of public transportation persisted until July 27, meaning that although market and commercial activity were allowed between April and July, they were inaccessible to many rural Guatemalans during the first four months of the pandemic. Rural citizens of impoverished communities may live too far away from a

¹ Personal communications: Argentina Osorio Asañón, January 15 2021; Carlos Ramírez, January 20 2021; Otilio Bravo, March 8 2021.
municipal center to arrive on foot, and private transportation was either costly or illicit at certain hours.

On July 27, 2020, the government eased the nationwide curfew hours further and implemented a municipal system of restrictions based on local ratings of four alert levels (green yellow, orange, red) which range from normal to maximum risk (Gobierno de Guatemala Reduce Toque de Queda e Inicia Sistema de Alerta de Salud Escalonado, 2020). Each level required differing restrictions on use of public space, group events, manufacturing, and restaurant capacities. Public transportation reopened at lowered capacities and municipal markets returned to normal hours with limitations on elderly and at-risk patronage. On a national level, communities could go back to using formal market channels. A full return to pre-pandemic market exchange has occurred to differing degrees based on location, however, given that throughout 2020 and 2021, the alert levels for risk at the study sites have fluctuated.

These measures are considered strict relative to other Central American countries, and deeply impacted the Guatemalan economy. Guatemala’s real GDP growth rate dipped to -1.5% in 2020 (International Monetary Fund (IMF), 2021). In the rural economy, agricultural and food supply chains, labor availability and trade logistics were greatly disrupted. Given Guatemala’s widespread and pre-existing food insecurity (Beveridge et al., 2019; Lopez-Ridaura et al., 2019; Vargas et al., 2018), it was categorized as a high-risk country for the pandemic’s impact on food access and a medium-high risk country for reduced agricultural labor supply (Food and Agriculture Organization, 2020).
1.1.2. Guatemala’s Land Inequality

No investigation of smallholder production, livelihoods and social movements in Guatemala can proceed without providing some background on displacement and inequality of land access within the country. Access to land is a crucial element, if not the elementary component, of smallholders’ ability to earn a livelihood before, during and after the pandemic. The small area of land available to most Guatemalan smallholders results from institutional acts of dispossession since Spanish conquest. An abridged history of land in Guatemala explains why smallholders, especially the Indigenous, operate on such small plots today.

Indigenous communities in present-day Guatemala have been subject to ongoing conquests and land grabs since colonization began in the 1500s. Their murder, displacement, and suppression through labor policies and state violence along with the less obvious but no less effective marginalization by institutionalized racism are ongoing (Castro & Picq, 2017; W. G. Lovell, 1988). During the colonial period (1524-1821), the Maya were subject to tribute and labor service under an emerging dual property system in New Spain (Greer, 2018). Guatemala's 1821 independence began an era of state-building that combined private property regimes with the capitalist development of the coffee industry (W. G. Lovell, 1994). The 1870s Liberal Revolution furthered state appropriation of land under the guise of national unification (Castro & Picq, 2017). Capitalist elites made Maya labor available by breaking up ancestral lands in an industrial transition from cochineal (Dactylopius coccus, an insect used to make red dye) to coffee (Steinberg et al., 2014),
creating a mixture of traditional agroforestry and systems intensified by “technification” (R. Rice, 1999).

Albeit being Guatemala’s most progressive political era, the state continued to dispossess Indigenous peasants of their land during and after the 1944-1954 revolutionary period’s ambitious state-led land reform. The 1952 Agrarian Reform Law (Decree 900) explicitly aimed to “liquidate feudal property in the countryside” and “develop the form of exploitation and capitalist methods of production in agriculture,” and granted majority-
ladino (non-Indigenous) departments double the land per capita than majority-Indigenous departments (Trefzeger, 2002).

Alongside ethnocentric land redistribution, alliances between urban workers and rural peasants built popular revolutionary agency (“Agrarian Reality in Guatemala,” 1965; Pearson, 1966) that threatened Guatemalan elites as well as US interests. Ultimately, elites and US interests reacted in the 1954 US-backed military coup that ended popularly-elected Jacobo Arbenz’s presidency. This set the scene for the 1960-1996 civil war and armed conflict, which arose in part from extreme inequality and conflict over land. Under a series of military governments, the state massacred over 200,000 (mostly Indigenous) civilians in a scorched earth campaign, intensifying fear and state violence that continues the pattern begun with Spanish conquest (Lovell, 2010). After the 1996 Peace Accords, Guatemala instituted agrarian reforms that again failed to redistribute land meaningfully, transferring limited and poor quality land and indebting the intended beneficiaries (Gauster & Isakson, 2007). In the 21st century, landholdings are extremely unequal; 87% of farms average just
1.2 hectares and occupy just 16% of the agricultural land, with a Gini coefficient of 0.84 for farmland distribution (Instituto Nacional de Estadísticas, 2004).

1.1.3. Resilience, adaptation and transformation in agroecology

The questions of this study are embedded in debates about resilience, adaptation and transformation as refracted through the racialized, ethnocentric, and anti-poor context of Guatemalan politics. Resilience and adaptation have become buzz words in the wider literature surrounding agriculture, climate change, social justice and social change. Resilience— the capacity of a social-ecological system to continually change and adapt while remaining within certain thresholds— involves adaptations. Adaptability is the capacity to adjust to internal and external drivers of change and continue stably along the current trajectory (Folke et al., 2010). Yet, whose interests are served by following the adaptive trajectories shaped by the current context? Scholars note that the poor, landless, and/or Indigenous may not benefit from being adaptable and resilient with the goal of maintaining current systems. Adaptation to environmental change accommodates rather than contests change, and is being taken up by technocratic fixes to structural problems (O’Brien, 2012). For peasant farmers, resilience-based policy approaches that do not challenge unjust power structures are thus open to serious critique given their implicit reliance on local adaptations to climate change and socioeconomic inequalities, when the structures behind them are best addressed at national and global levels (Holt-Giménez et al., 2021).
Transformation refers to the crossing of a threshold into new development trajectories (Folke et al., 2010). In rural Latin America, transformation can be emancipatory when rural people negotiate environmental and other changes in hybrid, multiple and intersectional ways. Notably, this returns agency to marginalized subjects as they enact creative alternatives to the challenges posed by climate change and globalization (B. P. Warner et al., 2020). To employ transformative politics, struggles for localized food systems must take up radical political approaches that seek deep structural changes rather than progressive and reformist policies which focus on food security and food justice (Holt Giménez & Shattuck, 2011). While agroecology is positioned as a transformative project across geographies and scales (Altieri, 1989, 2009; C. R. Anderson et al., 2019; S. Gliessman, 2016), and is sparking an agroecological revolution in Latin America (Altieri & Toledo, 2011), analyses of agroecology in practice illustrate the varied statuses and challenges of agroecological transitions on the ground.

This study seeks to explore agroecological variation in Guatemala within the tensions among the animating concepts of resilience, adaptation and transformation. The trajectories of agroecology in Guatemala are emblematic of a larger dispute between the institutionalization of agroecology and the antihegemonic power of its social movements (Giraldo & Rosset, 2018). If taken up by state governments, agroecology movements have to “move within limits defined by a system that exists to preserve the interests of the dominant class” (Giraldo & McCune, 2019 pg 786). Nicholas Copeland observes two sides of agroecology in Guatemala. On the one hand, it is a viable alternative development program that is successfully enhancing food sovereignty in specific places, namely where
communities have access to land, water and training. On the other hand, adaptive and resilience-based programs are passed off to NGOs as agroecology, turning the work into a business that extends neoliberal governance. In this sense, “agroecology can ‘responsibilize’ peasants for poverty, and habituate them to state abandonment” (Copeland, 2012, p. 2) Without land redistribution to peasant farmers, agroecology reaches ‘agrarian limits’ (Holt-Giménez et al., 2021), necessitating an explicitly political approach that includes rural social movements for re-peasantization and the return of land to Indigenous peoples (De Molina, 2013; Rosset & Martínez-Torres, 2012). The questions I ask in this research, while not explicitly investigating land inequality, access, and tenure, run parallel to these critiques by avoiding the normalization of campesino land constraints and positioning smallholder struggles and collective actions within the fundamental framework of Indigenous rights to land and life.

1.2. Literature Review

This literature review begins with an overview of the political economy of peasant agriculture in Guatemala as a foundational condition for smallholder farmer vulnerabilities during shocks. I then summarize how smallholders have adapted to past and concurrent shocks to pinpoint ways in which the pandemic’s economic shock, specifically market and mobility restrictions, lead to new vulnerabilities and challenges. Third, a section on agroecology and market functioning reviews the opportunities and constraints for agroecology in relation to globalized markets. Collective action among smallholders and
solidarity economies are ways in which communities of farmers work within various constraints to maintain their livelihoods, which leads to the question of the role of farmer organizations during the pandemic’s restrictions.

1.2.1. Political Economy of Central American Smallholder Agriculture

The smallholder farmer in Central America is caught in a creative struggle to subsist despite structural vulnerabilities that are continually reinforced by markets and the state. In Guatemala, the political economy of peasant agriculture produces and perpetuates conditions of poverty that exacerbate farmers’ vulnerability: unequal access to land and resources, market volatility, dependence on export crops such as coffee, and gendered inequalities. Amidst globalizing markets and intensified vulnerability, the persistence of the smallholder campesino is debated. This section first explores these debates, then turns to the vulnerabilities outlined above. The section ends by addressing the livelihood diversification strategies that Guatemalan farmers employ to survive.

The persistence of the peasantry in Latin America

The long-term viability of the peasantry in a capitalist economy has been debated, most notably in relation to Karl Kautsy and V.I. Lenin’s “agrarian question.” Concerned with the spread of capitalist markets into the countryside, they postulated that peasants would become a landless working class, serving the landed bourgeoisie (Kautsky, 1988; V.I. Lenin, 1956). The persistence of the peasantry under capitalism has occupied development scholars and agricultural economists since. An unstable ‘functional dualist’ model positions smallholders in an exploitative relationship with capitalist agriculture regarding their
subsistence production and labor power (de Janvry, 1981). Functional dualism between capitalist and peasant agriculture is characterized by semi-proletarianization and the subsistence production of basic grains to “subsidize” the reproduction of rural labor which would not occur simply from the low wages paid by capitalist farmers. Campesinos’ ability to produce some of their own food while engaging in wage labor allows capitalist producers to hire out labor below a living wage, effectively subsidizing capitalist agriculture.

According to de Janvry et al.’s view of Latin American agrarianism in the late 1980s, the contradictions were such that the system would lead to a “destruction of the peasantry in the long run” (1989, p. 85). They argue that land grabbing and the displacement of peasants to the most marginal land will cause an ecological collapse of the resource base, while demographic contradictions perpetuate rural poverty. This position raises questions about smallholder farmers’ agency and abilities to overcome the structural constraints they face.

Despite growing inequality, displacement to marginal land, and abandonment by Latin American state policies, “campesinos aren’t going away” (Loker, 1996, p. 77). In a global market, peasants adapt their market participation under a functional dualist model to help support traditional peasant subsistence agriculture. In Guatemala “market forms of provisioning can complement – rather than substitute for – peasant agriculture,” and campesino production of traditional Indigenous milpa (a Mesoamerican polyculture and system of resource management centered on maize) persists because of its cultural rather than capital importance (Isakson, 2009, p. 726). Smallholder producers in Central America and Mexico manage hundreds of agrobiodiverse commercial and subsistence crops (Méndez et al., 2010) guaranteeing the conservation of global agrobiodiversity (Moguel &
Toledo, 1999) and making their labor and expertise integral to global food security. Even still, smallholders are subject to De Janvry et al.’s (1989) “double (under-) development squeeze,” in which the combination of small plots of land and scarce employment opportunities mediated by the market perpetuate rural poverty for smallholders. In this political and economic context, smallholders face multiple vulnerabilities, detailed below.

**Structural Vulnerabilities: Access to land and resources**

Smallholder farmers across Central America depend on their production for both food security and income, cultivate small areas (less than 10 hectares) and source all or most of the farm labor from within the family (Nagayets, 2005). There were an estimated 15 million smallholder farms in Latin America as of 2011 (Berdegué & Fuentealba, 2011), including subsistence farms with diversified off-farm income as well as commercial family farms producing marketable surplus. In 2010 Guatemala had 560,904 smallholder farms measuring 1.4 hectares or under (Srivastava et al., 2010). For those who have land, sustained access is often uncertain: 33 percent of Guatemalans perceive their land tenure as insecure, ranking highest in Latin America (Feyertag et al., 2020). Land distribution is also extremely unequal; 87% of Guatemalan farms average just 1.2 hectares and occupy only 16% of the agricultural land, with a Gini coefficient of 0.84 for farmland distribution (Instituto Nacional de Estadísticas, 2004). Large land owners control the majority of agricultural land and notably consist of recent expansions of oil palm and sugarcane plantations in the northern lowlands (Alonso-Fradejas, 2013) and a long history of coffee
and banana plantations in the subtropical humid forest and coastal south (Schlesinger & Kinzer, 1982; Striffler et al., 2003; Wagner et al., 2001).

With dispossession of land comes a lack of access to environmental and cultural resources: forests, water, clean air, and sacred sites. Myriad development projects led by international actors and local elites have robbed Mayan peasants of their land rights and undermined basic security and wellbeing. A USAID 1970 Rural Development Plan used land reform and poverty alleviation discourse to depoliticize agrarian policies and effectively set the stage for state-led genocide in the 1980s (Copeland, 2012). In the 1980s international agencies like the World Bank and Interamerican Development Bank funded projects that displaced smallholders, such as the hydroelectric Chixoy Dam which flooded communities in Río Negro, Baja Verapaz (Einbinder, 2014, 2017). Multinational hydropower and mining projects continue to operate in concert with militarized interests in Guatemala, with varied impacts on development (Dougherty, 2019; Katz, 2000; Nolin & Stephens, 2010).

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2 In Rabinal, one of the sites in this study, a 1983 World Bank and Inter-American Development Bank project flooded a fertile valley in central Guatemala to establish the Chixoy Dam for hydroelectric power. Indigenous communities were displaced, and both arable land and sacred sites were inundated along the banks of the Río Negro in Baja Verapaz, causing long-lasting trauma associated with the loss of human and non-human life (Einbinder, 2014, 2017).

3 Mining conflicts were ongoing during the civil war and intensified nationwide by the early 2000s; by 2014 the Ministry of Energy and Mines recognized 19 ongoing hydropower related conflicts (Aguilar-Støen & Hirsch, 2015). Indigenous-led resistance movements demand that communities be consulted on the use of their land and resources: communities in La Puya near Guatemala City have protested the El Tambor mine by blocking its entrance for multiple years (Pedersen, 2014), there is ample resistance to the granting of mineral rights to Canadian companies in the western department of San Marcos (Laplante & Nolin, 2014), and neoliberal mining schemes are being challenged as human rights abuses, as in the eastern community of El Estor, Izabal (Nolin & Stephens, 2010), one of the field sites in this study.
Structural Vulnerabilities: Market volatility and dependence on export cropping

For many campesinos in the study areas, dependence on income from cash crops such as coffee and oil palm leads to vulnerabilities related to market functioning and price volatility, especially when combined with land grabbing and state violence. While Guatemala’s economy became increasingly dependent on coffee exports by the late 1990s (R. Rice, 1999), coffee production has a long-term inability to provide sufficient income and makes producers vulnerable to price shocks and rising production costs (Bacon et al., 2008, 2014). Oversupply and dependence on the commodity led to “somewhat or greatly diminished income” for producers in Guatemala (Eakin et al., 2006, p. 164) during severe price drops in 2001-2003 (Bacon, 2005; R. Rice, 2003). Low income combined with high corn prices make farmers vulnerable to food insecurity (see Bacon et al., 2014 on the "hungry farmer paradox"). Los meses flacos, or the lean months, refer to seasonal food shortages prior to harvests when farmers run out of stored staple crops and cannot generate enough income to buy food. In many households, more income is required for food than is generated from food sale (see Morris et al., 2013 for El Salvadorian case study).

Promotion of contract farming for oil palm is fraught. While campesino’s access to income can increase through cash cropping and certain mixtures of cash and subsistence crops (Immink & Alarcon, 1991; Von Braun & Kennedy, 1986), evidence abounds for oil palm’s exacerbation of unequal food access in Guatemala (Hervas & Isakson, 2020), acceleration of land sales, and production of precarious employment (Hervas, 2019). Uncontrolled development of oil palm is “cultivating vulnerability” for smallholders, heightening exposure to external shocks such as oil palm price drops and increasing overall
food system vulnerability (Hervas, 2020). In the Petén, Alta Verapaz, Izabal and Quiché departments, expansion of oil palm and sugar cane plantations infringes on Indigenous forests and campesino landholdings (Alonso-Fradejas, 2013). A salient example of oil palm’s ecological and human rights impacts is the 2015 ecocide of hundreds of thousands of fish caused by oil palm industry pollution in Sayaxché, Petén in 2015 (de la Roca, 2019).

**Structural Vulnerabilities: Gendered inequalities**

Gendered inequalities in agriculture make women’s livelihoods more vulnerable to shocks, which in turn can affect a family’s livelihood and community development outcomes (Blumberg, 1988; Schneider, 2016). Agriculture in Latin America is becoming feminized since the 1970s (Lastarria-Cornhiel, 2006) in a cultural context where women’s labor is primarily temporary, labor-intensive, and paid less than men’s labor (Deere, 2005). Women are doing more work overall: on top of existing reproductive care work, male out-migration leaves women to manage subsistence and commercial crops, and women take on more waged labor on contract or large-scale non-traditional export farms (de Schutter, 2013). This gendered transition occurs in highly gendered farming systems where traditional household units and the distinction of men as farm operators bars women from earning income (Radel et al., 2012). As of 2014, 51% of Guatemalan women (in all sectors) did not have an income separate from their male spouses or family members (CEPALSTAT, 2021).

In the smallholder sector, how the feminization of agriculture affects women’s vulnerability remains and open and localized question which merits further study (Zimmerer et al., 2015). A patriarchal baseline limits women’s ability to control and access resources,
even while women who farm commercially increasingly challenge the “myth of the masculine market” (Hamilton et al., 2001). Because the structural inequalities of smallholder agriculture suggest that vulnerable individuals will become more vulnerable during crises, rural women producers may contend with added challenges during the pandemic’s economic shock and the agrarian effects of the pandemic may vary on the axis of gender.

**Livelihood Diversification Strategies**

Livelihood diversification is “the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve their standards of living” (Ellis, 1998). Integral to this portfolio are different types of capital as well as the ability to combine, transform and expand those assets (Bebbington, 1999). Campesinos diversify livelihoods in order to cope with constraints related to land access and market volatility. Although encouraged by policy makers, livelihood diversification is not effective everywhere; it is critiqued as a negative adaptation that can perpetuate poverty in communities under food stress due to natural resource pressure and as a debt trap because of the cycle of funding new economic activities (Davies, 2016; Hussein & Nelson, 1998).

Crop diversification is a smallholder livelihood strategy in much of the global south (Bellon et al., 2020; Cho et al., 2016; Félix et al., 2018; Joshi et al., 2007; Kerr et al., 2007; Makate et al., 2016; McCord et al., 2015; Nguyen, 2014), and is becoming a widespread norm in Guatemala (Isakson, 2009). Home gardens, both rural and urban, provide a high degree of nutrient cycling and diverse functionality including food, medicinal and
ceremonial purposes in Guatemala (Immink & Alarcon, 1993; Keys, 1999; Méndez, Bacon, Olson, Morris, et al., 2010). Specifically, diversification of tree crops both in field plots and home garden settings is often promoted by food sovereignty movements and increases income and food security (Schroth & Ruf, 2014). Latin American agroforestry has become ‘mainstreamed’ with the spread of diversified coffee and cacao (Somarriba et al., 2012).

Guatemalan farmers diversify income via migratory work and local waged labor (Wyrwinski, 2004), often as a temporary measure during environmental and economic shock (Gerlicz et al., 2019). Rural migrants transform traditional land-use practices, gender roles and ethnic relations in their Guatemalan sending communities in locally specific and contested ways (Taylor et al., 2006). Central American farmers invest remittances to increase row crop and pasture land holdings, calling into question the sustainability of rural landscape management transformed by remittances (Davis & Lopez-Carr, 2014). Similarly, migrant households in Guatemala are in a better position to acquire land, leading to conversion of forest to cattle pasture and African palm (Taylor et al., 2016). On the other hand, rural outmigration is a dualistic phenomenon: a slow displacement that is “squeezing rural producers out of the countryside”, as well as a strategy to continue semi-subsistence agricultural production and address food insecurity, albeit unevenly successful (Carte, Schmook, et al., 2019). “Subsistence migration,” regional south-south movement between Central American countries, is integral to Central American smallholders’ persistence in agriculture amidst the continued deterioration of environmental and structural conditions (Carte, Radel, et al., 2019).
Rural and Indigenous communities, who were subject to the greatest degrees of repressive violence during Guatemala’s internal armed conflict and subsequent economic marginalization, were most dependent on international migration before the pandemic (Nichols, 2020). Approximately a million and a half Guatemalans live and work in the United States as of 2006, and remittances account for 13.9% of Guatemalan GDP as of 2019 (CEPALSTAT, 2021), indicating significant reliance on income from outside the country. Already precarious rural Guatemalan livelihoods were vulnerable to the pandemic’s changes in migration policy and transnational mobility restrictions. As early as April 2020, the economic effects of the pandemic were clearly linked to migration: US remittances sent to Guatemala fell 40 percent during March 2020 (Nómada, 2020) (and unemployment in the US was directly “threatening Central America’s economic lifeline” and fracturing the transnational safety nets of migrant sending families (Janetsky, 2020).

This exploration of structural vulnerabilities for Guatemalan smallholders makes clear that creative and flexible livelihood diversification strategies under a functional dualist model, however, do not necessarily guarantee livelihoods. With poor land access and dependence on market functioning as a core and perennial issue for rural Guatemalan campesinos, social, nutritional and public health disparities abound. In 2014, 50.5% of the country’s population was living in poverty, with even higher rates (65.8%) for the rural population. As of 2015, only 49.3% of the rural population used improved sanitation facilities, and as of 2019 16.1% of Guatemalans were below the minimum level of dietary energy consumption (CEPALSTAT, 2021). For Guatemalan smallholders, the structural
vulnerabilities discussed in this section perpetuate rural poverty and are a set of preconditions for increased vulnerability during shock.

1.2.2. Contextualizing multiple, cyclical and ongoing crises: How is the pandemic different?

The Covid-19 pandemic created a qualitatively distinct global food crisis. Smallholder responses to previous and ongoing shocks such as amplified climate variability, seasonal droughts, hurricanes, crops pests, and global commodity price drops help contextualize farmer responses to the pandemic’s unprecedented restrictions on markets and mobility. Despite increasing environmental shocks, Tucker et al. (2010) conclude that Central American and Mexican smallholders are more threatened by market shocks. However, the ability to implement agricultural adaptations during these shocks is more likely connected to land availability than perceived shock. Because the smallholders in this study face land constraints, reliance on market-based adaptive responses poses a new set of challenges during the pandemic.

The pandemic as a qualitatively distinct food system crisis

The pandemic’s unique impacts on the global food system are conditioned by structural vulnerabilities (Clapp & Moseley, 2020) and reveal existing vulnerabilities for smallholders (Altieri & Nicholls, 2020; Guido et al., 2020). In an historical analysis Clapp and Moseley (2020) outline how 70 years of policy responses to previous food system crises have conditioned the global food system’s vulnerability to the pandemic’s disruptions.
Industrialization and specialization makes the global food system more complex, and therefore vulnerable to lockdowns. Global food supply must travel long distances to reach consumers, making it vulnerable to transportation and mobility restrictions. Third, preexisting policy advice for smallholders has encouraged them to produce commodity export crops and rely on imported grains for consumption, making them vulnerable to food insecurity when supply could not reach consumers.

Despite the link between disease outbreaks and environmental change (Carter & Moseley, 2021), the pandemic was initially characterized as a social and economic crisis rather than an environmental one. According to a survey of 105 farmers from five Latin American countries, in the first three months of the pandemic (March – May 2020) over three fourths of farmers were concerned about the pandemic affecting crop sales while fewer (39.3%) were concerned about decreases in harvests (Salazar et al., 2020). Similarly, a global survey of Indigenous peoples and local communities, which included Guatemala, found that the pandemic caused more social and economic impacts than environmental ones (Walters et al., 2021); the devastating impacts of Hurricanes Eta and Iota in late 2020 intersected with the social and economic impacts of the pandemic, however. According to the Food and Agriculture Organization (FAO), Central American food systems’ top pandemic-induced problems are restricted mobility for shopping, economic and physical access, and regional and international trade on the demand side, accompanied by a rise in

4 However, lack of access to capital and inputs are expected to lead to future changes in land management and production strategies. The global coffee sector, for example, is expected to have long-lived financial impacts that make production especially vulnerable to ecological changes on farms when capital for management and inputs decrease (Guido et al. 2020).
food prices on the supply side. Guatemala is highlighted as having a “considerable decrease in transport to acquire and purchase food” (Food and Agriculture Organization, 2020, p. 4).

**Farmer responses to previous shocks and reliance on market-based strategies**

While it is difficult and futile to parse out whether environmental or economic shocks are worse for *campesinos* who live in the context of both, lessons on how smallholders and their families respond to environmental shocks are useful for anticipating and analyzing responses during the pandemic. Central American smallholders are increasingly vulnerable to climate change, which is significantly and adversely affecting production of staple and commercial crops (Harvey et al., 2018). While climate modeling suggests future drying across Central America (Depsky & Pons, 2020), local variability persists (T. G. Anderson et al., 2019), and detailed information on who and where the most vulnerable smallholders are is incomplete (Donatti et al., 2019).

Hurricanes and droughts demand short-term coping strategies that involve changing food intake and relying on market-based solutions. *Campesinos* in Mexico and Central America adapt to the crop loss, flooding and net profit loss associated with hurricanes by switching temporarily to subsistence maize and bean production to address food insecurity, decreasing food consumption, and replanting coffee if there is access capital (Cruz-Bello et al., 2011; Holt-Giménez, 2002). Droughts are widespread drivers of food shortages in Guatemala (Beveridge et al., 2019) and Nicaragua (Bacon et al., 2017) although food security is also shaped by social and economic factors such as unemployment, lack of land and resources, and market shocks. To cope with food shortages *campesinos* decrease food
intake, use savings, and sell livestock assets, which effectively decrease a household’s ability to cope with future shocks (Alpízar et al., 2020). This presents a serious consideration for smallholder communities during the pandemic because the commercialization of assets depends on having access to a local market.

In the early 2010s, a severe 2014 drought (World Food Programme, 2015) and the exacerbation of coffee leaf rust (Hemileia vastratix) emerged as cumulative shocks for smallholder coffee farmers throughout Central America and Mexico (C. M. Bacon et al., 2017). Correlated with both climate variability and the effects of previous economic shocks causing a decrease in coffee farm management and investment (Avelino et al., 2015) the rust unprecedentedly affected the livelihoods of more than two million Latin Americans and caused one billion dollars in damage between 2012 and 2014 (USAID, 2014). Adaptation strategies included off-farm employment, migration, crop diversification, and reliance on savings in Guatemala and Nicaragua (A. Rice, 2017), and adaptative changes such as switching to resistant varieties, applying agrochemicals or removing shade trees in Mexico (Valencia et al., 2018).

While market shocks are a significant driver of precarity for smallholder income, market access is also a lifeline. Farmers rely on market-mediated coping and adaptive strategies (selling assets, turning to off-farm employment, selling more agricultural good and livestock assets, and using agrochemicals to confront pests or disease) during shocks, putting their food security and income at stake during the pandemic’s unique market restrictions.
1.2.3. Agroecology’s relationships to market functioning and solidarity economies

Markets can provide promises as well as pitfalls for agroecological movement growth. This section provides a brief overview of agroecology, situating it within Mesoamerica, then discusses the doubled-edged sword of market functioning and the implications for economic solidarity.

*Agroecology’s Mesoamerican roots*

Agroecology is the science, movement, and practice of sustainable agriculture and resource management (Altieri, 1989; S. Gliessman et al., 1998; Wezel & Soldat, 2009) based on the application of principles such as recycling, efficiency, diversity, regulation and synergies (Altieri, 2002; Gliessman & Rosemeyer, 2009; Tittonell, 2015). With roots as a science in the 1930s, agroecology grew as a social movement and set of practices by the 1980s, and while institutionalized in the 1990s (Wezel & Soldat, 2009) the field remains a set of ‘agroecologies.’ Méndez et al. (Méndez et al., 2013) see agroecology as a participatory, transdisciplinary and action-oriented approach, framing ‘agroecologies’ pluralistically on a gradient between (1) a scientific approach grounded in disciplinary Western natural sciences, which works on a plot and farm scale, and (2) an ecology and agronomy-based approach that integrates with the social sciences to act on political economy at a food system scale.

Agroecological practices are alternatives to Green Revolution technologies (Wezel & Soldat, 2009), encompassing minimizing inputs, integrating crops for pest management,
implementing soil and water conservation techniques, diversifying production, saving native and traditional seeds, valuing Indigenous farming knowledge, and generally working within the farm’s closed loop nutrient cycle (Altieri, 1999; Francis et al., 2003; Gliessman et al., 1998). Core tenets of agroecology in Mesoamerica are based in Indigenous agricultural systems, one of which is, *milpa*, an open-field polyculture and system of resource management centered on maize that rotates cyclically with woodland vegetation (Gliessman et al., 1981; Hernández Xolocotzi & Bello Baltazar, 1995; Nigh & Diemont, 2013; Toledo et al., 2008). Much recent attention has been paid to practices that adapt to climate variability and change (Altieri et al., 2015; Bezner Kerr, et al., 2019; Viglizzo et al., 1995) as well as the integration of participatory and action-oriented approaches in agroecological transitions (Fernandez et al., 2013; Guzmán et al., 2013; Holt-Giménez, 2002; Méndez et al., 2015, 2017; Warner, 2008).

Agroecology is “a social movement with a strong ecological grounding that fosters justice, relationship, access, resilience, resistance, and sustainability” (Gliessman, 2013, p. 19). Movements for food sovereignty, which refers to farmers’ access to land, seeds and water to create local autonomous markets for food production (Altieri, 2009), implement agroecological principles and practices to achieve their goals. A driving force for agroecological movement expansion in Latin America is the *Movimiento Campesino a Campesino* (MCAC), or Farmer to Farmer Movement, which centers horizontal pedagogy and Indigenous knowledge sharing. MCAC originated with Mayan agricultural extensionists in the Guatemalan highlands and spread through Mexico and revolutionary Nicaragua in the late 20th century (Holt-Giménez, 2006), and its *promotores* (farmer-teachers) and
movement methods persist throughout the region. In 1993, the transnational peasant and family farmer movement *La Vía Campesina* was founded to “defend food sovereignty and struggle for land and agrarian reforms” with agroecology as a key form of resistance (*La Vía Campesina*, n.d.). A focus on re-peasantization in the face of corporate land-grabbing and large agribusinesses goes hand-in-hand with the explicitly political adoption of agroecology (Rosset & Martínez-Torres, 2011, 2012). Thinking and acting contextually is an enduring theme in both the theoretical and applied fields, since agroecology necessitates engagement with social identity, differences, and therefore with social justice (Bell, 2018).

**Agroecology’s potential for cushioning smallholders from economic and environmental shocks**

Existing research suggests that agroecology can play an important role in reducing farmers’ vulnerability to production and market shocks. The application of agroecological practices can improve financial capital at the farm level (including yield, farm profitability, income stability and assessment of transition costs) (D’Annolfo et al., 2017), helping farmers achieve more financial independence in the face of commodity price shocks. Dumont et al. (2016) present economic principles within agroecology, such as *financial independence*, *market access and autonomy*, *partnership between producers and consumers*, *rural development and preservation of rural fabric*, and *geographic proximity* many of which are relevant during market closures. A “re-localization” of markets via these principles, is a necessary step toward shortening food supply chains and ultimately transforming the food system into a just one (Gliessman, 2013).
While agroecology’s multifunctionality as it relates to ecological management, food sovereignty, and gender equality is well documented (Altieri, 1989; C. R. Anderson et al., 2019; Calderón et al., 2018; Holt-Giménez & Altieri, 2013; Schwendler & Thompson, 2017), Dumont et al. (2016) observe a gap between agroecology’s socioeconomic principles and their application in practice, highlighting the variable ways that agroecology sows resilience against economic shocks. Agroecological practices played a key role, for example, in helping Cuba’s food systems survive the economic crisis of the 1990s caused by the collapse of the Soviet socialist bloc. Without access to expensive imported agrochemicals and other inputs, Cuban peasant farmers first substituted more ecological inputs then transitioned to agroecological systems, eventually forming cooperatives that achieve economies of scale to market goods (Rosset et al., 2011). Diversification of agroecological farms allows for autonomy from the market via anti-specialization (Altieri & Nicholls, 2012; Van der Ploeg, 2012), and helps farmers face socioeconomic shocks and climate change (Altieri, 2003). On-farm processing and direct sales of diverse food products are an integral part of diversification, allowing for “the creation of considerable synergy” (Van der Ploeg, 2012, p. 49) of social and economic goals at the farm and community scales. The links between agroecological practices and food access in the context of compounding price and pest shocks is also clear; a strong correlation between fruit tree density and vulnerability to food insecurity for Nicaraguan smallholder coffee producers reinforces “the broader importance of agroforestry and agroecology for food security” (Bacon et al., 2017, p. 149).

Agroecology can also decrease vulnerability for smallholders contending with climate variability. Increased tree cover, vegetation complexity and other agroecological
management helped smallholders better resist and recover from the effects of hurricanes in the Dominican Republic (Uriarte et al., 2004) and reduced susceptibility to hurricane disturbance in Chiapas, Mexico (Philpott et al., 2008). Mexican smallholders in Chiapas who adopted agroecological practices on a community level, increased soil conservation practices, and planted more trees reduced their exposure to future storm risk (Cruz-Bello et al., 2011). Similarly, after the devastating 1998 Hurricane Mitch, agroecologically managed plots in Nicaragua had more topsoil, higher moisture in the field, more vegetation, less erosion and less economic loss overall than their conventional counterparts up to certain storm intensity thresholds (Holt-Giménez, 2002).

**Market-based constraints for agroecological smallholders**

Market functionality, however, can be a constraint for smallholder producers and agroecological producers, due to the negative impacts of neoliberal market structures. Globalized markets and processes of privatization, deregulation and greater competition with corporate agribusiness in the context of reduced state intervention in agriculture create uncertainties for small producers (Vásquez-León, 2010). In rural Latin America, large agro-processing firms commonly contract out and vertically integrate production of non-traditional export crops to obtain raw product (Key & Runsten, 1999), which can put pressure on subsistence farming and eliminate other options for livelihood generation (Hervas, 2019). Constantly changing value chains, difficulty meeting international quality standards, lack of other selling opportunities, and difficulty accessing urban centers are factors that can lead to monopsonistic market relations where buyers exploit producers.
using stronger bargaining power (Sivramkrishna & Jyotishi, 2008). Formal market access, however, is not the only explanatory factor for agroecological smallholders’ livelihood outcomes. The market-based constraints that smallholders face can be highly localized and include land prices, input prices and factor price ratios as well as market access, as seen in rural Kenya (Kopper & Jayne, 2019).

In Mexico maize markets do not encourage or reward crop diversification, which can be a challenge for implementing agroecology. Resource-poor smallholders, who manage significant genetic diversity in their corn crops, receive few incentives from bulk markets for diverse landraces, and the attempts to differentiate the market and add value to diversified corn have been challenging (Keleman et al., 2009). In this case market functionality puts maize diversification at odds with rational economic decisions, possibly constraining agroecological development to farmers with access to training, organizational networks, and outside funding.

Because it has been so volatile in the last few decades, the global coffee market’s mix of opportunities and constraints for smallholders has been carefully studied. Lack of product differentiation (Borrella et al., 2015) and overproduction have made smallholder coffee producers increasingly vulnerable to changing prices (R. Rice, 2003). With increased access to specialty coffee markets via collective marketing strategies, some smallholder coffee producers in Nicaragua were able to increase assets and resilience to future shocks (Méndez et al., 2010), but scholarship emphasizes that improved market access alone has uncertain impacts on rural poverty if the underlying financial and input constraints are not addressed concurrently (Donovan & Poole, 2014). Market-based cooperative and coffee
certification initiatives based in social equity promise to bring producers out of the devastation caused by price crises, but price premiums show little or varied effects on improving livelihood-related variables like education, income, savings, emigration, food security and poverty levels (Bacon et al., 2008; Méndez et al., 2010).

Mirroring the agroforestry and specialty market considerations for coffee, Central American smallholder cacao producers rely on smallholder enterprises and cooperatives to help them reach economies of scale in a market that has persistent excess demand (Donovan, 2006). Peruvian and Mexican smallholder cacao producers have significant challenges in connecting to lucrative markets that can support their livelihoods (Blare et al., 2021). Faced with these constraints, smallholder communities act collectively to access markets and form elements of solidarity economies.

**Collective action and solidarity economies**

Given the challenges for smallholders in dynamic and volatile export markets, collective action among producers can make participation in cash cropping beneficial for livelihoods, and can strengthen the social relations necessary for structural changes down the line. At the same time, community organization and social fabric is seen as “the culture medium on which agroecology grows” (Mier y Terán Giménez Cacho et al., 2018, p. 19), making agroecological organizations a possible node of equitable and community-led economic development.

Collective action can be advantageous for smallholders looking to market their products, much as it has been for community-led natural resource management (Agrawal,
Collaborative and self-organized smallholder organizations can address inefficiencies of the market, help with coordination challenges, and can achieve market access through reaching economies of scale, even with small groups of about 40 producers (Markelova et al., 2009). The Papa Andina network in the Andes, for example, promotes market innovation to support poor and marginalized smallholder potato farmers using a participatory market chain approach (Devaux et al., 2009). Myriad coffee cooperatives across Latin America are successful in sharing equipment, providing training and accessing higher prices (Wollni & Zeller, 2007) although certain initiatives such as Fair Trade are critiqued for their limited impacts on labor conditions and prices gained by producers (Johannessen & Wilhite, 2010; Valkila & Nygren, 2010). Returning to the historically emblematic example of Cuba’s 1990s “special period”, transitions to integrated agroecological systems were made possible by the social movement pedagogy and praxis of the Farmer to Farmer Movement (MCAC) and National Association of Small Farmers (ANAP), which efficiently trained and coordinated about one half of Cuban campesinos (Rosset et al., 2011).

Farmer organization is a critical factor in helping Mesoamerican smallholders access markets, but the role and timing of public and private investment in these organizations is nuanced. Farmer groups in the vegetable sector, for example, have clear benefits due to high transaction costs for individual farmers to access output markets, while in the maize sector transaction costs are low and producers benefit more from organizational affiliation when it comes to accessing inputs like credit, seeds and fertilizer (Hellin et al., 2009). Throughout Africa, producer groups act collectively to enable smallholders to take
advantage of new value chains, given the growth of supermarkets and the resulting displacement of small shops and public markets. These actions necessitate facilitation skills among diverse groups that can build trust and bridge multiple stakeholder interests (Markelova & Mwangi, 2010).

Collective action in alternative spaces helps smallholders adapt to changing global supply chains. Alternative agri-food networks (AAFNs) are anti-systemic, anti-productivist and post-capitalist social behaviors that work to make food chains shorter and value quality, place and nature (Higgins et al., 2008). AAFNs facilitate an ideological and participatory space where peasant farmers and urban consumers collaborate to resist globalization and promote social change (Nigh & González Cabañas, 2015). Similarly, emerging research about food system responses to the Covid-19 pandemic from across Latin America (Tittonell et al., 2021) cite pre-existing social groups such as agroecological movement organizations as one of the key features of local food systems that implemented alternative market channels and shortened supply chains to overcome the economic and social crisis.

Favorable market policies are crucial to farmers’ ability to access and participate in markets. Market policy issues are seen as both a constraint for and organizing goal for farmer organizations. While some degree of outside development or NGO assistance is often required to catalyze the creation of farmer organizations, support from the public and private sectors is needed to ensure that there are policies and programs in place that make access to markets stable (Markelova et al., 2009). Producer organizations’ policy needs vary in the context of differentiated state involvement in smallholder economies and struggles. The organic coffee industry in Chiapas, Mexico, is a successful example of agroecological
scaling (Mier y Terán Giménez Cacho et al., 2018) where a combination of leftist political
groups, organic certification labeling, and self-organized cooperatives facilitated access to
export markets for over 31,000 Indigenous smallholder coffee producers (Martinez-Torres,
2006). In Malawi, smallholder corn and tobacco producers are able to adopt these cash
crops only when policies exist that help them access credit, extension and markets (Zeller et
al., 1998). In India, the relative absence of government support for cooperatives and
‘producer companies’ is a hurdle for smallholders. Civil society organizations and NGOs have
taken up the work of forming groups that give smallholders access to high-value national
and export markets (Trebbin & Hassler, 2012). Globally, the state’s presence in market
functioning and formal markets’ relationship to grassroots agroecology movements are
contested. This tension is especially present in Guatemala were agroecology organizations
strive for market integration for their members laboriously and unevenly.

Solidarity economies merge democratic solidarity with economic activities, in which the
overarching logic of economic activities is not about producing a profit but about creating
relationships of exchange that suit common goods (Laville, 2010). As a response to
neoliberal capitalism, components of solidarity economies include fair trade initiatives,
alternative currencies, community land trusts, community supported agriculture (CSA)
programs, community resource libraries, and worker, consumer and producer cooperatives
(Miller, 2010). The logic of the gift, or el don, grounded in politics of reciprocity and
redistribution, is part of the ethos of solidarity economies in Latin America (Barona, 2013),
many of which are rooted in indigenous ontologies and worldviews (Fondo Indígena de
Centro América, 2008; Jairo, 2008). Ana Margarida Esteves (2014) frames the solidarity
economy as an emerging social justice paradigm for Latin America that decolonizes livelihoods and politics from the impacts of Western colonialism, while recognizing the structural inequalities that prevent subaltern groups from participating in public life under equal conditions to those who are most privileged.

There is a need to form politics of action in solidarity economies (Ahmed, 2015), for social capital becomes an organizing factor for defining economic goals collectively (Laville, 2010). The poorest and most marginalized people in Latin America, such as campesinos who contend with multiple structural vulnerabilities, stand to benefit from forming organizations that work towards solidarity economies.

This review of smallholders’ structural vulnerabilities, how they contend with ongoing shocks, and how agroecology organizations interact with market functionality has revealed some of the expected challenges for smallholders during the pandemic, and identified pathways for solidarity building. While smallholders historically rely on market coping strategies during environmental, economic and cumulative shocks, the pandemic’s near-complete closure of markets raises questions about how smallholder livelihoods were affected and whether agroecology helped. Agroecology movements and their grassroots organizations have been proven to alleviate impacts of economic and environmental shocks. A relative paucity of literature on the relationships between agroecology, collective action and solidarity economies, however, points to an opportunity to study how agroecology organizations may achieve better market access and equitable livelihood generation for their members, using the pandemic as a case study of these processes during an extreme economic shock.
1.3. Study Sites and Farmer Organizations

I worked with eight producer organizations across Guatemala that are devoted to and implementing agroecology differently. The organizations are located in six of Guatemala’s departments (Figure 1; Table 1): Huehuetenango, San Marcos, Baja Verapaz, Chiquimula, Izabal and Petén. This spread covers a wide range of the country (e.g. from 5 to 2500 masl), capturing diverse geographies, cultural contexts and facets of the agroecology movements. The biogeography of the study sites ranges from tropical moist broadleaf forests in the north and east to tropical coniferous forests in the west and central highlands.
The eight organizations are devoted to farmer organizing, agroecology, ecological management, gender equality and community development to different degrees (See Table 2; Appendix C). They were selected for their variation in size, mission or foci, programming, time working in their communities, and degree of implementation of agroecological practices, with the goal of capturing a range of agroecological activity and social movement building strategies in Guatemala. The organizations were also included on the basis of prior research contacts, and their interest in documenting and unpacking the impacts of the pandemic through this remote study.

Table 1: Basic characteristics of organizations

<table>
<thead>
<tr>
<th>Organization</th>
<th>Location</th>
<th>Elevation (masl); Habitat type</th>
<th>Year founded</th>
<th># of members</th>
<th>Ethnicities, self-identifieda</th>
<th>% of memb ers who own their landb</th>
<th>Average plot size of members b</th>
<th>Land constraintsb (yes/no)</th>
<th>Diminished soil healthc (yes/no/ some communiti es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMEDIPK - Asociación de Mujeres Eulalenses para el Desarrollo Integral Pixan Konob’</td>
<td>Santa Eulalia, Huehuetenango</td>
<td>2,300 m; tropical coniferous/ moist broadleaf forest</td>
<td>1998</td>
<td>680</td>
<td>Q’anjob’al</td>
<td>75%</td>
<td>0.09-0.13 hectares</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Red Kuchub’al</td>
<td>Sibinal and Tacaná, San Marcosc</td>
<td>2,300-2,400 m; tropical coniferous/ moist broadleaf forest</td>
<td>2005</td>
<td>353</td>
<td>Mam</td>
<td>90%**</td>
<td>0.22 hectares</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MCEV– Mujeres Caminando por una Esperanza de Vida</td>
<td>Tejutla, San Marcos / San Marcos department</td>
<td>2,300-2,500 m; tropical coniferous/ moist broadleaf forest</td>
<td>2019</td>
<td>12-20</td>
<td>Mam, Sicapacan, mestizo</td>
<td>50%</td>
<td>0.13-0.18 hectares</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ACP – Asociación de Comités de Productores Comunitarios</td>
<td>Rabinal, Baja Verapaz</td>
<td>~1,400-2,000 m; tropical coniferous forest</td>
<td>2003</td>
<td>300-450</td>
<td>Achi</td>
<td>90%</td>
<td>0.13-0.35 hectares</td>
<td>Yes</td>
<td>some communities</td>
</tr>
<tr>
<td>Organization</td>
<td>Location</td>
<td>Elevation Range</td>
<td>Terrain</td>
<td>Year</td>
<td>Land Size</td>
<td>Percentage</td>
<td>Yes</td>
<td>Comment</td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
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<td>---------</td>
<td></td>
</tr>
<tr>
<td>Qachuu Aloom</td>
<td>Rabinal, Baja Verapaz</td>
<td>~960-2,000 m</td>
<td>tropical coniferous forest</td>
<td>2003</td>
<td>600 hectares</td>
<td>75%</td>
<td>Yes</td>
<td>some</td>
<td></td>
</tr>
<tr>
<td>Mancomunidad Copan Ch’orti’</td>
<td>Camotán, Jocotán, Olopa and San Juan Ermita, Chiquimula</td>
<td>~440-1,600 m</td>
<td>tropical coniferous forest/dry scrub</td>
<td>2000</td>
<td>545 hectares</td>
<td>20%</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>GPPLU - Grupo de Pequeños Productores La Unión</td>
<td>El Estor, Izabal</td>
<td>5 m; tropical moist broadleaf forest</td>
<td>2007</td>
<td>189 hectares</td>
<td>95%</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercadito Campesino</td>
<td>Las Cruces, Petén</td>
<td>130 m; tropical moist broadleaf forest</td>
<td>2015</td>
<td>40 hectares</td>
<td>20%</td>
<td>No</td>
<td>some</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*May also include Ladinos*

**as reported by organizational contacts**

Red Kuchub’al consists of 12 sub-organizations in San Marcos, Quetzaltenango, Totonicapán and Retalhuleu departments, but this study engaged with Red Kuchub’al’s producers and agroecological *promotores* in San Marcos department.

Qachuu Aloom works in San Miguel Chicaj, Rabinal and Cubulco municipalities in Baja Verapaz, but this study engaged with Qachuu Aloom’s producers in Rabinal municipality.

*Reported in cuerdas. 1 cuerda = 441 m²*

*Reported in manzanas. 1 manzana = 7,000 m²*

The reach and scope of community organizing varies across organizations (Table 1).

Five of the organizations are based in a central municipality and work solely in that community: AMEDIPK, MCEV, ACPC, GPPLU and Mercadito Campesino. These organizations serve rural farmers in the area surrounding the town or urban center where the organization is based. Three organizations work across municipalities: Red Kuchub’al, Qachuu Aloom, and Mancomunidad Copan Ch’orti’. Six of the organizations serve smallholders with especially small landholdings of 0.09 to 0.35 hectares on average, with the two outliers being Grupo de Pequeños Productores La Unión (GPPLU) in Izabal and Mercadito Campesino in Petén where smallholders have slightly larger average landholdings of 2.00 to 2.19 hectares on average.
Membership numbers vary greatly (Table 1), due to organizational capacity, foci, date of founding, and other factors. The most recently formed group, *Mujeres Caminando por una Esperanza de Vida* (MCEV), has low membership numbers due to their forming just prior to the pandemic. Some organizations are founded by and/or for a specific Indigenous group and self-identify as serving the needs of Indigenous communities or promoting Indigenous land and life. AMEDIPK, Mancomunidad Copan Ch’orti’, GPPLU, Qachuu Aloom and ACPC are explicitly founded on addressing the need to secure Indigenous rights to land and life. The others do not include it as an organizational focus, but serve a partly or fully Indigenous membership.

Table 2 presents the philosophies, goals, programs and practices of each organization to illustrate their diverse foci around a set of core topics: food sovereignty, rural community development, and agroecology. All of the organizations center agricultural production as the material basis for social development, and engage with agroecology as a science, movement, and/or practice. The eight organizations educate on and promote agroecology to differently; some have well-developed agroecology programs and others have initiated their agroecological focus in the last couple years, or while interested in developing programs, face significant constraints to agroecological development at an institutional level.

**Table 2: Agroecological and programmatic characteristics of organizations**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Mission statement</th>
<th>Programs</th>
<th>Plot-level agroecological practices promoted</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMEDIPK - Asociación de</td>
<td>To promote and strengthen Indigenous women’s’ rights and economic</td>
<td>Agricultural training and extension, forestry management incentives,</td>
<td>Organic fertilizers and sprays, diversified plots, native plants, home-</td>
</tr>
<tr>
<td>Organization</td>
<td>Practices and Promoted Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mujeres Eulalenses para el Desarrollo Integral Pixan Konob</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Opportunities through public spaces and economic activities with a focus on agricultural production.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Red Kuchub'al</strong></td>
<td>To develop solidarity economies in Guatemala and to promote <em>buen vivir</em> (living in harmony with earth and people)&lt;sup&gt;5&lt;/sup&gt; by connecting producers and consumers through agroecological supply chains.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MCEV – Mujeres Caminando por una Esperanza de Vida</strong></td>
<td>To support women victims of violence and abuse within MTC, through social work and promoting agricultural production for economic independence.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACPC – Asociación de Comités de Productores Comunitarios</strong></td>
<td>To revitalize ancestral agricultural practices and new agroecological alternatives for sustainable family agroecology and climate change adaptation strategies in the Xesiguan River watershed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Qachuu Aloom</strong></td>
<td>To recover and promote ancestral knowledge about native and heirloom seeds for the material and spiritual wellbeing of communities, so that families can farm in harmony with Mother Earth, produce their own food and generate income.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mancomunidad Copan Ch’ortí’</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td>To operationalize plans and programs for the social development of the Chortí territory, that support local social actors to use resources sustainably.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GPPLU - Grupo de Pequeños Productores La Union</strong></td>
<td>To fight for our communities’ legal access to land and promote food sovereignty.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mercadito Campesino</strong></td>
<td>To improve smallholder household economies, strengthen agroecological practices and promote food sovereignty.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Practices promoted by the organization were self-reported.*

---

<sup>a</sup> For more on the related Maya-Achi concept of *utzii k’asleem*, or Indigenous perspectives on well-being, see (Einbinder & Morales, 2020), and for more on *buen vivir* as a political platform for alternative development in South America see (Gudynas, 2011).
1.4. Methods

This study used a mix of ethnographic and survey methods to document the changes and diversity of producer experiences during the pandemic, evaluate the role of agroecological engagement in livelihood outcomes and identify individual and organizational responses to economic crisis. Data was collected remotely from Madison, Wisconsin between December 2020 and April 2021, due to institutional travel restrictions and the ethics of conducting research in a global pandemic. Methods were approved by the University of Wisconsin-Madison Minimal Risk Research IRB (#2020-1299).

Seven research assistants were employed to identify participants, transfer compensation for internet and phone usage to farmer participants, and provide them with telephone access, where necessary. Data was collected via 1) key informant open-ended interviews, 2) online surveys with each organization, and 3) individual semi-structured farmer interviews. Data was analyzed qualitatively using ethnographic coding methods, and quantitatively via descriptive and analytical statistics. Eight months of previous research experience working in Guatemalan highland communities informed the design of the interviews and survey, as did pilot conversations with organizational staff and long-term experts in Guatemalan agroecology and community development.

1.4.1. Data Collection

*Key informant open-ended interviews*

Open-ended interviews with staff members and agroecological *promotores* at each organization provided important context for producer experiences. I interviewed two key
informants at five organizations, and one key informant at three organizations, for a total of 13 key informants. Two open-ended interviews were conducted per key informant, one at the beginning of fieldwork, and one after the collection of individual semi-structured farmer interviews, totaling 26 key informant interviews. Interviews lasted 40-75 minutes, and were conducted on Zoom or Whatsapp voice call, with the audio recorded for transcription. Key informants provided information on organizational histories, governance structures within the organization, local politics, agroecological philosophies, local land and resource access, and soil and water conditions. Their accounts of the dynamic municipal restrictions and closures, as well as the changing organizational goals and activities during the pandemic contributed to an understanding of organizational constraints and capacities. During initial interviews, I gave organizational contacts the opportunity to edit and add questions to the individual farmer interview script, so they could add questions they were interested in answering and edit the style to be as culturally and linguistically appropriate as possible. Follow-up interviews in April 2021 included questions about changing mobility and market restrictions and updates on how organizational programming, production and community life was affected during the duration of the fieldwork. This data primarily helped answer research questions 2, 3 and 4.

*Online surveys*

Each organization was asked to fill out a 50-question online survey consisting of six parts: (1) agricultural practices, (2) food production, (3) commercialization of farm products, (4) migration and employment, (5) community impacts and (6) alternatives for smallholders
during the pandemic (See Appendix A). Questions on agricultural practices included soil and water conservation, seed saving and buying, climactic constraints to production, land tenure, and agrobiodiversity. Questions about food production addressed changes during the pandemic, degree of community-level production practices, and traditional agricultural ceremonies. The commercialization section included questions about pre-pandemic food markets, changes in local supply and demand during the pandemic, local restrictions on transportation, marketing alternatives, and product scarcity. Questions about migration and employment addressed community-level migration trends during the pandemic, changes in remittances during the pandemic, and changes in local wages during the pandemic. The community impacts section asks the degree to which each social group had been affected during the pandemic. The alternatives section addressed organizational responses, barter, and emerging community initiatives.

At each organization, two to three staff members were surveyed, with the goal of triangulating responses among more than one perspective to gain an understanding of what was going on at each organization. Staff members were explicitly asked to reflect on the changes caused by the pandemic and to fill out the survey on behalf of their community of members, not on an individual basis. Survey results were used in qualitative coding to draw out themes and as a tool to generate new interview questions in the second round of key informant open-ended interviews. This data primarily helped answer research questions 2, 3 and 4.
Individual semi-structured farmer interviews

Farmer participants were selected through a collaborative process with organizational contacts. Organizational contacts were asked to identify 12 farmer participants in their organization: three young adult producers with ages of 18-21 years of any gender, three adult male producers with ages of 22-65 years, three adult female producers with ages of 22-65 years, and three elderly producers over the age of 65 years of any gender. Organizational contacts were asked to identify farmers with various levels of participation in the organization, ranging from “mildly” or “newly” involved to “very” involved (e.g. is a promoter and/or attends trainings regularly) from a list of all farmers served by the organization. Organizational contacts helped select a random sample of farmers that was stratified by age, gender and a range of participation levels, based in part on the proximity and availability of participants during the pandemic’s restrictions (i.e. possession of telephone or ability to travel near the organization’s office). Selection criteria carries some risk that organizations selected more engaged members during initial selection, a limitation shaped by my inability to visit plots in person or do participant observation that could influence the pool from which the random sample was taken. The study was designed to include 96 farmer interviews. Due to variable interest, capacity and time, a total of 70 farmers were interviewed. Three interviews were incomplete and thus removed from the statistical analysis, leaving a total of 67 farmer interviews included in the results.

I conducted most of the individual semi-structured farmer interviews via Zoom or Whatsapp voice call, and recorded them for transcription. For producers without internet or
cell phone access, research assistants conducted recorded interviews using the same interview protocol. At two of the sites, research assistants provided Spanish-to-Q’anjobal and Spanish-to-Q’eqchi’ translation, and vice versa, over Whatsapp voice call. Semi-structured interviews lasted 15-20 minutes, gathering information on producers’ agricultural practices, changes in production, consumption and sales, presence of or changes in Indigenous agricultural practices, and alternatives used to overcome challenges. Producers were asked open-ended questions about how the pandemic’s restrictions affected their livelihoods and family’s lives (See Appendix B). This data addresses research questions 1, 2, 3 and 4.

1.4.2. Data Analysis

Key informant and individual interviews were transcribed and coded based on emerging themes. Themes included but were not limited to: “expanded production,” “decreased production,” “local demand for new products,” “increased sales,” “unable to sell,” “novel home markets,” “change in traditional agricultural ceremonies,” “women’s organizing,” “trouble accessing inputs,” “positive pandemic experience,” and “food insecure.” I created a codebook of themes, then edited the themes during a second round of qualitative coding. Themes and initial analysis were compared with organizational survey responses during the second round of qualitative coding. These themes guided the organization and analysis of all qualitative data, and contributed to questions for key informants in follow-up interviews.
Statistical analysis was used to (1) determine agroecological engagement of participants and generate an index based on multiple variables (given data collection limitations, three variables were used), and (2) to compare levels of agroecological engagement with livelihood outcomes during the pandemic to determine the relationship between agroecology and resilience during economic shock.

Individual semi-structured farmer interviews were coded for independent and outcome variables (Table 3). Prior participation was coded by a combination of the prior assessments by organizational contacts and individual responses during interviews (1=low, 2=medium, 3=high). The combination was important for making this coding more consistent across organizations. Use of chemical inputs (fertilizers, herbicides, fungicides and other agrochemicals) was estimated based on self-reported use during individual interviews (0=some use and 1=no use). Categories of species-level crop diversification (1=low, 2=medium, 3=high) were estimated based on informants’ descriptions of the crops they grow, gathered in individual interviews. Producers who reported growing under 5 crops were coded as low diversity; producers who reported growing 5-10 crops were coded as medium diversity; producers who reported growing more than 10 crops were coded as high diversity. The diversity measure addresses only species-scale richness, not sub-species or cultivar diversities. It is important to note that plots likely include multiple varieties of maize, beans and other crops, but these were captured as one species. With regards to level of subsistence production during the pandemic, producers were asked directly whether they consumed “little,” “some” or “mostly” self-produced food during the pandemic, and were coded accordingly (1=low, 2=medium, 3=high).
An aggregate variable, Agroecological Practices Index (API), was calculated from three variables to measure how “agroecological” each producer is on the plot level. The index includes the level of diversification (1-3), the level of subsistence (1-3) and the use of chemical inputs score (0,1). The contributions of these variables to the index are normalized by dividing values by the means of these across all interviewed farmers. The agroecological values that make up the index co-vary with each other, supporting their inclusion in a single index; e.g. frequency analysis finds that level of diversification is positively correlated with level of subsistence (p=0.000). The index was created with the recognition that agroecological practices could, and arguably should, include other variables such as water management practices, soil management practices, recycling of nutrients, seed saving and use of native crops. Due to remote data collection limitations during the pandemic, the index provides a partial picture of agroecological practices.

Population of urban center was included as an independent variable for level of local market demand, to be used in regression analysis. Although simplified, this variable was used as a proxy for local market demand for farmers’ agricultural products because it was not possible to calculate distance or hours to market for each producer (some producers declined to give exact location due to privacy).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Use of chemical inputs</td>
<td>Self-reported use of chemical inputs (fertilizers, herbicides, fungicides and other agrochemicals)</td>
</tr>
<tr>
<td>(0=some use; 1=none)</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Level of diversification</td>
<td>Self-reported diversity of crops planted (species scale richness)</td>
</tr>
<tr>
<td>Level of subsistence production during the pandemic</td>
<td>Self-reported level of food consumed during the pandemic that was self-produced</td>
</tr>
<tr>
<td>Agroecological Practices Index (API)</td>
<td>A normalized index calculated from the three variables above (normalized by the mean scores of use of chemical inputs, level of diversification, level of subsistence)</td>
</tr>
<tr>
<td>Prior engagement with the organization</td>
<td>Level of participation in trainings, programs and communication with organizational staff and leadership</td>
</tr>
<tr>
<td>Population of urban center as proxy for local market demand (included in regression models)</td>
<td>Population of the nearest urban center with a municipal market used by producers</td>
</tr>
</tbody>
</table>

**Outcome variables**

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in production level</td>
<td>Self-reported change in production during the pandemic as compared to pre-pandemic levels</td>
</tr>
<tr>
<td>Consumption outcome</td>
<td>Self-reported household food sufficiency or insufficiency during the pandemic</td>
</tr>
<tr>
<td>Sale level</td>
<td>Self-reported level of agricultural product sales during the pandemic as compared to pre-pandemic levels</td>
</tr>
<tr>
<td>Change in household income</td>
<td>Self-reported change in overall level of household income during the pandemic, as compared to pre-pandemic levels</td>
</tr>
</tbody>
</table>

The outcome variables were also coded directly from individual farmer interviews. Producers were asked whether and how their production decreased, stayed the same, or increased during the pandemic, and were coded accordingly (-1=decrease; 0=no change; 1=increase). To provide a measure of informant households’ ability to maintain their food consumption, the consumption outcome variable was estimated based on producers’ descriptions of whether their household consumption was sufficient or insufficient during the pandemic. “Sufficient” refers to having enough to eat to avoid feeling hungry, but does not measure caloric intake or nutritional balance. “Insufficient” refers to having a lack of...
food that led to hunger, decreasing meals, or rationing during the pandemic. For sale level, producers were first asked whether they sold any agricultural goods during the pandemic. ‘No sales’ was coded as 0. If they sold, farmers were asked whether those sales were low, medium, or high as compared to their own pre-pandemic sale levels, and were coded accordingly (1=low; 2=medium; 3=high). To measure household income change, producers were asked whether their income decreased, stayed the same, or increased during the pandemic, and were coded accordingly (-1=decrease; 0=no change; 1=increase).

Statistical analysis consisted of summary statistics and regressions. Means and standard deviations were generated to describe variables. Analytical statistics included two-level logistic regressions of the outcome variables (production, consumption, sale level and household income) on both prior engagement and the API, including urban population (as a measure of potential market demand), with a level 2 grouping variable equal to organization. Ordered logistic regressions were run for change in production level (-1,0,1), sale level (0,1,2,3) and change in household economy (-1,0,1). A simple logistic regression was run for the consumption level (0,1), and a regular least-square regression was run for the API.

1.5. Positionality

This research was conducted remotely from the United States by myself, a white female researcher with an ethical and academic interest in building international solidarity in support of agroecology. Feminist theory on positionality guides my reflections on
privilege and solidarity with resistance movement in the margins. My positionality begins with “the geography closest in—the body” (Rich 2013, p. 212), the site where my identities overlap to create specific and inseparable material experiences, especially between my whiteness and my woman-ness. Recognizing that institutionalized racism positions white heteronormative upper-middle-class women as superior to women of color and women in the Global South (Russo, 2018), I know that the privileges and powers I receive through my identities relate directly to the oppression of people of color, both historically and currently. In relation to Guatemalan campesinos, I include in my frameworks the dark histories of the 1954 US-backed coup, imperial domination of Guatemalan industries, and the US’s paramilitary support for extensive human rights abuses in the last 60 years.

Bell Hooks identifies “marginality as much more than a site of deprivation... it is also the site of radical possibility, a space of resistance” (Hooks 1989, p. 20). I embed myself as a participant and scholar in agroecology, and other counter-hegemonic movements for food sovereignty. In doing so, I see opportunities to bring resources from academia (my time, funding for workshops and research assistants) to these movements that resist private property regimes and globalized industrial agriculture from the margins. While I aim to support and generate resistance for agroecology, I recognize that there are margins in which I do not and never will exist because of my whiteness, citizenship, class background, or other identities.

In order to approach international solidarity work while recognizing the identities and agency of my Guatemalan Indigenous, rural, and/or landless partners in the Global South, I frame my work in terms of accountability and reciprocity. Geographer and scholar-activist
Laura Pulido describes accountability as being “part of a community of struggle” (2008, p. 351). Reciprocity in research relationships is often achieved outside of the research timeline (Ybarra, 2014) and may center the ways I show up as a person, the on-the-ground support that I can give, and the agility with which I can follow a movement’s needs, rather than the written scholarship I produce. I remain aware of how development narratives are underpinned by a desire to *include* the Global South in a linear, hegemonic, and Western path of economic and social ‘improvement.’ In this vein, I move away from inclusion and towards accountability (Russo, 2018) by asking what partners may need from me. Some partners wanted funding for small initiatives, which I could offer modestly through compensation for participation. Another organization asked for international contacts to possible funders, which I become more positioned to deliver on as my studies continue. In initial interviews with organizational contacts, I asked for feedback on what topics would be useful to describe and measure during the pandemic, all of which were included in the interview questions. In this way, my collaborators edited the research design to suit both their needs and the local cultural context. At the conclusion of this writing, partners were given summaries of the research (in Spanish), specifically the recommendations section, to share with their staff and members. The remoteness of my work has limited me, however, in participating in organizational work and volunteering my time on-the-ground. As international travel opens up in 2021, I intend to continue these relationships and “pay it forward” (Ybarra, 2014) for future work.

My positionality creates possible bias in at least two ways: my political commitments to agroecology and my remote researcher status. Because I cannot separate my interests in
agroecology from its political agendas (decentralization of knowledge, demands for land reform, and demands for rights to Indigenous land and life), I choose to write about agroecology in ways that highlight its successes and help legitimize its goals. I include constraints to and critiques of agroecology in my analysis in order to challenge these material shortcomings and help provide pathways to overcome them. Possible bias may lie for some in my lack of “objectivity” towards agroecology movements. However, I do not believe objectivity is attainable nor desirable because I place my power in my abilities to participate, alongside addressing research questions, providing critical analysis, and sharing diverse forms of knowledge. The limitations of remote research leads to possible bias in my selective entry points to my field sites through a small group of organizational contacts. Because I could not conduct participant observation, all observation is effectively second-hand through my interviews. While I have collaboratively developed some of the research and interview questions and triangulated results between various data sources, I cannot know what contextual details I may be missing from afar. More specific limitations about the data collected are provided in Chapter 4.

2. Chapter 2: Assessing agroecology’s contributions to resilience to economic shock

Introduction

Guatemala’s March 2020 halting of economic activities, including open-air municipal market closures, and the nation-wide restrictions on mobility rang alarm bells for smallholder producers and the agroecological organizations who serve them. Pre-pandemic,
the semi-subsistence smallholders in this study secured their household food (whether sufficient to meet dietary needs or not) from a combination of their own production and purchasing in municipal market places. The unprecedented market closures of 2020 provide a unique lens with which to measure whether and how semi-subsistence producers could meet their needs when temporarily cut off from formal markets. Early reports about the impacts of the pandemic across the region emphasize concerns about changes in markets and food access over concerns for production capacity on farms. This chapter presents empirical data on production, consumption and commercialization from Guatemalan farmers engaged with agroecology movements, providing a broader view of the pandemic (the first ten months).

The eight farmer organizations have supported producer members with agroecological trainings, social networks, and differing degrees of market integration since before the pandemic, and have differing degrees of agroecological adoption among their members. These data suggest that engagement with the organization and adoption of agroecological practices affected farmer resilience at the farm level during the pandemic. This data contributes the variation in agroecological engagement with respect to resilience to the aggregate story of food systems in crisis.

Section 2.1 addresses Research Question #1 (How were smallholder farmers who are connected to agroecology organizations affected in terms of production, consumption and commercialization of food crops during the COVID-19 pandemic?) by documenting the variation and nuance of semi-subsistence farming experiences during the pandemic. I present summary statistics from the interviews before turning to qualitative data that
elucidates the range of experiences across study sites and among farmers. Section 2.2 draws on statistical analyses and qualitative interview data to answer Research Question #2 (How does agroecology affect smallholder resilience to the economic shocks associated with sudden shifts in access to formal markets?). I address how prior engagement with organizations and agroecological practices affect smallholder farmer resilience during the pandemic’s economic shock, with regards to the four livelihood outcome variables, concluding that the more agroecologically-engaged farmers were more likely to have favorable production and consumption outcomes than their less agroecologically engaged peers. Section 2.3 discusses the evidence for agroecological engagement and practices bolstering resilience to economic shock at the farm level.

2.1. The pandemic’s effects on production, consumption and sales of agricultural products

Of the 67 participants, 28 were male (41.8%) and 39 female (58.2%). There were 7 young adult participants (with ages 18-21), 46 adult participants (with ages 22-64) and 14 elder participants (with ages 65 and over). Table 4 provides summary statistics on participant responses during semi-structured interviews. Across all participants at the eight field sites, producers report greater struggles in terms of sales and income than in maintaining their production and consumption. In this section I present farmer experiences of the nearly half (43.2%) who reported no change in production, as well as the wide range of accounts from those who report changes in production levels and practices. While in interviews the majority of producers report being food sufficient during the pandemic
(61.1%), this measure of food sufficiency refers to a lack of hunger, but may still indicate low nutritional value and food insecurity. Qualitative data reveals that some producers faced significant hardship in relation to accessing food, reporting frequent food rationing and eating from fewer food groups. The implications of these challenges are explored in my discussion on food security, agroecology, and resilience. Table 4 also presents producers’ ability to sell their products during the pandemic in formal or informal markets, which skews towards no sales or low sales. 2.1.1 presents data on the pandemic’s effects on production, 2.1.2 on consumption, and 2.1.3 on sales. Variations exist across age, gender identity and Indigenous identity as well (presented in 2.1.4), although descriptive statistics are not presented because there were not enough responses.

Table 4: Smallholders’ reported experiences during the pandemic; dependent variables (n=67 respondents)

<table>
<thead>
<tr>
<th></th>
<th>Increase</th>
<th>No Change</th>
<th>Decrease</th>
<th>Undetermined(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production level</td>
<td>26.9%</td>
<td>43.2%</td>
<td>20.9%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Household income</td>
<td>17.9%</td>
<td>28.4%</td>
<td>53.7%</td>
<td>n/a(^b)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Sufficient(^c)</th>
<th>Insufficient</th>
<th>Undetermined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption outcome</td>
<td>61.1%</td>
<td>29.9%</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>No sales</th>
<th>Low sales</th>
<th>Medium sales</th>
<th>High sales</th>
<th>Undetermined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale level</td>
<td>31.3%</td>
<td>28.4%</td>
<td>19.4%</td>
<td>19.4%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

\(^a\)=unable to answer or unsure of answer

\(^b\)=zero respondents were undetermined

\(^c\)=sufficiency refers to a lack of hunger, but may still indicate low nutritional value and food insecurity
2.1.1. Food Production

Among the farmers interviewed, 43.2% (Table 4) made no changes to crop production during the pandemic. Certain land, capital and resource constraints limited some farmers while farmers without these constraints expanded or increased production immediately following the onset of the pandemic. Farmers who did alter production strategies report changing the magnitude of crop and animal production, types of crops and animal products, use of family farm labor, and production practices including the use of chemical inputs.

Farmers who report making no changes to production operated as normal. For example, farmers in and near Las Cruces, Petén, largely report continuing production of banana, cassava, honey and other products as they had before. “Honey production has been good. During the pandemic, I’ve continued working normally,” says a 58-year-old apiculturist and farmer in the community of Palestina, Las Cruces, Petén. If anything, producers in the northeastern field site in Petén and the easternmost field site in Izabal report that their production was impacted by the October - November 2020 hurricanes Eta and Iota. “The pandemic hasn’t affected us, thank God,” says a 50-year-old male producer in San José Buena Fé, Las Cruces, Petén. “We are working in the fields the same as before. But some of our lowland fields were affected by the hurricanes and we lost crops.” A producer from El Estor, Izabal recounts her losses due to the hurricanes; “More than the pandemic, we were affected by the rain and winds from the storms, which destroyed our
harvests” (73-year-old female producer). Other producers comment on how it is society that changed, and less so the ecological aspects of production or the ability to farm:

“The impact [of the pandemic] has been mainly psychological. The crops in our fields, they have been normal. We plant on all sides of our plot, and we make sure that any hired laborers who are working with us are spaced out to maintain social distancing. The impact was the isolation of the adult from society.”

-65-year-old male producer, Tesoro Arriba, Jocotán, Chiquimula

Certain perennial limitations such as lack of land and capital kept producers from expanding production of much-needed food crops, and for some farmers were barriers to crop diversification. “My planting practices didn’t change,” says a 30-year-old female producer in Pacux, Rabinal. “I would need more space, more land for diversifying my garden crops. It takes more economic resources, too.” Notably, this producer is part of a displaced community of survivors of the Río Negro massacres associated with the construction of a dam that flooded their land (Einbinder, 2017). Many producers in this community are land-constrained. Another producer from Pacux echoes her sentiment. “It is because of my landholding. I only have 10 meters by 8 meters [0.008 hectares] on which to farm, that’s why I didn’t plant enough. It’s because we are displaced from Río Negro.” Producers in Santa Eulalia, Huehuetenango were another land-constrained group, farming plots of seven or ten square meters. In Izabal, producers in the Polochic Valley face the challenge of farming on marginal land, even if their holdings are larger. “The soil is very dry here and the land is rocky... Large African palm farms are diverting the rivers,” says a 26-year-old producer near El Estor, Izabal. “I don’t have my own land so I rent a small area on which to
plant corn, beans, chili, cassava, and squash with my wife.” Producers in Sibinal, San Marcos noted the capital constraints that some producers face, even if they own land. Construction of infrastructure such as a sturdy plastic high tunnel allows producers to control temperature and protect seedlings from frost and wind, ultimately growing more individual plants and types of crops. Where plots can be at 2,400 masl with low afternoon and evening temperatures and high winds, a structure in which to grow can give a producer more flexibility in sub-species diversification, and can help diversify their household’s diet. “A high tunnel costs around 15,000 quetzales [~USD $1,943],” says a 38-year-old producer. “Even if some people own a half a hectare$^6$ of land, it lies fallow because they don’t have that kind of money for the investment.”

On the other hand, nearly one third of producers (26.9%) report expanding or intensifying their production. Having adequate land on which to expand, having access to capital with which to intensify (e.g. add infrastructure, composting systems, irrigation systems), and exposure to prior agroecological training, allowed farmers to invest in their agroecological practices, diversify crops and increase yields during the pandemic. Experiences from three producers in different departments illustrate the breadth of responses from this subset of producers.

“During the pandemic of 2020, we took advantage of our added time and built a high tunnel. I’ve planted tomatoes in it, and they are beautiful. They are flowering. We were able to do this project during the pandemic, and it has even generated enough income to invest back into its maintenance.”

-47-year-old male producer, Checambá, San Marcos

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$^6$ Measurement originally given in cuerdas. 1 cuerda = 441 m².
“Before I used to plant twice a year, but when the pandemic started in 2020, I decided to sow three crops this year. During the pandemic local production was highly valued. People could not leave their communities to buy food, and this is what motivated me to plant more. I ate some of it with my family, and the rest I sold to neighbors.”
-18-year-old female producer, Santa Eulalia, Huehuetenango

“We started to plant more squash. We also planted a stand of orange trees, so that in 2 or 3 years they will produce and increase our value, our farm’s diversity and our general agricultural knowledge. We had to invest. We were looking for ways to come out ahead, looking towards the future. The pandemic has been hard for everyone…”
-22-year-old male producer, Chichupac, Rabinal, Baja Verapaz

In the early stages of the pandemic (March-May 2020), farmers transitioned commercial crops to subsistence crops and increased existing subsistence production, resulting in an overall increase in subsistence production while commercial production decreased or stayed the same for these producers. Namely, this included planting more basic grains and vegetables for their own families and others in the community. “We planted fewer market crops,” says a 26-year-old male producer from the upland community of Chichupac in Rabinal, Baja Verapaz. “Instead we gave garden vegetables to families in need. We planted way more basic grains this year, more corn and beans so that we didn’t have to travel outside of our village to buy.” Another farmer, who is also an agroecological promotor, replaced his flower production with tomato and carrot production. “I knew I wouldn’t be able to find an urban market for specialty flowers during this crisis,” says a 38-year-old producer in Sibinal, San Marcos. “So right away I switched most of my flower production to vegetables like carrots and broccoli.” Diversification did not exclude animal products; some producers report raising more types of poultry, for example. Besides raising
heirloom chickens for eggs and meat, a 54-year-old female producer from Los Limones, Tacaná, San Marcos describes her additional activities. “The neighbors wanted local eggs. So I have a new flock of ducks. It’s going well, the eggs are flying off my porch when people come to buy.”

This expansion in cultivation area for some producers in this group was often small, but could have significant impacts on subsistence. In San Marcos, an agroecological promoter with Red Kuchub’al reports that most families in his immediate area own between 0.09 and 0.13 hectares\(^7\) of land. While they usually only cultivate about half of that land, some producers brought another 0.04 hectares\(^8\) under cultivation during the pandemic. This expansion was namely for horticultural vegetable crops that they would normally find at municipal markets, but suddenly weren’t available.

Some producers who both intensified and expanded area of cultivation describe their activities during the pandemic as an exciting opportunity for their families to come together and improve livelihoods or “get ahead”. While many producers’ family members held daily or seasonal jobs in their communities or in urban centers pre-pandemic, they found themselves at home with more time to work in their fields. For producers whose farms are adjacent to their homes, many channeled the labor of quarantined family members to crop planting and maintenance. Producers themselves were also “out and about” less often during the pandemic, resulting in more time to devote to agriculture.

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\(^7\) Measurement originally given in cuerda. 1 cuerda = 441 m\(^2\).

\(^8\) Measurement originally given in cuerda. 1 cuerda = 441 m\(^2\).
These accounts illustrate the sentiment of producers who paid more daily attention and care to their crops as well as to their family members:

“The pandemic benefitted me. I had more time to love and care for my children, for my animals. The entire family stayed at home, and we put ourselves to work. I experimented with selling pumpkin seeds, and now I am raising ducks.”
- 54-year-old woman, Los Limones, Tacaná, San Marcos

“In the month of March we had to gather together as a family. The situation was already really serious. How were we going to go to Tacaná [urban center]? How were we going to sell our products? We had to talk to our kids, to plan. What we did was make more compost, a lot more. We planted the garden crops and we fertilized the corn well.”
- 75-year-old male producer, Torcheche, Tacaná, San Marcos

“The positive part of this time, which was an advantage to the family, was that we dedicated more time to work in our fields. We weren’t out and about in town ignoring our work. When we were home during the pandemic, we dedicated ourselves to our agriculture.”
- 26-year-old female producer, Camotán, Chiquimula

Increased time for farm labor is intertwined with production practices. Agroecological practices such as soil management (making compost and other organic fertilizers, building living barriers), water conservation (maintaining wells and irrigation), pest management (hand-weeding, plant species diversification, making and applying botanical pest sprays) and seed saving are labor-intensive. Given the increased availability of time and labor during the pandemic, some producers were able to implement more agroecological practices:
“During the pandemic I’ve already made three new compost systems with bokashi\(^9\). I’m using them on my crops and seeing that yes, there are great results. I’ve seen positive changes in the tomatoes and potatoes.”

-47-year-old male producer, Checambá, San Marcos

Some producers reduced their use of chemical inputs and used less purchased seed during the pandemic. Inability to access these inputs due to closed markets and decreased income led some producers to use more alternative practices. “Beforehand, we always used chemical fertilizer, and the crops grew well but the drawback was the chemicals,” said a 21-year-old female producer from Sibinal, San Marcos. “This year, we made completely organic compost and they grew well. We realized that organic compost has great results.” In Villahermosa, Tacaná, San Marcos, another producer said that he and his family “couldn’t go to town to get our fertilizer,” that they used previously on their maize. For some producers, such as this 23-year-old man from Santa Eulalia, Huehuetenango, pandemic market closures limited production because of reduced seed supply. “When I wanted to plant more of certain crops, it was difficult to find the seeds I needed to buy.”

The remaining 14 farmers (20.9%) decreased their production during the pandemic (Table 4). They tell vastly different accounts of hardship and financial struggle than those who could expand farm activities. While confronted with land and capital constraints, the added closure of markets made farmers concerned about whether the efforts of production beyond basic subsistence was worth it, as they faced barriers in distributing their products,

\(^9\) Bokashi is a Japanese term that refers to a fermented composting method. Food waste is combined with wheat germ or wheat bran and inoculated with *Lactobacilli* bacteria to create a nutrient-rich soil amendment via anaerobic fermentation.
even to other rural families. Most of the producers in this category connect a decrease in production directly to a decrease in sales. “[The pandemic] affected us acutely. For example, we produced fewer beans than usual, and we had to decrease that production because there wasn’t a market,” says a 24-year-old male producer in Aldea San Rafael, Rabinal, Baja Verapaz. Mobility constraints proved to be another barrier for this category of farmers, because those whose plots of land are far from where they live were isolated at home without normal access to their fields. “There were families who planted but did not harvest,” says a 25-year-old male producer from La Crosa, Izabal. “These producers’ fields are far from their houses so they couldn’t get to the crops at harvest time. In my case, I have small plantings behind my house so I could at least care for and harvest those.” Locally specific histories of settlement, displacement and tenure regimes play a role in these farmers’ distance from their fields. While data on distance to field was not collected, producers across study sites noted how this constraint was exacerbated during the pandemic. On the other side of Guatemala near Tejutla, San Marcos, a 62-year-old female producer faced a similar constraint. “The impact [of the pandemic] was negative, because I couldn’t go out. We were always at home so we never had the opportunity to go to our farm and realize the plantings that we do each year.” Producers recall the fear and uncertainty associated with navigating through their communities, mentioning that “I was scared to go to my own fields. People on the street were saying that this is how you contract the virus” (55-year-old male producer from Tacaná, San Marcos). This new vulnerability contributed to the decrease in overall production for those farmers whose plots were more distant from their homes.
2.1.2. Food Consumption

Across the eight field sites, nearly two-thirds (61.1%) reported sufficient household consumption during the pandemic, while nearly one third (29.9%) reported insufficient household consumption and 9.0% of interviewees were undetermined (Table 4). Semi-structured interviews reveal varied consumption adaptations, which include increases in subsistence production, revaluing traditional food practices, varied dependence on purchased food in the context of price increases, some use of grain storage, and uneven access to direct food aid. These experiences range from reports of food sufficiency and enjoyment for some producers while others report high food insecurity and household distress.

Directly connected to production changes during the pandemic, the consumption outcomes for producers who were able to expand and diversify production were positive in the sense that they were able to be self-sufficient. Some producers in uplands areas of Rabinal (who have access to land on which to expand) report eating more of their own produce and grains. “I ate more, and primarily, from the fields,” says a 75-year-old male producer. “We ate only natural products produced right here,” says an 18-year-old female farmer from the same area. Some producers report “eating better” and “having more than enough” for their families. In San Marcos, many producer members of Red Kuchub’al expressed “returning to nature” and revaluing traditional practices, including producing less pollution associated with food packaging:
“Consumption changed during the pandemic. It was better. We ate locally, what is growing on our farm. There were a lot fewer outside products.”
- 47-year-old male producer, Checambá, San Marcos

“We ate more of our own products. Beforehand, we bought things. But the avocados, carrots, pumpkins seeds, favas, greens, radishes, and all the other vegetables are from our farm. We don’t eat processed pasta anymore. When the prices went up, the local stores had empty shelves. And the medicinal plants... if we have any sort of pain, we just go harvest them. This helped us a lot, because we didn’t need to go buy at the pharmacy.”
- 39-year-old female producer, Los Limones, Tacáná, San Marcos

“We slaughtered our cattle at home instead of in town. We learned a lot. When selling beef cuts [to neighbors], we didn’t use nylon plastic bags. We found the widest leaves from the forest. We took what was natural to wrap the meat in, because we weren’t going to town to buy bags. This way, there was less pollution of the environment.... We recovered ancient practices. Our culture grew, and we were made to return to nature.”
- 75-year-old male producer, Torcheche, Tacáná, San Marcos

These accounts also touch on the increase in local prices, both for produce as well as for shelf-stable processed food sold in tiendas, the small community stores. In Rabinal, producers report the price of tomatoes in local markets rising 200%, from 2 quetzales (USD $0.26) to 6 quetzales (USD $0.78) per pound. In San Marcos, producers report that potato prices increased by at least 75%, from 2 quetzales (USD $0.26) to 3.5 quetzales (USD $0.45) per pound. Farmers who were already producing enough for their own subsistence were buffered, however, from the price shocks. Some producers who expanded production as a direct reaction to the pandemic, however, experienced lags in food access between planting and harvest times. This impact was more severe if they hadn’t diversified pre-pandemic, and were dependent on store-bought or market-bought food. “Around 20-30% of the producers we work with are highly dependent on the marketplaces for their food, and they...
were very affected” says the staff director at Red Kuchub’al. “In San Marcos a lot of the families in that category, who started growing vegetable crops, learned that the growing process isn’t immediate. They had to wait a couple months to meet their needs through garden production.”

Storage of basic grains from the previous harvest, a food security strategy used widely before the pandemic, was crucial for some producers during the pandemic. Having grains stored for household consumption allowed some producers to avoid buying at higher prices or taking costly, often unaffordable, trips into town and risking Covid-19 exposure. Notably, several members of AMEDIPK in Santa Eulalia, Huehuetenango report having few concerns about food access because they had stored corn\(^{10}\). “When the pandemic started, I wasn’t concerned because we had 15 quintales\(^{11}\) [1,500 pounds] of corn stored in reserve,” says a -56-year-old male producer. “And we have a lot [of horticultural crops] growing in our garden.” An 80-year-old female producer from the same community echoed his outlook. “I didn’t have a need to barter. I still have 30 quintales [3,000 pounds] of grain saved from last year.”

Roughly one third (29.9%) of producer participants report insufficient household consumption during the pandemic. For families with a combination of land constraints and low cash flow, their subsistence production was not enough to meet household food needs, even if it increased from pre-pandemic levels. Across field sites, producers report reducing

\(^{10}\) The quality of storage and the risk of mycotoxins is a common concern for stored corn in rural Guatemala (see Mendoza et al., 2018).

\(^{11}\) One quintal = 100 pounds.
their food intake. “We suffered from a food shortage,” says a 67-year-old male producer in Rabinal. “We couldn’t buy anything. We made do with what we had growing here, some greens and herbs. We ate what we could grow.” These quotes selected from two additional departments relate the increased degree of food need during the pandemic’s economic shock:

“Hunger levels were critical, very difficult. People suffered a lot. We began to make tortillas with plantains because there was so little corn. People always find a way to survive, to make sure their kids don’t go hungry when they can’t find work. Sometimes people even stole plantains around here. Everyone has to find a way…”

-60-year-old female producer, Camotán, Chiquimula

“In the store in my community there was nothing to eat. The shelves were empty. So families rationed food…. We had to analyze this situation and turn to our own crops, which are so important. Still, we suffered having less food.”

-34-year-old female producer, Colonia Santiaguito, Izabal

Direct food aid was crucial for some families during the pandemic, although producers say it was difficult to access. Some of the organizations gave out food aid, as government aid was rarely received by the study’s participants. A 61-year-old farmer member of Qachuu Aloom received “ten pounds of corn, a sack of sugar and cooking oil” directly from the organization in May 2020. Some of Red Kuchub’al’s sub-groups gave out direct food aid as well, namely corn and beans. Numerous farmers report never receiving government aid, whether direct food aid or monetary support, which was promised in the news media.

“People said that the government was giving out crisis support. We never saw any of it. They didn’t take us into account. We saw the announcements on television, yes. Maybe people in other areas received it.”
– 75-year-old male, Villahermosa, Tacaná, San Marcos

“The president hasn’t taken action. He has forgotten about the people in the [rural] communities, never securing help for food provisions, education, or health services. The government sees us Indigenous people as more vulnerable and more exploitable.”

-30-year-old female producer, Pacux, Rabinal

“Financial support is given through Bono Familia\(^\text{12}\). But they only distribute it through a code that refunds electricity bills. It is not given out through the municipalities. Only those who have electricity can access the money as a reimbursement. Those without electricity in their homes never received it and as a result only a few of those in need receive support.”

– 65-year-old male producer, Tesoro Arriba, Jocotán, Chiquimula

Notably, consumption outcomes among this sample of agroecological producers were varied. Food consumption is not only tied to subsistence crops, but also to income generated from the sale of non-subsistence crops, which was difficult during the pandemic.

2.1.3. Sales of agricultural products

Restrictions on markets and mobility greatly affected sales of agricultural products. 31.3\% of participants were unable to sell any agricultural goods during the pandemic, and 28.4\% report selling at low levels in comparison to pre-pandemic sales (Table 4). Those who did sell agricultural products were able to do so primarily at pop-up markets in their

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\(^{12}\) Bono Familia is a nation-wide emergency fund established by the Guatemalan government in 2020 to support portions of the population affected by the pandemic’s restrictions. The temporary program was designed to administer cash transfers of up to Q1,000 (~USD$129.13) to households with an average energy usage of 200kWh or less in on their February 2020 electricity bills and to people or households without electricity, deemed “special cases.” ([https://cien.org.gt/wp-content/uploads/2020/12/Documento-Analisis-Fondo-Bono-Familia.pdf](https://cien.org.gt/wp-content/uploads/2020/12/Documento-Analisis-Fondo-Bono-Familia.pdf))
immediate communities, or to access informal sale arrangements with neighbors (Table 5).

Bartering was a common form of non-monetary exchange, discussed in Chapter 3.

**Table 5: Types of food crop sales during the pandemic (n=67 respondents, multiple responses allowed)**

<table>
<thead>
<tr>
<th>Types of transaction</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sold to neighbors</td>
<td>56.7%</td>
<td>43.3%</td>
</tr>
<tr>
<td>Sold at local pop-up markets</td>
<td>19.4%</td>
<td>80.6%</td>
</tr>
<tr>
<td>Sold on social media</td>
<td>7.5%</td>
<td>92.5%</td>
</tr>
<tr>
<td>Sold to organization</td>
<td>6.0%</td>
<td>94%</td>
</tr>
</tbody>
</table>

For the nearly one third of producers who did not sell at all during the pandemic, the disappointment of a harvest with nowhere to distribute it was profound.

“Our harvest is ready, but there is no market that we can take it to. The rains came, but the problem was an economic one. So we’ve had huge losses, not only in the small vegetable crops, but also in fava bean sales. There just wasn’t a municipal market. It was completely forbidden to enter.”

- 55-year-old male producer, Tacaná, San Marcos

“I think it’s important to get our products to the market place because a lot of families are waiting on them. I heard on the news that families suffered from food shortages. And it’s a shame that our products never got to market.”

- 26-year-old male producer, El Zapotillo, El Estor, Izabal

These producers report that in small rural communities, low local demand was a problem because either their neighbors were all growing and attempting to sell similar things, or potential buyers were cash-poor. In the small upland community of Chichupac near the city of Rabinal, small-scale producers are limited in what they can grow during the summer months because persistent drought makes corn and other grain production
unfeasible. One producer related that while she used to sell culinary and medicinal herbs, leafy greens and onions in the municipal market, she had no buyers during the pandemic. “I didn’t sell anything. Here in the community everyone is growing the same things that I grow” (61-year-old female producer). It was noted that this problem existed before the pandemic, but was exacerbated when there was no municipal market outlet. Others identified a halted economy and lack of cash flow in their communities as a problem for sellers. “People here are running out of money for buying my crops,” says a 46-year-old female producer from outside of Tejutla, San Marcos.

In some communities, small and very localized markets were organized in community plazas or central meeting points one or two days per week to account for the inability of people in those communities to travel to the municipal market place to sell or buy fresh produce. These small local pop up markets were differentially successful for producers, depending on location and local demand. In some communities, people attempted to sell but were met with low demand and sold at low levels compared to pre-pandemic sales. A producer in Santa Eulalia, Huehuetenango had abundant harvests and was accustomed to taking his produce to market in another municipality pre-pandemic. “Our community put together a small market that we went to, but the demand was very low,” says this 56-year-old male producer. “There weren’t enough people arriving to buy.” Limited mobility and the high transportation costs associated with closures limited sales. Many producers in the low sales group (28.4%) sold what they could to get by, but clearly expressed the economic hardship associated with diminished market access.
“Selling was difficult, because of the transportation. The trucks weren’t coming by here, so they weren’t buying bananas. It was because transportation was so costly. I sold a lot less, just some bananas here and there. A little bit of coffee, some firewood too.”

-30-year-old male producer, Olopa, Chiquimula

“I used to sell a lot of cacao beans in bulk. But not anymore during the pandemic. Now people come to my house for 1 or 2 pounds here and there. Because of the pandemic, I can’t sell in bulk anymore. I’d have to walk with the beans to market, and I can’t carry that quantity.”

-70-year-old male producer, Las Cruces, Peten

Limited sales were observed alongside accounts of lower ability to earn income during the pandemic. Across all farmer participants, 53.7% had a decrease in household income during the pandemic, while 28.4% of producers’ household income stayed the same, and 17.9% experienced increases in household income (Table 4).

Conversely, this sub-group of producers who reported increased household income during the pandemic are observed alongside the 19.4% of all producers who reported high sale levels. These producers pivoted their sales quickly at the beginning of the pandemic, and were able to access informal markets in their proximity, by selling to neighbors out of their homes or at very localized pop-up markets (discussed further in Chapter 3).

“We essentially created individual home markets. For example, if someone has a product to sell, a neighbor would come find them at home. That is how people avoided going to town, to sell within the same community. People also went door to door to offer their products at each house.”

-33-year-old female producer, Rabinal, Baja Verapaz

“During the pandemic I sold vegetables, medicinal plants, beans, chilies. I sold a lot of corn and beans to people who couldn’t go to
other municipalities. I was able to sell from my home because there are families who can’t cultivate crops since their land is infertile.”
-34-year-old female producer, El Esfuerzo, El Estor Izabal

These novel home markets initiated by producers was largely what facilitated the connection of farmers to consumers. Of all participants, over half sold to neighbors (56.7%) in some capacity (whether low, medium or high sale levels). Producers who report being satisfied with the pandemic-related market changes had to invest less time and effort into transporting their goods to market, and were the ones finding more time at home to produce crops for the localized demand. Organizational contacts in Rabinal and San Marcos attribute income from off-farm employment (professional or service jobs), savings, or remittances to some consumer’s ability to maintain cash flow and buy produce from their neighboring producers during the pandemic. The restrictions on markets and mobility also created increased demand for certain local products at some study sites, documented in Chapter 3.

Besides selling at novel home markets, about one fifth (19.4%) sold at a local or pop-up market. Where there was cash flow and enough demand, some producers in this group found advantages to more direct relationships with consumers. A 50-year-old male producer of beans, corn and cassava in San José Buena Fe, Petén described his satisfaction with having more direct market relationships.

“The agricultural sector always suffers the most when prices fall. It’s not fair... but the pandemic helped us as producers. It is better to sell product directly to the consumer.”
- 50 year old producer, San José Buena Fe, Petén
2.1.4. Differential effects of age, gender and indigeneity

Age, gender, and indigeneity were factors that affected producer experience differentially during the pandemic. Of 67 participants, 41.8% were male and 58.2% were female. Data on Indigenous identity of individual respondents was not collected. While many participants identify as Indigenous Maya (e.g. Ch’orti’, Q’eqchi’, Achí, Mam), the cultural contexts of Indigenous identity varies across sites. Qualitative data illustrates that age impacted production and ability to sale, and gender affected consumption and labor allocation. The influence and cultural valuation of Indigenous agricultural practices are often sources of pride for respondents, and are associated with their ability to continue production and maintain sufficient consumption levels during the pandemic.

While a degree of social isolation was experienced by all during the state-sanctioned curfews, the elderly were more adversely affected because of added fear of contagion and illness. Elderly producers more commonly describe the impacts of mobility restrictions on their ability to get to their fields and to access pop-up markets or neighborly sales. While younger and more physically able people were more likely to walk to others’ home markets,

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13 For example, in San Marcos many older people who wear traditional Indigenous clothing and speak Mam identify as Mam, while their children who do not speak Mam or wear the traditional clothing identify as “Indigenous” people with Mam ancestors.

14 Whether Indigenous agricultural practices align with agroecology is a complex issue because while many agroecology organizations center Indigenous knowledge and practices, some Indigenous practices such as burning fields are discouraged by agroecology organizations. Many agroecological programs are a mixture of traditional and introduced practices (e.g. see Einbinder et al., 2019 p. 16 on defining agroecology in the Maya Achí territory).
to pop-up markets or to their fields, the lack of buses and high costs of private transportation on rural roads kept the elderly at home:

“When the pandemic started I only had one small garden for my own consumption. I wanted to expand it and plant more, but because of the pandemic and my age I could not leave my home to sell. And my plot is not accessible enough for neighbors to come buy my produce. This was an obstacle for my harvest and my sales.”
-80-year-old female producer, Santa Eulalia, Huehuetenango

“We planted fewer crops... we could not work as much in the fields since we are elderly, and we couldn’t find the help.”
-75-year-old male producer, Villahermosa, Tacaná, San Marcos

Because traditional gender roles in Guatemala place women in the kitchen and in charge of childcare, female participants in the study describe having more demands on their labor during the pandemic, causing physical and emotional burdens. Experience varied based on the numbers of working age children versus young children needing care. Women with young children describe the emotional toll of caring for children with decreased household resources. Women with children of all ages rationed food during shortages and strategized about how to prepare meals during food scarcity. “The pandemic has completely destroyed our family,” relays a 30-year-old female producer and mother in Pacux, Rabinal, Baja Verapaz. “It has been hard to find work, and in my case I’ve been worried about finding food for my kids.” Some male producers comment on the toll on women, exemplified by this producer, also from Rabinal:

“I couldn’t find work, but my wife is the one who suffered the most. She is the one who prepares the food. With the food shortages, it was tough. She saw first-hand how this virus is affecting our wellbeing. She had to ration the food because it is not enough for the children.”
While this study did not gather specifics on individual Indigenous identity, producers were asked about whether they practice traditional Indigenous agricultural ceremonies and how those were affected by the pandemic’s restrictions. There were strong anecdotal associations between traditional Indigenous practices and self-sufficiency, relating to production and consumption. Some producers implemented more traditional Indigenous practices as central parts of their agroecological practices, reflecting as a family on “how our ancestors planted their crops, and how they prayed with mother earth before planting” (18-year-old female producer, Santa Eulalia, Huehuetenango). While planting and harvesting *milpa* is often done in groups, the pandemic’s restrictions limited producers’ ability to hold these communal agricultural ceremonies across families and at the community level. Traditional ceremonies associated with planting and harvesting were still practiced, but were often done without a spiritual elder in attendance and/or limited to immediate family and neighbors.

Traditional *milpa* production was re-valued, expanded and depended on for food sufficiency during the pandemic. Traditional Indigenous uses of medicinal plants were also mentioned exhaustively among Indigenous and non-Indigenous identified participants as a recovered or deepened Indigenous practice. Three producers of different generations and locations exemplify these sentiments:

---

15 Concern for spiritual elders traveling between communities and risking Covid-19 exposure prevented them from holding community events with large groups.
“[During the pandemic] My father brought up the importance of the ancestral production practices that we need to learn as kids, so that we won’t experience the pains of hunger during this or any other pandemic. He showed us again how to plant corn and beans, because that is the biggest lesson passed down through our family.”

-23-year-old male producer, Santa Eulalia, Huehuetenango

“Since we could not go to the pharmacy in town, we found those same plants in our community and on the mountainsides. We found ourselves more curious about nature, about plants. This knowledge was being forgotten, but we know the benefits of plants. We have all the medicine we need right here in our backyard pharmacy, the living pharmacy.”

-75-year-old male producer, Torcheche, Tacaná, San Marcos

“During the pandemic, the medicinal plants – ginger, lime leaves, lime juice, quinine bark, hierba de inciensio, became very important for families here. We all made teas for coughs and colds, which also helped with immune defense against Covid-19.”

-36-year-old male producer, Chupá, Camotán, Chiquimula

In some Indigenous communities, a lack of information in the community’s native Mayan language was a barrier to understanding the health concerns of the virus, the details of mobility and market restrictions, and sometimes the global significance of the pandemic. In communities near El Estor, Izabal, numerous respondents recall never receiving news or public health announcements in their native Q’eqchi’ language, and only hearing about Covid-19 through word-of-mouth that turned into factually incorrect rumors and conspiracy theories. Lack of information instilled fear and distrust within communities and towards the government.

2.2. Agroecology’s effects on smallholder resilience to economic shock
This section first establishes the relevance of the agroecological practices index (API) used in statistical analysis. I then present the results of the multi-level regression analysis. Qualitative data from farmer and organizational contact interviews illustrate how agroecological practices and prior engagement with organizations were leveraged by participants during the pandemic.

2.2.1. Agroecological resilience at the farm level

Table 6 presents quantitative analysis of producer characteristics (independent variables) and producer experiences during the pandemic (outcomes). Three independent variables are combined in the API, establishing a measure of “how agroecological” producers are. See section 1.4.2 for variables’ criteria and the calculation of the index.

*Table 6: Agroecological practices, agroecological engagement and COVID pandemic outcomes. Number of observations (n), means, and standard deviations (s.d.) for independent and outcome variables across all participants.*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
<th>N</th>
<th>Mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of chemical inputs (0=some use; 1=none)</td>
<td>Self-reported use of chemical inputs (fertilizers, herbicides, fungicides and other agrochemicals)</td>
<td>51</td>
<td>0.75 (0.44)</td>
</tr>
<tr>
<td>Level of diversification (1=low; 2=medium; 3=high)</td>
<td>Self-reported diversity of crops planted (species scale richness)</td>
<td>67.</td>
<td>2.28 (0.75)</td>
</tr>
<tr>
<td>Level of subsistence production during the pandemic (1=low; 2=medium; 3=high)</td>
<td>Self-reported level of food consumed during the pandemic that was self-produced</td>
<td>67</td>
<td>2.21 (0.77)</td>
</tr>
<tr>
<td><strong>Agroecological Practices Index (API)</strong></td>
<td>A normalized index calculated from the three variables above (normalized by the mean scores of use of chemical inputs, level of diversification, level of subsistence)</td>
<td>67</td>
<td>0.98b (0.33)</td>
</tr>
<tr>
<td>Prior engagement with the organization (1=low; 2=medium; 3=high)</td>
<td>Level of participation in trainings, programs and communication with organizational staff and leadership</td>
<td>67</td>
<td>2.24 (0.76)</td>
</tr>
<tr>
<td>Population of urban center as proxy for local market demand (included in regression models)</td>
<td>Population of the nearest urban center with a municipal market used by producers</td>
<td>67</td>
<td>71015 (26570)</td>
</tr>
</tbody>
</table>

**Outcome variables**

| Change in production level (1=decrease; 0=no change; 1=increase) | Self-reported change in production during the pandemic as compared to pre-pandemic levels | 64 | 0.08 (0.72) |
| Consumption outcome (0=insufficient; 1=sufficient) | Self-reported household food sufficiency or insufficiency during the pandemic | 61 | 0.67 (0.47) |
| Sale level (0= no sales; 1=low; 2=medium; 3=high) | Self-reported level of agricultural product sales during the pandemic as compared to pre-pandemic levels | 66 | 1.27 (1.11) |
| Change in household income (1=decrease; 0=no change; 1=increase) | Self-reported change in overall level of household income during the pandemic, as compared to pre-pandemic levels | 67 | -0.36 (0.77) |

*aCriteria for categorization of each variable is presented in Section 1.4.2.

*bFor 16 participants, the Use of chemical inputs scores were not available. The mean API value for the 16 without the chemical inputs score is 0.71 (calculated from the 2 remaining variables). The mean API value for the 51 participants with all three variables was 1.06.

The API incorporates three independent variables to measure degrees of agroecological plot-level practices across producers in varying locations, with different access to land, resources and training, and with access to different farmer organizations.

The average API across all producers is 0.98. Notably, level of diversification on individual plots and level of subsistence production during the pandemic (both calculated on a 1-3 scale) are between “medium” and “high” on average (2.28 and 2.21, respectively). While some producers report using chemical inputs (19.4%), more than half (56.7%) do not use any chemical inputs (and 23.9% were undetermined), making the average for external input usage 0.75 on a 0 to 1 scale. Prior engagement in the organization is also between “medium” and “high” on average (2.24 on a 1-3 scale). Population of the nearest urban
center was included as an independent measure of local market demand, averaging at 71,015 people.

Among the livelihood outcomes measured during the pandemic, production across all producers was positive on average (above 0) and consumption skewed towards sufficiency (above 0.5). Sale level was closer to “low sales” on average and household income was negative on average (below 0).

Table 7: The effects of prior engagement on agroecological practices index (API) and outcome variables. Two-level logistic regression analysis of the agroecological practices index (API) and household experiences during the COVID pandemic on prior engagement and urban population (divided by 10,000; as measure of potential market demand) with level 2 grouping variable equal to organization. Ordered logistic regressions were run for change in production level (-1,0,1), sale level (0,1,2,3) and change in household economy (-1,0,1); a simple logistic regression was run for the consumption outcome (0,1) and a regular least-square regression was run for API. In the first section of the table, the general model parameters are presented. The second section presents the cutoffs for ordered logistic models and constant for logistic and regular models as well as the coefficients of fixed factors in each model (Coef). In both of the first two sections, significance levels (p) for constants, coefficients, and overall models (tied to Wald chi²) are presented. In the third section, the variance (Var) and the intraclass correlation (ICC) of the organization random effect are presented.

<table>
<thead>
<tr>
<th>Model Parameters</th>
<th>Agroecological Practices Index (API)</th>
<th>Change in Production Level</th>
<th>Consumption Outcome</th>
<th>Sale Level</th>
<th>Changes in Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td># of observations³</td>
<td>67</td>
<td>64</td>
<td>61</td>
<td>66</td>
<td>67</td>
</tr>
<tr>
<td># of clusters</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>2.99</td>
<td>-57.17</td>
<td>-35.64</td>
<td>-80.41</td>
<td>-61.80</td>
</tr>
<tr>
<td>Wald chi²</td>
<td>38.56</td>
<td>&lt;0.001</td>
<td>7.81</td>
<td>0.020</td>
<td>4.56</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Factors</th>
<th>Coef</th>
<th>p</th>
<th>Coef</th>
<th>p</th>
<th>Coef</th>
<th>p</th>
<th>Coef</th>
<th>p</th>
<th>Coef</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant/Cutoff 1</td>
<td>0.39</td>
<td>&lt;0.001</td>
<td>0.67</td>
<td>3.54</td>
<td>-0.56</td>
<td>0.679</td>
<td>2.82</td>
<td>4.50</td>
<td>2.47</td>
<td>4.16</td>
</tr>
<tr>
<td>Cutoff 2</td>
<td>0.26</td>
<td>&lt;0.001</td>
<td>1.23</td>
<td>0.006</td>
<td>0.84</td>
<td>0.043</td>
<td>0.76</td>
<td>0.052</td>
<td>0.61</td>
<td>0.142</td>
</tr>
<tr>
<td>Cutoff 3</td>
<td>0.26</td>
<td>&lt;0.001</td>
<td>1.23</td>
<td>0.006</td>
<td>0.84</td>
<td>0.043</td>
<td>0.76</td>
<td>0.052</td>
<td>0.61</td>
<td>0.142</td>
</tr>
<tr>
<td>Prior Engagement</td>
<td>0.26</td>
<td>&lt;0.001</td>
<td>1.23</td>
<td>0.006</td>
<td>0.84</td>
<td>0.043</td>
<td>0.76</td>
<td>0.052</td>
<td>0.61</td>
<td>0.142</td>
</tr>
<tr>
<td>Urban Population</td>
<td>n/a³</td>
<td></td>
<td>0.30</td>
<td>0.11</td>
<td>0.17</td>
<td>0.05</td>
<td>1.33</td>
<td>0.29</td>
<td>0.81</td>
<td>0.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>Var</th>
<th>ICC</th>
<th>Var</th>
<th>ICC</th>
<th>Var</th>
<th>ICC</th>
<th>Var</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>0.02</td>
<td>0.30</td>
<td>0.39</td>
<td>0.11</td>
<td>0.17</td>
<td>0.05</td>
<td>1.33</td>
<td>0.29</td>
</tr>
</tbody>
</table>

³ n for each regression varies because some respondents did not answer every question

² No regression for API on urban population because the analysis does not include assessing the effects of urban population (potential market demand) on agroecological practices.
Analysis of how prior engagement with a farmer organization shaped the API is found in Table 7. Regression analysis strongly suggests that prior engagement with an organization is correlated with producers’ levels of agroecological practices (p<0.001). Prior engagement is also positively correlated with change in production level (p<0.05) and consumption outcome (p<0.05) during the pandemic. In turn, Table 8 presents two-level ordered regressions assessing the relationships between the API and (1) change in production level, (2) sale level and (3) change in household income (as these data were ranked/ordered). A standard logistic regression was used to assess the relationship between the API and the consumption outcome, which is a simple binary variable. The regression analysis strongly suggests that a higher API is associated with expansion of production during the pandemic (p < 0.05) and with maintaining household food sufficiency during the pandemic (p < 0.05).

Population of nearest urban center with a municipal market is included in each model (Table 7; Table 8) to control for local market demand at municipal markets, given that many were partially open at different times during the pandemic. The measure of local market demand (the urban population in the market town used by producers) is not found to significantly affect farmers’ abilities to sell or earn income during the pandemic. The lack of correlation between urban population and any livelihood outcomes suggests that during the pandemic, aggregate demand within the community’s area does not necessarily have an effect on any of the livelihood outcomes. This follows logically from the partial to full closure of markets. By contrast, both prior engagement (Table 7) and API (Table 8) are significantly correlated with production level and consumption outcome, suggesting that
agroecological organizations and the practices they impart played a role in sustaining livelihoods during the pandemic.

Table 8: Two-level logistic regression analysis of household experiences during the COVID pandemic on the agroecological practices index (API) and urban population (divided by 10,000; as measure of potential market demand) with level 2 grouping variable equal to organization. Ordered logistic regressions were run for change in production level (-1,0,1), sale level (0,1,2,3) and change in household economy (-1,0,1) while a simple logistic regression was run for the consumption outcome (0,1). In the first section of the table, the general model parameters are presented. The second section presents the cutoffs for ordered logistic models and constant for logistic models (Coef) as well as the coefficients of fixed factors in each model. In both of the first two sections, significance levels (p) for constants, coefficients, and overall models (tied to Wald chi$^2$) are presented. In the third section, the variance (Var) and the intraclass correlation (ICC) of the organization random effect are presented.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Change in Production Level</th>
<th>Consumption Outcome</th>
<th>Sale Level</th>
<th>Change in Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Parameters</td>
<td>Value</td>
<td>p</td>
<td>Value</td>
<td>p</td>
</tr>
<tr>
<td># of observations$^a$</td>
<td>64</td>
<td></td>
<td>61</td>
<td></td>
</tr>
<tr>
<td># of clusters</td>
<td>7</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-58.67</td>
<td></td>
<td>-34.35</td>
<td></td>
</tr>
<tr>
<td>Wald chi$^2$</td>
<td>4.60</td>
<td>0.100</td>
<td>6.74</td>
<td>0.035</td>
</tr>
<tr>
<td>Fixed Factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant/Cutoff 1</td>
<td>-0.38</td>
<td></td>
<td>-0.50</td>
<td>0.667</td>
</tr>
<tr>
<td>Cutoff2</td>
<td>2.48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutoff3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>API</td>
<td>2.06</td>
<td>0.033</td>
<td>2.65</td>
<td>0.012</td>
</tr>
<tr>
<td>Urban Population</td>
<td>-0.11</td>
<td>0.585</td>
<td>-0.19</td>
<td>0.141</td>
</tr>
<tr>
<td>Random Effects</td>
<td>Var</td>
<td>ICC</td>
<td>Var</td>
<td>ICC</td>
</tr>
<tr>
<td>Organization</td>
<td>1.10</td>
<td>0.25</td>
<td>0.10</td>
<td>0.03</td>
</tr>
</tbody>
</table>

$^a$n for each regression varies because some respondents did not answer every question.

No correlation was found between API and sale level (p>0.05) or change in household income (p>0.05) during the pandemic (Table 8). Notably, prior engagement’s effect on sale level is barely over the significance threshold (p=0.052). This data suggests that while agroecological practices were not found to shape sale level during the pandemic, prior engagement with a farmer organization may have played a role in farmers’ ability to
sell. Furthermore, sale level was found to differ among organizations more so than the other livelihood outcomes. Regarding prior engagement’s effects on livelihood outcomes (Table 7), sale level has the highest variance (1.33) and highest intraclass correlation (0.29) values. Regarding the API’s effects on livelihood outcomes (Table 8), sale level is also found to have the highest variance (1.82) and highest intraclass correlation (0.36) values. This is unexplained by agroecological practices or formal market demand (urban population) and merits further investigation into why certain groups of farmers’ (certain organizations’) scores for sale level were clustered (see Chapter 3). Additionally, the variance and intraclass correlation values for prior engagement’s effects on sale level and household income are higher than for the other outcome variables (Table 7). This suggests that engagement with an organization played a role; this and other factors are explored in Chapter 3.

2.2.2. “Those of us who practice agroecology can defend ourselves”

Consistent with the results presented above, organizational contacts as well as individual farmers describe how agroecology, specifically the dissemination of on-farm practices, contributes to favorable production and consumption outcomes. From Red Kuchub’al’s point of view, agroecological practices are the most practical for rural producers. “The basic practices that we always promote are easily adaptable,” says the director. “Making organic compost, making locally specific bio ferments that are used as foliar fertilizers as well as botanical extracts for pest mitigation... these are applicable to any community and don’t depend on external inputs.”
Organizational contacts identified diversification as a key factor in maintaining food security during the pandemic. According to the same director at Red Kuchub’al, “a farmer could only confront this crisis with what they already had available. When we compare the families who had diversified before the pandemic to those who hadn’t, there are clear differences in resilience to the crisis. Those with diversified systems were less vulnerable.” In Rabinal, a leader, producer, and promotor at ACPC also made connections between his agroecological practices and confronting the pandemic. “I’ve had a lot to defend myself with against the effects of Covid: cassava, squash, banana, sweet potato, poultry. Those of us who practice agroecology can defend ourselves. But there are still vulnerable families.”

Some organizations described how a focus on producing for subsistence instead of for the market helped buffer producers from market shocks. In Huehuetenango, staff at AMEDIPK reports that “Some of the producers here learned a valuable lesson, that if they had enough corn growing and in reserve, they didn’t need to worry about the markets during the pandemic, at least for their own consumption needs.” A leader at ACPC echoes the utility of agroecological practices for avoiding some impacts of market volatility when it comes to consumption:

“Agroecology is a beneficial alternative that can be practiced in any crisis; it is an alternative for survival. The market suffered and there are fewer opportunities now. The situation is critical, but the important part is that we have enough food for a healthy subsistence.”

-A leader and promotor at ACPC, Rabinal, Baja Verapaz

Individual farmers describe using agroecological knowledge to expand production and maintain their household consumption. “During quarantine,” says an 18-year-old
female producer from Rabinal, Baja Verapaz, “I dedicated my time to growing vegetables for our family. I learned a lot about life, including about agroecology.” Producers from various field sites describe using home-made organic fertilizer such as compost and organic pest sprays, as well as knowledge of diverse culinary and medicinal plants. This knowledge was directly used as a strategy during the pandemic’s economic shock, helping farmers grow more diverse crops and maintain access to healthy and diversified food sources:

“[The pandemic] helped us work with our crops more. We made more compost, planted more vegetables than we did beforehand. Things got a lot better for us during the pandemic. In our family we consumed more of our home-grown crops. This has helped me as a mother because I know that my kids are eating something natural, chemical-free.”
-21-year-old female, Sibinal, San Marcos

“Agroecology helped us know that our products are fresh and natural. By growing native plants and amending them with our own organic compost we can be assured that they aren’t contaminated.”
-26-year-old female producer, Camotán, Chiquimula

“I like agroecology, because it is ours. A lot of time, people don’t value it enough. In this moment [the pandemic], practicing agroecology has served us well. It gives us firewood. We have fruit. We have everything, thank God. Chatate, hierba mora, chipilín, cilantro, cassava, pacaya, sugar cane, poultry production… everything we need. The women are raising heirloom hens. During this pandemic, the thing that helped us the most is our diversified production.”
-41-year-old male producer, Jocotán Chiquimula

2.3. Discussion

This study concerns populations that have various existing economic and land-based constraints to production, have different prior engagement with agroecology and received
variable levels of support from agroecological (and other) organizations during the pandemic. The adopters of agroecology range from producers who are just integrating agroecological practices to producers who have exemplary integrated plots and even may serve as *promotores*. Study participants were selected on a range of engagement levels in collaboration with the organization (see section 1.4.1). Even the most agroecologically engaged farmers are not unaffected by poverty, resource constraints and social marginalization. The inclusion of this range attempts to decrease possible bias that selects for participants who already have better access to resources than their peers and who may garner more resources from their organization, simply being the most connected and involved. What connects producers in the study is their affiliation with an organization that supports agroecology, a crucial link to training, social networks, and market integration. The data cannot speak to populations that haven’t had any exposure to agroecology, and thus does not provide a comparison between agroecological producers and producers “outside of” the movement. It can, however, explore variation in the experience of producers with various levels of agroecological engagement and practices within agroecology movements during the pandemic’s unique challenges to markets and mobility.

Through the combination of quantitative and qualitative data, this study suggests that prior engagement with an organization helps shape producers’ agroecological practices. Producers with higher adoption of agroecological practices were more buffered from the pandemic’s economic crisis in terms of production and consumption, when compared to their less-engaged peers in the agroecology movement. The positive associations of both prior engagement and agroecological practices with production level
and consumption outcomes, even when controlling for formal market demand, suggest that
involvement in agroecology organizations is connected to producers’ ability to be resilient
to this economic shock.

2.3.1. Agroecology as opportunity: production and consumption

Smallholder food security in Guatemala’s Western highlands was concerning long
before the pandemic (Immink & Alarcon, 1991), where over half of farm households do not
have the means to attain sufficient nutritional energy from their agricultural activities
(Lopez-Ridaura et al., 2019). Diversified subsistence production was previously identified as
an important strategy for sheltering poor farming households across Central America from
economic crisis, as in the case of the early 2000s coffee commodity price shocks (Bacon et
al., 2017; Eakin et al., 2006) and the 2006-2008 global food price drops (De Janvry &
Sadoulet, 2010). Pre-pandemic data with Red Kuchub’al producers in Guatemala’s San
Marcos department show that producers with access to training, organizational support,
and market opportunities provided by agroecology movements have higher levels of crop
diversification, more food access, and even higher income than their semi-conventional
peers who are not affiliated with an agroecology organization (Calderón et al., 2018). It
follows that during the pandemic’s economic crisis, the more “agroecological” a producer is,
the greater ability they had to continue or expand production and maintain consumption
levels. Similar to Calderón et al. (2018), organizational support may be very important.

At the time of writing, minimal empirical literature exists on smallholder experiences
across Guatemala during the pandemic’s novel challenges. This study adds to our
knowledge of semi-subsistence producer realities during the pandemic, with an eye towards agroecology’s utility and relevance during economic crisis. Ceballos et al. (2021) evaluated the pandemic’s short term impacts on smallholder food security in the Western highlands, concluding that there was a net decrease in dietary diversity and increase in food insecurity at multiple levels (mild, moderate, severe). This study’s participants, however, are smallholders involved in commercial farming, and the study does not specifically examine agroecological production. Comparing the subsistence outcomes of agroecological producers who have various levels of adoption nuances food security challenges and responses, confirming that while agroecology alone cannot liberate producers from all of the constraints they face (Bezner Kerr, et al., 2019; Copeland, 2019b, 2019a; Holt-Giménez et al., 2021; Holt-Giménez & Altieri, 2013), agroecological practices can improve livelihoods (Altieri, 2009; Méndez et al., 2010).

Additionally, existing data from Ceballos et al. (2021) was collected in the early stages of the pandemic, in May-June 2020. This period marks the beginning of “the thin months” in the region (Morris et al., 2013), possibly failing to account for the prevalence of recurring seasonal food insecurity at this time. My study’s evaluation of the rest of 2020, as well as the beginning of 2021, has presented data on reported changes in production, in line with Guatemala’s agricultural production timeline (many maize varieties are planted in May and harvests begin in December). Although useful for immediate policy responses, the May-June data collection timeline occurred before it was likely that production decisions made by farmers as a reaction to the pandemic were able to bear fruit. In the regression analysis, intraclass correlation and variation values are close for changes in production and sale level
(Table 8), suggesting that production and ability to sell were closely linked in May 2020 (2 months into the pandemic) because of the timing of the agricultural cycle: farmers were making planting decisions. These correlation of these outcomes values within organizations suggests that the farmers who expanded production may have done so in part because of their ability or perceived ability to sell despite market closures, and the farmers who decreased production may have done so in part because of an inability or perceived inability to sell.

While existing regional literature from Latin America categorizes production during the pandemic as relatively static, qualitative and quantitative results suggest that the more agroecological a producer is, the more access they may have to the knowledge and tools to increase or intensify production as a response to the crisis. A 2020 Inter-American Development Bank (IDB) study evaluated a similar set of questions, albeit with producers outside Guatemala (Argentina, Paraguay, Bolivia, Peru, Dominican Republic) and of varying crop sectors and plot sizes. In this IDB study, 76.7% of producers experienced no change in harvest quantity and only 3.3% of producers report an increase (n=105) (Salazar et al., 2020). This contrasts with my data from an agroecological sample, where fewer than half of producers report no change in production (43.2%), and 26.9% of them were able to increase production. This contrast points to the potential of agroecology to situate producers with resources and alternatives for increased production when an economic crisis limits access to capital, labor, and inputs, although the lack of a non-agroecological control group in this study does limit the ability to compare with non-agroecological farmers.
2.3.2. Agroecology’s new global relevance for socioeconomic restructuring

At the onset of the pandemic, a common plea from poverty-stricken rural communities in the global south was for governments to treat the socioeconomic dimensions of the crisis seriously. “If the virus doesn’t kill me, hunger will…” has become a common sentiment among the poor in the global south (Franco, 2020, p. 576), highlighting the political and economic dimensions of hunger in a world that produces enough food to feed the global population (Holt-Giménez et al., 2012). Agroecologists, scholars, and activists continue to situate social and economic solutions, as well as the ecological, under agroecology’s multifaceted umbrella. Indeed, agroecology has new relevance for transforming agriculture through and after the pandemic (Altieri & Nicholls, 2020; Montenegro de Wit, 2021).

Myriad calls for scaling agroecology (Altieri et al., 2012; Brescia, 2017; Ferguson et al., 2019; Nicholls & Altieri, 2018) have been taken up during this pandemic and other crises. Because crises are a factor that can influence agroecological growth when paired with other factors (Mier y Terán Giménez Cacho et al., 2018), experiences during the pandemic may be important for increasing agroecological engagement that persists. Efforts to expand subsistence production and shorten food supply chains as a form of adaptation and self-preservation during the pandemic’s crisis was widespread. In the United States and the UK, urban and rural populations sowed ‘victory gardens’ at home during the pandemic, harkening back to a World War II livelihood strategy that rearranged productive resources and labor to be able to support war efforts (Howard, 2020; Valle, 2021). Brazilian
agroecological networks exhibited resilience to market shut-downs during the pandemic due to their focus on affordable and local subsistence products (Preiss, 2020). An older but still-salient example of agroecology enhancing food security and revitalizing sustainable production during economic crisis on a national scale is Cuba’s agroecological extensionist initiatives during the 1990s ‘special period’ (Nelson et al., 2009; Rosset et al., 2011). At these Guatemalan field sites, agroecology has been similarly relevant, and is “the alternative fit for any crisis,” according to an ACPC leader and promotor. Whether agroecological engagement and scaling increases as a result of the pandemic remains an open question, but given the agroecological expansion on study participants’ individual plots and some organizations’ tendency to assist non-members during the pandemic, it may be likely.

2.3.3. Resilience: a rocky road

In the context of structurally produced and perpetuated vulnerabilities, are smallholders responsible for overcoming the gargantuan constraints of limited land access, diminished access to resources, and globalized markets solely by the volition of their own organizing and strategic solidarities with allies? Should agroecology organizations shoulder the burdens of protecting their members from recurrent shocks that originate in places and systems far beyond Guatemala’s borders? Resilience frameworks—which increase the capacity of a system to absorb disturbance and retain the same functions (Folke et al., 2010)— and the programs associated with them can keep smallholder farmers within cycles of poverty. In some cases, expecting farmers to adapt and be more resilient may be
demanding that they work harder for food access when structures are working against them (Copeland, 2019b; Holt-Giménez et al., 2021).

The downsides of resilience frameworks include their propensity to perpetuate existing inequality and oppression. The semi-subsistence smallholders in this study depend largely on family labor for agricultural production, and agroecological production is a labor-intensive endeavor. While many participants reported having more time (labor hours) to work on their plots during the pandemic, the expansion of agroecology ultimately requires more labor power from small producers. This asks them to work harder to meet their needs and legitimizes their increased effort to earn a livelihood under deteriorating conditions. Alain de Janvry et al.’s (1989) ‘double under-development squeeze’ – the combination of small plots of land and scarce employment opportunities perpetuating rural poverty – was indeed exacerbated during the pandemic because smallholders had to rely more on their small plots while employment opportunities were so scarce that they were nearly or completely nonexistent. The implicit calls from agroecology programs geared towards resilience that ask farmers to devote more labor without increased support dually extends this pattern of unremunerated labor supporting capital and leaves behind those farmers without sufficient labor power, deeming them agroecologically ‘unsuccessful’.

Interviewees also mentioned violence against women as an existing oppressive problem that was exacerbated during the pandemic. Although it was not a topic in the interview protocol, some women describe household violence increasing in an existing patriarchal context of *machismo* (sexism) because “people are stuck at home and they are desperate.” A 62-year-old producer in San Marcos department says, “There have been assaults and
violations of minors within families, both boys and girls. Several women have also been murdered in our community; we are under threat in this country.” Evidently, there are serious harms associated with expecting marginalized communities to be resilient to shock—especially when associated with social isolation—, including but not limited to exacerbated gender inequality, further marginalization of Indigenous people, the normalization of displacement and decreasing state assistance.

Even still, maintaining access to food that keeps producers independent of structures that work against them may help ensure the basic welfare of farming communities while strengthening the ability of agroecological organizations and their partners to enact structural changes.

If agroecology movements are to be systemically transformative, they must link independence with regards to production and consumption to economic independence at the community and regional levels. Agroecologist Steve Gleissman’s (2016, pg. 188) framework for transforming food systems through agroecology necessitates re-establishing “a more direct connection between those who grow our food and those who consume it.” While agroecology organizations in Guatemala were challenged by the extreme case of economic crisis during the pandemic, they are positioned to take on this work in rural communities that lack institutional assistance. Indeed, some of them already are. Maywa Montenegro de Wit contends that repairing the food system’s both ecological and social metabolic rifts is necessary in agroecological discourse and action, and that the “transformative shifts of which agroecology is capable will not spring from crisis spontaneously” (2021, p. 112) (for an example in Malawi, see Bezner Kerr et al., 2019).
Engagement in agroecology organizations provides technical as well as social tools for producers to respond to economic crisis. Whether there are pathways for developing economies of solidarity that can transform smallholder organizing and livelihoods, is explored in Chapter 3.

Chapter 3 addresses the variation, across organizations, in producer ability to access markets both formally and informally. As seen in this Chapter, nearly 40% of producers in this study were able to sell agricultural goods at medium or high levels during the temporary absence of formal markets (Table 4) and organizations varied in their ability to facilitate this access (Table 7). Qualitative data reveals multiple opinions that “agroecology helped us access products right here in the community” and that being involved with “a group that works together” was what “helped us survive and come out ahead economically.”

3. Chapter 3: Social networks, collective action and response to economic shock

Introduction

Data presented in Chapter 2 suggests a positive relationship between resilience to economic shock at the farm level and both prior engagement and agroecological practices. For sale levels and household income, however, the role of agroecology is more site-specific and complex. The initial closure of markets from March – July 2020, and the subsequent restrictions into 2021 were the hallmark of the pandemic, making commercialization of agricultural produce extremely difficult for rural producers. Among this agroecological
sample, however, about 40% of producers still managed to sell agricultural produce at medium or high levels as compared to pre-pandemic sales (Table 4), much of which was in informal and creative ways. Given that the analyses in Chapter 2 controlled for organization and the outcomes for sale level were clustered by group, the role of organization was not addressed. This chapter addresses this by focusing specifically into the role of farmer organizations, addressing research questions 3 and 4:

**RQ3:** Given the variable and differentiated effects of the closure of municipal markets on smallholders’ ability to sell agricultural products, how did farmer organizations influence farmers’ responses to economic shock?

**RQ4:** How do organizations’ efforts to promote agroecology open up space for long-term solidarity building among farmers?

This chapter explores how farmer organizations support social networks and catalyze collective actions that increase producers’ ability and agility in responding to market shocks. While not all organizations were able to facilitate market access for their members during this extreme case of economic shock, farmers’ and organizational staff’s accounts suggest that agroecological practices and the social networks inherent to agroecological movements help farmers respond to economic shock with greater speed and agility.

The pandemic offers a qualitatively distinct lens on socioeconomic crisis, marked specifically by extreme market and mobility restrictions. I argue that social networks and collective actions, with farmer organizations as their nodes, mediated alternative forms of market exchange during the pandemic, such as novel home markets, virtual sales and enhanced bartering practices. I frame “market access” beyond the formal market structures
provided by municipal markets in central towns, and show how both social networks and agroecological practices, such as diversification, are promising elements of localized market access. In this chapter I delve into the possible underlying causes of some producers’ ability to commercialize their products during market closures. The variation across organizations offers a set of salient examples of people working toward economic solidarity within agroecology, while facing many structural constraints.

In section 3.1 I present quantitative data on the pandemic’s impacts on farmers grouped by organization. Section 3.2 describes how multiple structural constraints to equitable livelihood generation were exacerbated during the pandemic, most of which may require systemic changes beyond strengthening social networks. Section 3.3 presents key themes that illustrate how social networks and collective action mediated localized marketing alternatives. I conclude Chapter 3 by discussing the connections between Guatemalan agroecology organizations and solidarity economy as a model and process of economic organizing.

3.1. Organizational comparisons

Table 9: Means for agroecological practices index (API) and outcome variables by organization

<table>
<thead>
<tr>
<th>Red Kuchub’al</th>
<th>AMEDIPK</th>
<th>Grupo de Pequeños Productores La Union (GPPLU)</th>
<th>Mancomunidad Copan Ch’ortí’</th>
<th>ACPC/Qachuu Aloom</th>
<th>Mercadito Campesino</th>
<th>MCEV</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th>Agroecological Practices Index (API) b</th>
<th>1.17</th>
<th>1.07</th>
<th>1.15</th>
<th>1.06</th>
<th>0.95</th>
<th>0.57</th>
<th>0.61</th>
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<tbody>
<tr>
<td></td>
<td>n=12</td>
<td>n=5</td>
<td>n=10</td>
<td>n=11</td>
<td>n=16</td>
<td>n=6</td>
<td>n=7</td>
</tr>
<tr>
<td>Change in Production Level</td>
<td>0.84</td>
<td>0.20</td>
<td>-0.30</td>
<td>-0.20</td>
<td>0.19</td>
<td>-0.17</td>
<td>-0.60</td>
</tr>
<tr>
<td></td>
<td>n=12</td>
<td>n=5</td>
<td>n=10</td>
<td>n=10</td>
<td>n=16</td>
<td>n=6</td>
<td>n=5</td>
</tr>
<tr>
<td>Consumption Outcome (%) of food sufficient households</td>
<td>92%</td>
<td>100%</td>
<td>78%</td>
<td>40%</td>
<td>60%</td>
<td>67%</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>n=12</td>
<td>n=5</td>
<td>n=9</td>
<td>n=10</td>
<td>n=15</td>
<td>n=3</td>
<td>n=7</td>
</tr>
<tr>
<td>Sale Level</td>
<td>2.17</td>
<td>0.80</td>
<td>0.80</td>
<td>1.55</td>
<td>0.81</td>
<td>2.5</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>n=12</td>
<td>n=5</td>
<td>n=10</td>
<td>n=11</td>
<td>n=16</td>
<td>n=6</td>
<td>n=6</td>
</tr>
<tr>
<td>Change in Household Income</td>
<td>0.33</td>
<td>-0.20</td>
<td>-0.50</td>
<td>-0.45</td>
<td>-0.69</td>
<td>0.17</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>n=12</td>
<td>n=5</td>
<td>n=10</td>
<td>n=11</td>
<td>n=16</td>
<td>n=6</td>
<td>n=7</td>
</tr>
</tbody>
</table>

\(a\) These two organizations are grouped together given that they are based around the same small city (Rabinal, Baja Verapaz) and to account for a low sample size for one organization.

\(b\) Agroecological practices index includes (1) use of external inputs, (2) level of subsistence during the pandemic, and (3) level of diversification.

\(c\) \(n\) for each variable and group varies because the undetermined values were not included in the calculation of means.

Table 9 presents the means for the API and the four outcome variables by organization. For statistical analyses, ACPC and Qachuu Aloom were grouped together due to a low sample size from Qachuu Aloom and the two groups’ location in the greater Rabinal, Baja Verapaz area (their data is separated in the qualitative data). Representation of means by organization also separates participants by location, so differences are not simply due to organization but also to historical context and geography.
Notably, differences in “how agroecological” producers are is observed by group:

Red Kuchub’al producers stand apart as having the highest levels of agroecological practices (API), while MCEV and Mercadito Campesino’s producer participants have the lowest API values (they are also the most recently formed). The other groups fall in between.

Red Kuchub’al scores are high across all four dependent variables in relation to the other organizations, highlighting their producers’ ability to expand production, find a market for their products, and maintain consumption with either self-produced food or the income from their relatively high sale levels. While AMEDIPK and ACPC/Qachuu Aloom producers were able to expand production and maintain medium-to-high household consumption, they struggled to sell and had decreased household income during the pandemic.

Notably, Mercadito Campesino producers were able to sell at medium-high levels (2.5) and had an increase in household income on average, while production levels and consumption suffered during the pandemic, indicating their ability to access a localized market for agricultural goods even when production was decreasing on the whole. Four groups appear both on the lower spectrum of sale level (less than 1 on average) and have decreased income levels during the pandemic: ACPC/Qachuu Aloom, AMEDPIK, GPPLU, and MCEV. Mancomunidad Copan Ch’orti’ producers are the only group that maintained low-to-medium sale levels (1.55 on average) yet had a severe decrease in household income (-0.45 average), indicating the possibility of low local prices and/or small volumes of sales to a broader base of consumers.
3.2. Heightened vulnerabilities during the pandemic

Existing structural constraints to livelihood generation were exacerbated during the pandemic by the government’s restrictions on markets and mobility. Lack of access to land or uncertain tenure is a common constraint, especially for ACPC, Qachuu Aloom, AMEDIPK and Mancomunidad Copan Ch’orti’ producers. The members of these groups are challenged by a combination of operating on small plots and/or renting the plots on which they farm. Even still, some of these producers are among the ones who expanded production and agroecological activities during the pandemic, indicating that farmers are implementing agroecology on a very small scale and are cultivating all or most of their available land. For these semi-subsistence farmers, being essentially cut off from markets where they previously bought and sold food put more pressure on their inadequate landholdings to provide for them and their families. The pandemic’s economic shock effectively heightened vulnerability due to land access. The relatively low bargaining power of grassroots organizations when it comes to land access and reform remains a perennially difficult limitation for farmers and their organizations.

Lack of access to arable land was a notable constraint for GPPLU and Mancomunidad Copan Ch’orti producers, as well as some members of ACPC and Qachuu Aloom. Due to combinations of climate variability, erosion, decades of practices that have diminished soil health, and displacement of campesinos, some of these producers may have land but are unable to achieve significant yields on marginal soil.
In Izabal, generations of multinational mining operations that are displacing local people and diverting water are making producers’ land more marginal and production increasingly difficult. GPPLU leaders, especially women, are tasked with the demanding political organizing and legal work associated with resistance (see Deonandan et al., 2017). These activities, however, such as press conferences and community meetings, were difficult or impossible to carry out during the pandemic, presenting GPPLU with a serious limitation in their organizing for Indigenous rights to land and life. GPPLU producers were also affected by Hurricanes Eta and Iota’s devastating flooding and destruction of farmland in October - November 2020. Total harvest losses and the displacement of campesinos from their homes (with little or no government help for relocating) were even more detrimental to producers’ ability to earn a livelihood during the pandemic’s restrictions. Mancomunidad Copan Ch’orti producers in Chiquimula struggle with long-term soil infertility, drought, lack of water access, and the prevalence of chemical fertilizers offered by the state and local governments. These are significant barriers to agroecological education, according to a staff member. The same staff member also contends that the infertile soil in the Camotán and Jocotán areas is a barrier to securing funding for agroecological programming. “I would give anything for a grant to start an agroecological extension program,” he says. “But when funders see that our topsoil is at most a couple of centimeters deep, they turn around and go fund programs in the western highlands where farmers are elbow-deep in fertile topsoil.” For this group, the multiple and interconnected barriers to agroecological education heightened producers’ vulnerability and exacerbated poverty during the pandemic.
Across study sites, histories of displacement have led to dispersed landholding patterns where farmers may live kilometers away from the plots that they rent or own for agricultural production. In these cases, a new axis of vulnerability related to land emerged, as these campesinos could not visit their fields regularly during the lockdowns. Producers’ ability to plant, work in their fields and harvest was hindered by the pandemic’s restrictions on mobility. Without public transportation or instilled with fear of viral exposure or retribution from authorities, farmers with landholdings that are removed from their homes were disconnected from their source of food and income.

3.3. Mediating localized marketing alternatives: Key themes

This section provides qualitative data on how the social networks provided through organizations gave producers the ability and agility to respond to economic shock. This was achieved through five themes: (1) novel home markets, (2) bartering and gifting practices, (3) women’s cooperative initiatives, (4) virtual markets and online sale capacity and (5) responding to increased demand for local products during the pandemic. Table 10 summarizes organizational variation as it relates to the social networks and actions that helped mediate economic alternatives during the pandemic, as well as other contextual data.
Table 10: Organizational variation in actions and programming during the pandemic

<table>
<thead>
<tr>
<th>Organization</th>
<th>Location</th>
<th>Number of members</th>
<th>Novel home markets (yes/not reported)</th>
<th>Programmatic focus on bartering and gifting (yes/not reported)</th>
<th>Has a women’s cooperative or group (yes/no/women-led)</th>
<th>Organized virtual markets or online sales (yes/not reported)</th>
<th>Subsistence garden program (yes/no)</th>
<th>Supply chain or marketing programmatic focus (yes/no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMEDIPK</td>
<td>Santa Eulalia, Huehuetenango</td>
<td>680</td>
<td>Not reported</td>
<td>Not reported</td>
<td>women-led</td>
<td>Not reported</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Red Kuchub’al</td>
<td>Sibinal and Tacaná areas, San Marcos a</td>
<td>353</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Not reported</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>MCEV</td>
<td>Tejutla, San Marcos / San Marcos department</td>
<td>12</td>
<td>Not reported</td>
<td>Not reported</td>
<td>women-led</td>
<td>Not reported</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ACPC</td>
<td>Rabinal, Baja Verapaz</td>
<td>300-450</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Not reported</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Qachuu Aloom</td>
<td>Rabinal, Baja Verapaz b</td>
<td>500+</td>
<td>Yes</td>
<td>Yes, informally with medicinals</td>
<td>Yes</td>
<td>Not reported</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mancomunidad Copan Ch’ortí’</td>
<td>Camotán, Jocotán, Olopa and San Juan Ermita, Chiquimula</td>
<td>545</td>
<td>Not reported</td>
<td>Not reported</td>
<td>No</td>
<td>Not reported</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>GPPLU</td>
<td>El Estor, Izabal</td>
<td>189</td>
<td>Yes</td>
<td>Yes, informally with basic grains</td>
<td>No; women-led</td>
<td>Not reported</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Mercadito Campesino</td>
<td>Las Cruces, Petén</td>
<td>40</td>
<td>Yes</td>
<td>Not reported</td>
<td>No; women-led</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

a Red Kuchub’al consists of 12 sub-organizations in San Marcos, Quetzaltenango, Totonicapán and Retalhuleu departments, but this study engaged with Red Kuchub’al’s producers and agroecological promotores in San Marcos department.

b Qachuu Aloom works in San Miguel Chicaj, Rabinal and Cubulco municipalities in Baja Verapaz, but this study engaged with Qachuu Aloom’s producers in Rabinal municipality.

3.3.1. Novel home markets

“We essentially created individual home markets,” says a 33-year-old female producer from ACPC in Rabinal, Baja Verapaz of her selling practices during the pandemic.

These novel home markets allowed producers to sell their excess agricultural products, earn
income, and make up for the temporarily vanished supply of market produce and animal products that was previously centralized at a municipal market. People either received buyers at their homes or fields, or went door-to-door with products in hand. Producers in Red Kuchub’al, GPPLU, ACPC and Qachuu Aloom discuss being able to find consumers in their immediate vicinity because of their social connections within the network and with neighbors. Several Red Kuchub’al producers noted that it was primarily because they were “known in their community” as Red Kuchub’al agroecological producers with “high-quality and healthy produce” that they were able to immediately receive local buyers at their homes when markets closed.

“Neighbors would come by to buy from me. I have a quality product, it’s organic and healthy. I was happy that people came to find me. I was able to be identified as a reliable producer. Before the pandemic I had to go find the consumer, but now the consumer comes to me.”

-47 year old male, Checambá, San Marcos

These producers experienced little to no disruption in sales. In fact, many of them noted an increased demand because they were some of the few producers in their communities who were filling the void created by the municipal market closures. Individual home markets included diversified vegetable, grain, herb, and animal products where neighbors could come to fulfill most of their household food needs within walking distance and with minimal risk to exposure of Covid-19. Having products that were diversified and known to be agroecologically produced (i.e. “organic and healthy” in the quote above) made these producers attractive food suppliers, pointing to the importance of agroecological knowledge and practices for accessing local consumers.
An important feature of commercializing produce from home and in the immediate community is that, despite high demand, producers priced their goods reasonably low. Some producers comment on choosing to keep prices lower than the equivalent rate at the municipal markets before the pandemic, because they were aware of what their neighbors could afford.

“All of the prices went up. We sold at accessible prices because we saw that so many of our neighbors lost work. There are people here with very little money, so we did not raise our prices.”

-21-year-old female, Sibinal, San Marcos

To be certain, these novel home markets did not catch on everywhere. Where producers in an immediate community cultivate the same crops, there was low or no demand for their products in the immediate vicinities. Achieving higher levels of diversification was constrained by either the local microclimate only supporting a few types of crops (e.g. being too dry for milpa production in upland areas of Rabinal), or a lack of education, training and access to seeds for diversified production. Small communities in very rural areas were constrained by low population densities; in these cases novel home markets were not viable because transportation to neighboring consumers was too far, too costly, or restricted by the government.

3.3.2. Bartering and gifting practices
Pre-pandemic, Red Kuchub’al’s networks bartered food products between highland and lowland groups of producers, taking advantage of communities’ ability to grow distinct food crops based on elevation (Calderón et al., 2018). At other field sites, bartering was practiced casually or known as an ancestral practice that was practiced in informal ways before the pandemic. Bartering and gifting increased across field sites during the pandemic, practiced through local social networks. Some producers and organizational leaders see it as a social agroecological practice. While bartering was widespread at the individual level among producers as an emergency survival strategy during March-July of 2020, it waned once markets reopened in the second half of 2020. Two organizations are integrating bartering at the community level, however, into future programming as a response to the pandemic.

Among individual producers, 37.3% of producers bartered produce and animal products, 34.3% did not engage in any bartering, and 28.4% of producers were undetermined (they did not answer the question). Producers who bartered describe the practice in two main ways. The first was as a survival strategy when cash flow was low and food prices high. This was especially salient among Mancomunidad Copan Ch’orti’ producers who were cut off from urban centers and from the organization after the October-November 2020 hurricanes Eta and Iota. Bartering took place in localized form, among family members of different households or among neighbors who already knew each other. “We bartered among our families,” says a 59-year-old female producer in Camotán, Chiquimula. “But not with other people in neighboring communities. My daughter would give me eucalyptus and I traded her ginger.” Some producers expressed fear of
Covid-19 exposure and limited bartering to family members, even though bartering is widely understood as a traditional practice that is open to all community members. Two additional producers from other departments relay the importance of bartering as a food access strategy during the economic shock.

“Many of us ran out of money [during the pandemic] so we would exchange beans for corn or fruit. Apples for peaches, potatoes in exchange for corn, etc. We did this with people who are close to us. For a while, money lost its value.”

-62-year-old female producer, Tejutla, San Marcos

“Sometimes we sold, but more often we bartered produce for animals, like ducks, chickens and fish. That was how we confronted the pandemic.”

-45-year-old male producer, El Esfuerzo, El Estor, Izabal

Notably, bartering and gifting were untethered from the value of money. Even when exchanging one good for another, people gave what they could spare, gave what others needed, or enthusiastically shared produce that needed to be consumed before spoiling. When “money lost its value,” as noted above, people operated based on what was mutually beneficial, not on market prices.

“Bartering was a way to help others. We are neighbors and we have to help each other. We can’t have our crops rotting in the fields...”

-25-year-old female producer, Aldea Majada, Tacaná, San Marcos

The second conception of bartering was as a revalued ancestral tradition that was being brought back into practice as a component of agroecology. ACPC and Red Kuchub’al are facilitating bartering among their producers as a direct organizational response to the pandemic and a way to cushion against future shocks. “The practice of bartering is from our ancestors, and it has been practiced for many years,” says an ACPC leader. He sees
bartering as an integral ancestral and agroecological practice, which the organization can promote on a community level. “[During the pandemic] it resurged in the community culture, and it should not be lost. What we are starting is a system of bartering. It is part of agroecology.” Red Kuchub’al, which has producers across elevations and had a pre-existing barter system (Calderón et al., 2018), sees an opportunity for expanding this regional exchange of goods between highland and sub-tropical zones to help more households access diversified diets. At the end of 2020, a Red Kuchub’al director reflected on the transportation and market-related constraints that prevented them from implementing this system during the pandemic:

“As an organization the minimum we could do during the pandemic was conduct a diagnostic about which products have the most potential in each region during this crisis. We couldn’t organize a regional bartering program between highland and lowland communities because of the road closures and transportation costs, but we are developing that this coming year.”

Food gifting in the form of mutual aid among producers in a network was common during the pandemic, and reliant on the social connections formed among members. This was distinct from direct food aid obtained through development organizations or outside funding because this community gifting was among producers themselves. In Izabal, a GPPLU organizer and community leader describes how her community of producer families addressed food access communally. “We got together at the beginning of the pandemic to make sure that all of the families had enough corn and beans. ‘If anyone doesn’t have enough,’ we said, ‘come to the group for help.’” GPPLU decided to store grains as an
organization, having noticed right away that members could run out of the previous year’s grain stores.

3.3.3. Women’s cooperatives and sub-groups

Women’s cooperatives and sub-groups among organizations were at work before the pandemic to carry out technical training in value-added products and animal care, run women’s savings groups, and offer workshops on childhood nutrition and on social issues like women’s rights and domestic violence prevention. ACPC and Red Kuchub’al have active women’s cooperatives that meet as working groups or sub-groups within the larger organization. These two groups took collective actions to both adapt production and access markets during the pandemic. Notably, other groups such as AMEDIPK, Qachuu Aloom, GPPLU, Mercadito Campesino and MCEV are already women-led or founded by women to serve all producers, and thus did not describe women’s sub-groups in the study.

The ACPC women’s group consists of 115 women in 5 small communities outside of Rabinal. In 2020, they maintained a basic grains bank, continued an heirloom chicken raising project for meat and egg production, had a savings group and worked in ACPC’s coffee seedling nursery. The bank for basic grains was “geared towards enhancing food access locally,” says a member and leader of the women’s group. Another ACPC leader described the challenge of formal market access for women’s groups. “The women who have a project for heirloom eggs production tried to take their product to [the municipal] market\textsuperscript{16} and

\footnotesize
\textsuperscript{16} The municipal market in Rabinal was open with limited hours shortly before the time of the interview, in February 2021.
found that there were no buyers because there is so little trust in the greater community during COVID. They are finding ways to sell among the [immediate] community without a physical market place; it is completely decentralized.” Women’s groups in these communities were the primary organizers of door-to-door and home markets selling eggs, an important source of protein relied on by most households.

In Red Kuchub’al, women’s groups are central to the expansion and diversification of value-added products, such as teas, medicinal products, juice concentrates, jams, and coffee processing and packaging. In the San Marcos municipality, a women’s sub-group increased honey production during the pandemic, and expanded to products like bee pollen and propolis tinctures. In Tacaná, San Marcos two women members of a women’s cooperative comment on their pandemic-era activities:

“Working with the women’s group [during the pandemic] helped us survive economically and in terms of food production. We were working in the tea processing facility, processing various medicinals... As a women’s group we were supporting each other, we were all involved, and we took advantage of what was around us.”

–39-year-old female producer, Limones, Tacaná, San Marcos

“During the pandemic we didn’t sit around twiddling our thumbs. We started new projects. We had to come out ahead, in some way or another. We had to find new ways to earn an income. Our husbands lost their jobs, but in the women’s group we took advantage of this time to work on our projects and with the crops to have enough food for our families.”

–30-year-old female producer, Limones, Tacaná, San Marcos

This group changed production and marketing with agility, by responding in a timely fashion to increased local demands for certain products over others, discussed below.

Mercadito Campesino, while not a women’s group, is largely women-led. For much of 2020 members relied in part on a farm-to-school lunch program for income. Before the
pandemic women organizers secured municipal contracts for farmers with schools in Las Cruces, Petén. Members of Mercadito Campesino help transport, sort and process beans, corn, cassava, fruit, maize, and other products for delivery. Producers continued to sell these products to schools during the initial months of lockdown, because in Petén there were fewer municipal restrictions and they experienced less enforcement overall due to distance from large cities. After the July 27 reopenings, producers resumed selling to schools as they had pre-pandemic.

3.3.4. Virtual markets and online sale capacity

Mercadito Campesino stands out as the only group in this study that converted an open-air, in-person market into an online market during the pandemic. This youth and women-led initiative was crucial for keeping consumers and producers in their network. While the community was stuck at home due to curfews and elderly or at-risk people were instilled with fear of exposure, women organizers and their young adult children (ages 17-20) reorganized the mercadito, or market, using the social media outlets Facebook and Whatsapp. Accounts from adult organizers report that their teenage children helped post and share photographs of produce and prepared food products. Consumers contacted the group to make transactions, and either came by a central home to pick up orders or received them via delivery. Members of Mercadito Campesino and their children made home deliveries by bicycle or on foot. “We didn’t stop working,” says one woman organizer. “And the mercadito never closed, because we started the home delivery immediately.”
With humor and enthusiasm, she comments on the joys of the project. “At the bare minimum, we got some much-needed exercise.”

While not related to an organizational initiative, young adult producers in Chiquimula connected to Mancomunidad Copan Ch’orti’ reported selling produce online. Even though the Mancomunidad Copan Ch’orti’ organization had a gap in programming in early 2020 and had trouble accessing its member communities due to hurricane damage on roads (see Appendix C), some producers tapped into their local social networks for marketing alternatives, exemplified by this 20-year-old male producer’s account. He sold higher amounts of ginger, lime and other medicinals during the pandemic, also using Whatsapp and Facebook.

“The pandemic taught me an important lesson. Besides fear, it has given me initiative. I discovered that selling products online was really effective... I’d post photos of my produce, then my contacts would respond with their orders. It was a way to generate income, and I realized that I needed to be proactive even given the situation in this country. Despite the emergency at hand, despite the pandemic, despite there being no physical spaces for the economy to take place or to sell products. The small producers didn’t have a place to commercialize product because of all the restrictions. But on social media, it was possible to earn some income even while living through this crisis.”

-20-year-old male producer, Aldea Chupá, Camotán, Chiquimula

3.3.5. Responding to increased demand for local products

Across study sites, demand and supply of unprocessed produce and animal products shifted to the local level during the pandemic. Producers leveraged social networks to identify needs and buyers for new products, and used agroecological knowledge and
practices to fill those diverse needs. Food products that meet subsistence needs had increased local demand, while non-subsistence products became temporarily obsolete.

Overall, producers with diversified crops had more products to offer, and could earn some income by being able to supply their neighbors with various food products. In the Sibinal, San Marcos area, local greens like *hierba mora* (*Solanum americanum*), watercress (*Nasturtium officinale*), and *chipilín* (*Crotalaria longirostrata*) as well as vegetables like broccoli, cauliflower, potatoes and carrots were among the most lucrative crops on the market. “Basic grains, especially maize, were the most sought-after,” says a producer and agroecological *promotor* who works with Red Kuchub’al. A 23-year old AMEDIPK producer “planted more vegetable crops because it was clear that there was local demand, given that people could not buy at the municipal market.” This was echoed by producers in Rabinal area, associated with both Qachuu Aloom and ACPC, who planted more basic grains in mid 2020 because they anticipated this need.

Red Kuchub’al staff noticed the low demand for specialty value-added products such as chocolate, shampoos, and jams that were previously sold nationally and internationally. “These products do not consist of the basics that a family requires to be well-fed and well cared-for,” says an organizational leader. “Furthermore, if they are for export or for specialty markets, our producers cannot afford them.” During the pandemic, the organization piloted fruit and vegetable dehydration and grain milling projects geared towards securing access to subsistence food. “We were able to experiment during the pandemic,” says a 42-year-old female producer in Tacaná, San Marcos. “We have the dehydrator. There were so many extra carrots this year, and we could not sell all the small
ones. So we dehydrated them to preserve for eating later in the year.” They would eventually sell dehydrated product locally in small amounts as part of the pilot.

Members of ACPC, Qachuu Aloom, Red Kuchub’al, Mancomunidad Copan Ch’ort’i’, and AMEDIPK emphasized the importance and increased use of Mayan herbal medicine during the pandemic, at both individual and organizational levels. Growing, bartering and selling traditional herbal plants during the pandemic was another way to administer mutual aid, and relied on existing social networks during periods of lockdown and isolation. This was coupled with an increased demand for fresh medicinal plants and prepared medicinal products. “During the pandemic, the medicinal plants – ginger, lime leaves, lime juice, quinine bark, *hierba de incienso* [an unspecified mint in the *lamiaceae* family], became very important for families here,” says a 36-year-old male producer in Chupá, Camotán, Chiquimula. In Rabinal area, Qachuu Aloom worked with midwives and traditional Maya-Achí healers to prepare immunity-boosting medicinal formulas and share the new recipes, which were formulated through Indigenous ceremonies, with members of the organization. Although ginger is not usually grown in Rabinal, Qachuu Aloom producers who noticed the increased demand for ginger in medicinal remedies began planting it at the beginning of the pandemic. Bartering of medicinal herbs was common among producers in these groups.

3.4. Discussion

Agroecology organizations, while unable to facilitate market access across the board, helped farmers respond to the pandemic’s economic shock. This was achieved to varying degrees through existing social networks and both existing and emerging collective actions,
which included the implementation of agroecological knowledge and practices through those social networks.

3.4.1. Constraints to livelihoods and overcoming marketing challenges during the pandemic

Pre-pandemic, campesinos relied on livelihood diversification and coping strategies such as income diversification via local off-farm employment, migrating regionally or internationally for employment, selling more agricultural products, and selling assets like livestock (Alpízar et al., 2020; Cruz-Bello et al., 2011; Holt-Giménez, 2002; A. Rice, 2017). Data suggests that existing structural vulnerabilities related to land access and soil infertility were exacerbated due to the unavailability of these market-mediated and mobility-related coping strategies. As previously documented by Tucker et al. in Guatemala, Mexico and Honduras (Tucker et al., 2010), access to land is a central constraint for making agricultural adaptations when farmers perceive or experience market risk. In terms of agroecological development, access to enough land and water to meet production needs is a necessary condition which remains out of reach for most rural Guatemalan farmers (Copeland, 2019b). Farmers accounts across the eight study sites are consistent with this challenge.

Market volatility, while a perennial constraint for farmers in Central America and Mexico especially regarding staple and commercial crops like basic grains (C. M. Bacon et al., 2014), coffee (Bacon et al., 2008; R. Rice, 2003) and cacao (Blare et al., 2021), challenged farmers in unprecedented ways. Regarding market closures, numerous accounts of “never imagining this would happen” or that markets could “be this bad to us” were recorded in
this study. The temporary inability for farmers to find regional or national consumers for bulk sales of unprocessed agricultural products and for value-added products was novel in 2020-2021. At the same time, price shocks for basic food products could make food unaffordable. Market closures, restrictions, and their slow and labored reopening were such totalizing constraints that few farmers could overcome them alone. Additionally, markets necessitate infrastructure, such as roads and access to transportation, which were both primary concerns during the pandemic. While road development and its relationship to market access and resource use is complex in Central America (see Schmitt & Kramer, 2009 on Nicaragua) it is clear that the dearth of developed roads connecting rural smallholders in remote villages to urban centers in Guatemala makes getting to market difficult. Where passable roads exist, the complete closure of public transportation between March 22 and July 27, and the partial and site-specific closures after July 27, could make getting to municipal markets “so costly that it wasn’t worth the trip.”

3.4.2. Sharing agroecological knowledge through social networks

Agroecological practices at the plot and community levels, such as diversification, a focus on native and medicinal crops, localized markets, and low reliance on external inputs were beneficial to producers in this study during economic shock. They are facilitated by and made more effective by the social networks provided by agroecology organizations.

High levels of diversification on individual agroecological plots and in an immediate community increases food security (Zimmerer & de Haan, 2020). Data from across study sites suggests that during the pandemic knowledge of diverse subsistence crops
(vegetables, fruit trees, *milpa*) was integral to producers’ ability to feed themselves and to offer diverse products at home markets, virtual markets, and for barter. Data suggests that the social ties among neighboring producer members of organizations, and specific sub-groups such as women’s cooperatives facilitated these exchanges. Moreover, diversified production made local exchange more viable, cost effective and safe because people avoided costly and risky travel to access varied food products during the pandemic. Prior cultivation and knowledge of native medicinals, specifically, gave producers the opportunity to provide culturally relevant products to their communities via sale or barter, and to benefit from that exchange when demand was high. Furthermore, diversification allows for autonomy from the market through anti-specialization, and direct sales of diverse products is an integral part of sustaining diversification (Van der Ploeg, 2012).

A re-localization of markets necessitates more direct relationships between producers and consumers (Gliessman, 2016). Albeit temporary, local pop-up markets in rural communities, home markets, and even the virtual version of the Mercadito Campesino bi-weekly market embodied re-localization to the benefit of both producers and consumers. These pandemic-era market configurations require strong social relations and collective actions among producers, which agroecology organizations are positioned to offer in the pursuit of food sovereignty and solidarity economies.

While this study did not focus on characteristics of agricultural inputs, diminished use or lack of external inputs on agroecological plots seems to not only provide ecological and productive benefits to smallholders (Altieri, 1999; S. Gliessman et al., 1981), but economic benefits during shocks. Existing studies describe the economic benefits of
eliminating external inputs for Achí producers associated with Qachuu Aloom (Einbinder et al., 2019) and for members of Red Kuchub’al in San Marcos (Calderón et al., 2018). This pattern persists during the pandemic’s shock, at these sites as well as throughout the other six field sites, even though eliminating inputs can increase labor demands. Producers who do not rely on external inputs not only spend less money on production, but were less constrained by market closures, making them more able to respond to changing local demand (producing more or new crops) during the pandemic. These accounts are consistent with the argument that agroecological practices help farmers face socioeconomic shocks (Altieri, 2003).

Agroecological practices on the farm and community level can be applied in the pursuit of food sovereignty, barring important land and resource constraints discussed above, which necessitate additional political approaches (De Molina, 2013; Holt-Giménez et al., 2021; Peter M. Rosset & Martínez-Torres, 2012) to defend land and resource rights. This study highlights the potential for producers who are vulnerable to shocks to move towards more food-sovereign systems, given how agroecological practices and existing social networks have benefitted them during the pandemic. Food sovereignty must include strengthening relational and local forms of exchange, and must go beyond producing for one’s self and family on the individual plot level.

3.4.3. Collective action towards solidarity economies

Throughout Latin America, Indigenous-led development initiatives forefront values of cooperation and solidarity in building equitable economies that transition away from
capitalist modes of exchange and development (Consejo Indígena de Centro América, 2008; Santiago, 2010). Rural farmer organizations have long been identified as critical for adaptation to market volatility (Eakin et al., 2006) and for providing access to information that helps farmers cope with shocks (Tucker et al., 2010). The ways in which agroecology organizations succeeded and fell short of facilitating market access during economic shock reveals multiple movements at various stages that have the potential to promote social justice, improve livelihoods and build solidarity through solidarity economies. Collective actions and the social networks associated with agroecology appear to play a role in helping farmers respond to economic shock and in some cases, access markets. The promising examples of organizations that leveraged existing social networks to mobilize collective actions and share agroecological knowledge provide pathways for other agroecology groups with similar missions.

In food systems across Latin America, solidarity networks associated with agroecology movements played key roles in food aid and assistance with vulnerable populations during the pandemic (Tittonell et al., 2021), and informal food chains have been identified as crucial to maintaining “the resilience-enhancing biodiversity of food and agriculture known as agrobiodiversity” (Zimmerer & de Haan, 2020, p. 891). These efforts are foregrounded by existing Indigenous frameworks, such as buen vivir, that promote social and agronomic practices akin to agroecology (Consejo Indígena de Centro América, 2008; Einbinder & Morales, 2020; Figueroa-Helland et al., 2018; Giovannini, 2015; Gudynas, 2011; Peredo, 2019), whether they bear the name or not.
This Guatemalan case suggests that agroecology organizations foster social networks, often rooted in traditional indigenous social relations, that not only improve livelihoods through agroecological principles and practices, but that also provide visions of collectively developing livelihood practices that increase independence from the global capitalist system and are based in solidarity and right relationships with people and the environment. Even though they face constraints, actions such as ACPC’s expansion of agroecological programming to a vulnerable neighboring community, Qachuu Aloom’s facilitation of medicinal plant cultivation and distribution of technical support, Mercadito Campesino’s school lunch program and virtual market, and GPPLU’s food storage and distribution of food aid are salient examples of organizational responses based in grassroots social networks that embrace the horizon of food sovereignty. These efforts are of course rooted in previous initiatives and struggles. Red Kuchub’al’s pandemic-era diagnostic of viable production for barter and exchange across regions, for example, was developed in the spirit of existing community programming in Sibinal, San Marcos that holds an annual bartering fair for the exchange of goods with producers in lower altitudes, and in practices of non-monetary exchange of agricultural labor known as cambia mano (translated as “hands exchange”) (Calderón et al., 2018).

Ample literature identifies grassroots organizations and approaches to collective action as beneficial to, and possibly transformative for, smallholder livelihoods (Lustig & Tommasi, 2020; Warner et al., 2020), especially in conflict-affected Guatemala (Hellin et al., 2018), while institutional support and public policies are another key side of the equation (Markelova et al., 2009; Mier y Terán Giménez Cacho et al., 2018). With strong producer
organizing and institutional support in place, the concept of solidarity economy may be more possible in practice.

Solidarity economy is “not so much a model of economic organization as it is a process of economic organizing; it is not a vision, but an active process of collective visioning” (Miller, 2010, p. 28, emphasis in the original). It is clear that Guatemalan agroecology is also “in process”, and collective visioning is a part of the struggle for legitimacy, financial support, and economic viability. By implementing collective actions, agroecology organizations build communities based in economic solidarity. As seen in other parts of Guatemala, Indigenous communities have high levels of knowledge regarding solidarity economy values which they put into practice despite low levels of formal education (Henkle, 2011). A salient example in neighboring Southern Mexico are the efforts of Zapatista communities in Chiapas, where exchange of both material goods and knowledge are integral to economic solidarity, exemplified through autonomous agricultural cooperatives that require collective action and broad participation (Santiago, 2010). Bartering practices, specifically, saw a pre-pandemic resurgence in Colombian Indigenous communities, and are considered part of collective social memory (Jairo, 2008). Mercadito Campesino’s women and youth-led virtual market embodies the search for alternatives in solidarity economies, “offering a concrete alternative at a time of capitalist crisis” (Laville, 2010). The explicit inclusion of youth in collective action makes possible intergenerational solutions to myriad interwoven problems, providing concrete alternatives that more people can participate in, if not hope for a younger generation who may be disenchanted by agricultural career paths. By developing locally-specific products that
people need and coordinating local sales, women’s cooperatives in ACPC and Red Kuchub’al foster relationships of mutual support. As such, these organizations leverage social networks and the resources available to them to put a “process of economic organizing” in motion.

Farmer organizations operated under tremendous constraints during the pandemic, not only related to restrictions on markets and mobility, but existing land and resource constraints, uneven or lacking institutional support and infrastructure, unfavorable markets, and social marginalization. It remains “badly evident... that transformative shifts of which agroecology is capable will not spring from crisis spontaneously” (Montenegro de Wit, 2021, p.112), making collective action evermore salient in smallholder struggles for land, life, and basic dignities.

4. Chapter 4

4.1. Recommendations

All recommendations exist within a greater need for institutional changes such as land reform, community control of resources, and investment in rural communities (education, public health). These recommendations are subject to editing based on organizational reflection and further input, which continue beyond the timeline of this thesis. While the economic shock associated with the pandemic was severe, similar challenges exist for smallholders in relation to market access during recurring instances of market failure and
disruption (price fluctuations, disruptions, volatility). These recommendations apply as well during less severe and/or recurring market shocks.

**Recommendations at the plot/farm scale:** As seen in Chapter 2, the more prior engagement a producer had and the higher they scored on the agroecological practices index (API), the more likely they were to have expanded or maintained production and maintained sufficient consumption levels during the pandemic’s economic shock. Farmers report using agroecological practices that have been proven to increase yields, contribute to food security, and provide some levels of independence from the market (Altieri, 1999; Altieri et al., 2015; Gliessman et al., 1981; Holt-Giménez et al., 2012; Van der Ploeg, 2012).

During the pandemic, plot-level practices that increased this engagement include:

- adopting nutrient cycling techniques such as composting and making bioferments
- low reliance on external inputs (whether organic or inorganic)
- seed saving
- diversifying production (especially of subsistence products) both on the plot scale and between farmer plots in the same community

Nutrient cycling techniques that were used by some producers and proved helpful include composting and preparing bioferments (such as bokashi) with locally available plants and manure to be used as foliar sprays. While these practices increase labor time, they preserve soil health affordably and practically. Saving seed, composting, and decreasing or eliminating external inputs make farmers less dependent on store-bought products for planting, fertilizing and pest management.
Diversifying production, especially of subsistence products, is recommended for maintaining sufficient subsistence during market closures. Farmers who were highly diversified (more than 10 crops at species scale) were more likely to provide a mixture of farm products, and therefore nutrients, to their families during market closures. They were also more likely to have products that were marketable to local consumers (neighbors and neighboring communities) or available for bartering, than their peers who had fewer crops to offer. A higher diversity of crops grown among farmers in the same or neighboring communities helped facilitate local barter and trade. It is recommended that farmer organizations facilitate the diversification of crops across the community as well as on individual plots, focusing on various microclimates, so that farmers can work together to provide a diversity of subsistence products within their immediate communities.

**Recommendations at the organization/community scale:** To increase individual farmers’ and communities’ ability to respond with agility to future economic shock, farmer organizations must be strengthened with the goal of developing local social networks that can be leveraged to respond to recurring and unprecedented challenges. The implementation of several types of programs is recommended:

- supporting women’s cooperatives or subgroups
- supporting youth programming and/or opportunities for participation
- providing training and infrastructure to farmers who are developing new products
- incentivizing farmers to focus part or a majority of their production on subsistence products
- facilitating the movement in and out of formal market exchange by strengthening local and regional bartering networks
• strengthening local and regional seed exchange
• increasing online sale capacity
• financial support for and trainings on farm infrastructure (irrigation, storage, transportation)

Organizations with women’s cooperatives or subgroups had more capacity to support diversified production and processing of diverse products, as well as ability to respond to emerging local demand during the pandemic. Inclusion of youth in community solutions is important for providing young people with activities and personal development, as well as for organizational growth. Farmers need training and infrastructure to develop new products, such as beekeeping materials and training, grain milling equipment and training, access to traditional medicinal plant knowledge and plant material, dehydrators and other equipment for preserving produce, and more. The inclusion of training and infrastructure for subsistence products (products that will meet a family’s basic needs) is recommended.

Local bartering, often regarded as a traditional or ancestral practice, relies on social networks and mutual aid practices. Strengthening local social networks, in which producers know each other, build trust and are familiar with each others’ practices, is recommended to help facilitate the movement in and out of formal market exchange. Having this agility will allow farmers to barter or access localized producers and consumers during future possible market closures and volatilities.

Heirloom and native seed saving is connected to preserving and valuing traditional Indigenous culture and agricultural practices, which is recommended where this desire exists among communities. These practices, especially when done on a community level,
make producers less dependent on store bought food and other products. They also preserve the aforementioned social relations and direct linkages to other producers and to local consumers that farmers can utilize to both buy and sell products when markets close.

Increasing online sale capacity is recommended to prepare for possible future restrictions on markets and mobility. While individual efforts to sell farm products online may benefit individual farmers, organizational programming for online sales is recommended. This requires training and organizing at the group level and can be as simple as connecting all producers virtually through a Facebook or Whatsapp group to be used in the case of market and mobility restrictions. This necessitates that each producer, or at least each household, have access to a device and the internet (which may be a barriers in many communities). If capacity is higher, organizations can create an alternative online platform and/or begin facilitating partial online sales while the Covid-19 pandemic continues, in order to build producers’ familiarity with and access to the process.

4.2. Limitations

The limitations of this study related to my positionality and to accountability and reciprocity as a remote researcher are can be found in section 1.5. Conducting remote fieldwork across international borders eliminated the opportunity for immersion at my Guatemalan field sites, presenting data collection limitations. Collecting data remotely inhibited my ability to survey plots, identify plants or map farm management. The method used for measuring diversification is limited in its degree of detail because I could not
personally conduct counts, do participatory surveying of crops with farmers or use visual cues to measure and record diversification. The measurement of food sufficiency is similarly limited in its detail because remote surveying did not allow for the time and capacity to gather data on food groups, food distribution within a household, and nutritional content. The ethnographic work was limited to semi-structured and open-ended interviews because I could not form in-person direct relationships with research contacts and participants.

Statistical analysis was limited by my inability to access data on distance to market and formal market access, as many farmers chose not to provide their exact location. Instead, regression analysis used urban population of nearest municipal center as a proxy for effective market demand, limiting the models’ predictive power. Finally, this study lacks a control group from before the pandemic and a non-agroecological control group from before or during the pandemic. A common method for establishing control groups is asking farmers to identify non-agroecological or non-member neighbors in their community. Asking participants or organizational contacts to do this during the pandemic was unethical and logistically challenging, and accessing control groups using another remote method was beyond the capacity of this study.

4.3. Conclusions

Guatemala’s strict nation-wide quarantine, curfews, and closures during 2020 amidst the Covid-19 pandemic and the resulting economic shock created unprecedented challenges for rural smallholder farmers who depend on both subsistence and commercial
food production to earn their livelihoods. Restrictions on mobility and municipal market closures made accessing markets, both for sale and for consumption, the crux of the economic shock. Because smallholders historically rely on market-based coping strategies during previous economic and environmental shocks, the near-complete closure of markets raised questions about how producers and their families would weather the pandemic.

Across a sample of farmer-members of organizations that support agroecology, producers maintained production and sufficient consumption levels during the pandemic more so than their ability to sell agricultural products. In this vain, qualitative and quantitative data suggests that farmers who are more highly engaged with agroecology organizations and have higher levels of agroecological practices are more resilient to economic shock at the farm level than their less-engaged peers.

Data suggests that farmer organizations, which are widely recognized as integral to providing market access, education and training, and representation for rural smallholders, may play a role in helping farmers respond to economic shock. Organizations that offer agroecological programming support social networks that increase producers’ ability and agility in responding to market shocks. Through collective action, organizations can support food access and market access. This study has highlighted the variation, across eight organizations, in organizational actions and outcomes during the pandemic, while contextualizing the myriad constraints that pose ongoing challenges. Smallholders and their grassroots organizations should not be solely responsible for solving and overcoming constraints that originate in globalized industry and elite institutions (Holt-Giménez et al., 2021), which agroecology can do when resilience frameworks are used in reformist
development projects (Copeland, 2019b). Still, the examples provided here of agroecology organizations working towards food sovereignty and solidarity economies provide a roadmap for how grassroots organizing and community agency can improve livelihoods during economic shock, while working towards much-needed institutional reforms on the horizon.

### 4.4 Spanish-Language Summary

*Resumen de investigación*

**Agroecología Guatemalteca en tiempos de pandemia: Solidaridad económica y la resiliencia de pequeños productores ante el choque económico**

2020-2021

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Durante la pandemia de Covid-19 (aquí en adelante denominada “la pandemia”), la cuarentena nacional, los toques de queda, los cierres de mercados y las restricciones a la movilidad impuestas por el gobierno guatemalteco afectaron directamente a las familias campesinas que dependen tanto de la subsistencia como de la producción comercial de alimentos. Los cierres físicos de los mercados municipales crearon un impacto económico para los productores guatemaltecos, quienes enfrentan otros múltiples desafíos estructurales de tipo social, climático y político. Una preocupación para los pequeños
agricultores durante la pandemia fue la dificultad de comprar y vender productos agrícolas en los mercados locales y regionales, la pérdida de empleo fuera de sus fincas, la falta de acceso a insumos agrícolas y otros factores relacionados (Food and Agriculture Organization, 2020).

Así mismo, diversas organizaciones de agricultores llevan promoviendo la agroecología - la ciencia, el movimiento social y la práctica de la agricultura sostenible y el manejo ecológico de recursos (Altieri, 1989; Gliessman et al., 1998; Wezel et al., 2009) - en Guatemala durante décadas con el fin de fortalecer medios de vida rurales, lograr la soberanía alimentaria comunitaria, defender los derechos Indígenas a la tierra y a la vida, y desarrollar adaptaciones al cambio climático (Calderón et al., 2018; Copeland, 2019; Einbinder et al., 2019; Einbinder & Morales, 2020). En este estudio, realizado de diciembre de 2020 a abril de 2021, trabajamos con ocho organizaciones agrícolas que participan en dichos movimientos agroecológicos para explorar las formas en que la agroecología afectó la resiliencia de las familias campesinas durante el choque económico causado por la pandemia de marzo de 2020 hasta diciembre de 2020, e identificar las limitaciones y oportunidades para la agroecología en Guatemala con respecto al acceso a los mercados.

La resiliencia se define como la capacidad de un sistema socio-ecológico de cambiar y adaptarse y al mismo tiempo permanecer funcionando dentro de las características del sistema (Folke et al., 2010). Con esto en mente, este estudio se enfoca en la resiliencia de los medios de vida de los productores agrícolas a los impactos económicos. La resiliencia se utiliza como marco analítico, teniendo en cuenta que las acciones más allá de los marcos de resiliencia podrían generar una solidaridad entre los agricultores que va más allá de las características del sistema actual.

**Preguntas de investigación:**

1. ¿Cómo fueron afectados los pequeños productores afiliados a organizaciones agroecológicas con respecto a la producción, el consumo y la comercialización de productos agrícolas durante la pandemia?
2. ¿Qué impactos tiene la agroecología en la resiliencia de los pequeños productores ante los choques económicos asociados con cambios en el acceso a los mercados formales?

3. Considerando los efectos diferenciados del cierre de mercados municipales en la comercialización de productos agrícolas de pequeños productores, ¿cómo influyeron las organizaciones agrícolas en las respuestas de los productores al impacto económico?

4. ¿Qué posibilidades abre la promoción de la agroecología para la revalorización de mecanismos tradicionales de solidaridad, a corto y largo plazo, entre productores?

Sitios de estudio y metodología

Figura 1: Mapa de los sitios de estudio, por Anika Rice

Este estudio incorpora productores de ocho organizaciones agrícolas y comunitarias, las cuales promueven la agroecología (prácticas agrícolas y sociales) de maneras diferentes. Las organizaciones se localizan en seis departamentos (Huehuetenango, San Marcos, Baja Verapaz, Chiquimula, Izabal y Petén), representando diversas geografías y contextos.
culturales. Dichas organizaciones fueron seleccionadas con base en los contactos de los investigadores y sus proyectos previos, y con base en su variación con respecto a tamaño, misión o enfoque, edad, y programación (Tabla 1).

**Tabla 11: Características de las organizaciones**

<table>
<thead>
<tr>
<th>Organización</th>
<th>Ubicación</th>
<th>Año de fundación</th>
<th># de socios</th>
<th>Identidades étnicas (pueden incluir ladinos)</th>
<th>Tamaño medio de terreno</th>
<th>Misión</th>
<th>Sitio web</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMEDIPK - Asociación de Mujeres Eulalenses para el Desarrollo Integral Pixan Konob'</td>
<td>Santa Eulalia, Huehuetenango</td>
<td>1998</td>
<td>680</td>
<td>Q’anjob’al</td>
<td>0.09-0.13 hectáreas</td>
<td>Promover los derechos de las mujeres Indígenas Eulalenses y la participación de la mujer en espacios públicos a través de programas de incentivos forestales, viveros agroforestales, y emprendimientos de textiles y bancos comunales.</td>
<td><a href="https://asociacionutzche.org/asociacion-de-mujeres-">https://asociacionutzche.org/asociacion-de-mujeres-</a> eulalenses-para-el-desarrollo-integral-pixan-konob-amedipk/</td>
</tr>
<tr>
<td>Red Kuchub’al</td>
<td>Sibinal y Tacaná, San Marcos</td>
<td>2005</td>
<td>353</td>
<td>Mam</td>
<td>0.22 hectáreas</td>
<td>Impulsar la economía solidaria en Guatemala, para la búsqueda del buen vivir, a través de ser una red sólida que integra organizaciones de productores y consumidores a través de cadenas productivas agroecológicas de economía solidaria.</td>
<td><a href="https://www.kuchubal.org/">https://www.kuchubal.org/</a></td>
</tr>
<tr>
<td>MCEV– Mujeres Caminando por una Esperanza de Vida</td>
<td>Tejutla, San Marcos</td>
<td>2019</td>
<td>12</td>
<td>Mam, Sicapacan, mestizo</td>
<td>0.13-0.18 hectáreas</td>
<td>Apoyar a mujeres víctimas de violencia y abuso a través de trabajo social y la promoción de producción agrícola para la independencia económica.</td>
<td>---</td>
</tr>
<tr>
<td>ACPC – Asociación de Comités de Productores Comunitarios</td>
<td>Rabinal, Baja Verapaz</td>
<td>2003</td>
<td>300-450</td>
<td>Achi</td>
<td>0.13-0.35 hectáreas</td>
<td>Revalorizar prácticas ancestrales y nuevas alternativas agroecológicas para la adaptación al cambio climático y la agricultura familiar sostenible en la cuenca del Xesiguan.</td>
<td><a href="https://asociacionutzche.org/asociacion-de-comites-de-productores-comunitarios-acpc/">https://asociacionutzche.org/asociacion-de-comites-de-productores-comunitarios-acpc/</a></td>
</tr>
<tr>
<td>Qachuu Aloom</td>
<td>Rabinal, Baja Verapaz</td>
<td>2003</td>
<td>600</td>
<td>Achi</td>
<td>0.09 hectáreas</td>
<td>Rescatar el conocimiento ancestral de la producción y uso de las semillas nativas y criollas para el bienestar material y espiritual de las familias en las comunidades, para que puedan producir en armonía con la Madre Tierra sus propios alimentos, así como generar ingresos económicos.</td>
<td><a href="http://www.qachuualoom.org/">http://www.qachuualoom.org/</a></td>
</tr>
<tr>
<td>Mancomunidad ad Copan Ch’orti’</td>
<td>Camotán, Jocotán, Olopá y San Juan Ermita, Chiquimulá</td>
<td>2000</td>
<td>545</td>
<td>Ch’orti’</td>
<td>0.18-0.22 hectáreas</td>
<td>Implementar planes y programas para el desarrollo social del territorio Chortí, que apoyen a los actores sociales locales a utilizar los recursos de manera sostenible.</td>
<td><a href="https://www.copanchorti.org/">https://www.copanchorti.org/</a></td>
</tr>
<tr>
<td>GPLLU - Grupo de Pequeños</td>
<td>El Estor, Izabal</td>
<td>2007</td>
<td>189</td>
<td>Q’eqchi’</td>
<td>2.00 hectáreas</td>
<td>Luchar por el acceso legal a la tierra en comunidades Indígenas y promover la soberanía alimentaria.</td>
<td>---</td>
</tr>
</tbody>
</table>
La Unión
Mercadito Campesino
Las Cruces, Petén
2015
40
Kaqchikel, Q’eqchi’
2.19 hectáreas
Mejorar las economías de pequeños productores, fortalecer las prácticas agroecológicas, y promover la soberanía alimentaria.

---

Red Kuchub’al consiste en 12 organizaciones en San Marcos, Quetzaltenango, Totonicapán y Retalhuleu. Esta investigación involucró productores y promotores en San Marcos.

Qachuu Aloom trabaja en las municipalidades de San Miguel Chicaj, Rabinal y Cubulco en Baja Verapaz. Esta investigación involucró productores en Rabinal.

como fue reportado por las organizaciones

reportado en cuerdas. 1 cuerda = 441 m².

reportado en manzanas. 1 manzana = 7,000 m².

Para la realización de este estudio, se recopilaron datos a través de encuestas y metodologías etnográficas, las cuales se implementaron de forma remota desde Madison, Wisconsin, entre diciembre de 2020 y abril de 2021, debido a las restricciones institucionales de viaje y la ética de realizar investigaciones en tiempos de pandemia global. Los datos se recopilaron a través de entrevistas semiestructuradas con 13 informantes clave, encuestas en línea con cada una de las ocho organizaciones, y 67 entrevistas individuales semiestructuradas con pequeños productores. El estudio se realizó principalmente usando las plataformas de Zoom y WhatsApp. La colaboración de siete asistentes de investigación facilitó la selección de productores con una variedad de niveles de participación en la organización y con una variedad de edades (jóvenes entre 18-21, adultos entre 22-65, personas de mayor edad 65+). En cada categoría de edad, se hizo el esfuerzo de seleccionar una cantidad uniforme de hombres y mujeres. Los asistentes de investigación también fueron clave para realizar el pago a cada productor por su participación y uso de datos móviles, así como la traducción de idiomas Mayas al Español cuando era necesario.

El análisis fue cualitativo y cuantitativo. Las entrevistas fueron transcritas y codificadas con base en temas emergentes. La codificación de las encuestas y entrevistas con pequeños productores facilitó el análisis estadístico sobre las relaciones entre (1) la participación previa con la organización y las prácticas agroecológicas de los productores y (2) las prácticas agroecológicas de los productores y los resultados de producción, consumo y comercialización durante la pandemia.

Resultados
La mayoría de los productores participantes en este estudio mantuvieron la producción y el consumo a niveles más altos que las ventas durante la pandemia (Tabla 2) debido a las dificultades sin precedentes para mantener conexiones en el mercado intracomunitario y regional.

**Tabla 2: Experiencias de pequeños productores durante la pandemia, marzo de 2020 hasta diciembre de 2020 (n=67 participantes)**

<table>
<thead>
<tr>
<th></th>
<th>Aumento</th>
<th>Ningún cambio</th>
<th>Disminución</th>
<th>Indeterminado a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nivel de producción</td>
<td>26.9%</td>
<td>43.2%</td>
<td>20.9%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Ingresos del hogar</td>
<td>17.9%</td>
<td>28.4%</td>
<td>53.7%</td>
<td>n/a b</td>
</tr>
<tr>
<td>Suficiente c</td>
<td>61.1%</td>
<td>29.9%</td>
<td>9.0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Ninguna venta</th>
<th>Ventas bajas</th>
<th>Algunas ventas</th>
<th>Ventas altas</th>
<th>Indeterminado</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nivel de venta de productos agrícolas</td>
<td>31.3%</td>
<td>28.4%</td>
<td>19.4%</td>
<td>19.4%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

a=incapaz de responder o sin respuesta  
b=no había participantes con respuesta indeterminada  
c=suficiencia refiere a una falta de hambre durante este periodo de tiempo, pero aún puede indicar bajo valor nutricional o inseguridad alimentaria

Los datos cualitativos y cuantitativos sugieren que, durante los cierres de mercado causados por la pandemia, los pequeños productores con mayor participación previa en una organización agrícola y más integración de prácticas agroecológicas (diversificación, manejo de suelos y agua, trabajo agroforestal, menor compra de insumos, etc) en sus parcelas pudieron continuar o expandir su producción agrícola y mantener el consumo familiar en mayor medida comparado con los productores con menor involucramiento previo en una organización agrícola y menor entrenamiento en prácticas agroecológicas. Los datos sugieren que las prácticas agroecológicas y la participación previa con las organizaciones de agroecología están correlacionadas con una mayor resiliencia al impacto económico de la pandemia a nivel de la finca, con respecto a la producción y el consumo. En general, las vulnerabilidades existentes y los desafíos sociales y económicos, —los cuales pueden requerir cambios estructurales más allá de los marcos de resiliencia (Copeland, 2019; Holt-
Giménez et al., 2021) — se exacerbaron durante la pandemia con respecto a la producción, el consumo, las ventas y los ingresos de los pequeños agricultores.

Las organizaciones que promueven la agroecología pueden apoyar a la resiliencia de los agricultores ante un impacto económico extremo debido a que fortalecen el tejido social. Las organizaciones apoyan las redes sociales que promueven las prácticas agroecológicas de los productores y aumentan su capacidad para responder a los choques del mercado. Estos esfuerzos incluyen diversas estrategias de integración de mercado, el apoyo de grupos de mujeres y jóvenes, la creación de emprendimientos diversos enfocados en productos para subsistencia, y la creación de redes comunitarias para ventas locales. Notablemente, los redes de trueque y la transición a “mercados de hogar”, en que productores recibieron a sus vecinos a intercambiar o comprar una multitud de productos diversos (hortalizas, hierbas, carne, granos básicos, huevos, frutas, plantas medicinales) fueron efectivos durante la pandemia. Estas redes, en la mayoría de los casos construidos a través de las organizaciones, permitieron a las comunidades a hacer la transición del mercado municipal formal a los mercados informales. En un caso, la organización Mercadito Campesino realizó su mercado en línea usando las plataformas de Facebook y Whatsapp. En varios casos, se notó la importancia de la ayuda mutua entre productores (ver Barona, 2013), mediada por las organizaciones, donde grupos de productores regalaron granos básicos y otros productos a los miembros de la comunidad con la más necesidad.

Conclusión y resumen de las recomendaciones:

Estas recomendaciones surgen en el contexto de una necesidad de cambios institucionales como la reforma agraria para tener acceso a tierras agrícolas productivas, el control comunitario de los recursos naturales y la inversión en las comunidades rurales (educación, salud pública). Estas recomendaciones están sujetas a cambios con base en la reflexión organizacional, que continúan más allá de la terminación de esta tesis.

A nivel de la finca/las parcelas individuales, la participación previa y niveles altos de la integración de prácticas agroecológicas hizo que los productores tuvieran mayor capacidad para mantener o expandir su producción durante la pandemia. Esto también
aumentó el acceso a productos diversos para el consumo familiar. Se enfatizan varias prácticas que contribuyen a la resiliencia de productores ante los impactos económicos:

- adopción de técnicas de ciclo de nutrientes
- baja dependencia de insumos externos (orgánicos o sintéticos)
- almacenamiento de semillas nativas y criollas
- la diversificación de la producción (especialmente de productos de subsistencia)
  i. en cada parcela individual
  ii. entre parcelas en la misma comunidad, con atención a los microclimas y a la posibilidad del comercio y trueque local durante cierres de mercado

**A nivel de la comunidad y/o la organización**, el fortalecimiento de las organizaciones agroecológicas y sus redes sociales comunitarias puede reforzar la capacidad de las comunidades de responder a choques económicos u otras crisis futuras. Se recomienda la implementación o expansión de varias iniciativas, las cuales facilitan las relaciones sociales y solidaridad entre productores:

- apoyar a las cooperativas o grupos de mujeres (ver Siliprandi & Zuluaga, 2014; Zuluaga Sánchez et al., 2018)
- apoyar la programación y/o las oportunidades de participación para jóvenes
- proporcionar capacitación continua a los agricultores
- buscar financiamientos para apoyar proyectos de mejora de la infraestructura agrícola
- incentivar la producción de cultivos de subsistencia
- fortalecer el trueque local y entre comunidades que permita a los productores alternar entre mercados formales e informales con más facilidad
- diversificar la producción local, para no depender de mercados externos para surtir la canasta básica dentro de las comunidades
• fortalecer el intercambio local y regional de semillas
• aumentar la capacidad de venta en línea

Reconocimiento

Esta investigación no hubiera sido posible sin la participación, colaboración y apertura de los colaboradores y asistentes de investigación en Guatemala (reconocidos en la página 1). También estoy muy agradecida por mis dos asesores en el departamento de Geografía, Dr. Matthew Turner y Dra. Lisa Naughton. Dra. Claudia Irene Calderón y Dr. Nathan Einbinder fueron fundamentales para el diseño, el análisis y la representación de los datos. Finalmente, deseo agradecer las diversas fuentes de apoyo financiero que hicieron posible esta investigación: UW Center for Integrated Agricultural Systems Graduate Student Summer Mini-Grant, UW 4W Engagement Grant for Emerging Scholars, UW Institute for Regional and International Studies Award for Incoming Graduate Students, Conference of Latin American Geography Field Study Award, National Science Foundation Graduate Research Fellowship, UW Latin American, Caribbean and Iberian Studies Center y el Departamento de Geografía de UW-Madison.

Bibliografía


**Appendices**

**Appendix A: Online survey instrument for organizations**

Agricultural and commercial experiences of small agricultural producers in Guatemala during the COVID-19 pandemic

Please respond to the following questions based on your experience during the COVID-19 pandemic starting in March 2020. From now on this survey will refer to “the pandemic”.
Basic Information
Date: ______________________
City/Town: _________________________________________________
State:  ______________________________________________
Community group or cooperative organization: _______________________
Number of members: _____________________
Organizational mission or vision: _______________________________________
Date founded: _________________
Your role in the organization: ______________________________
How does your organization engage with ancestral knowledge and practice?:
__________________________________________________________
Which transportation, movement and public health measures were implemented in your community during the pandemic?
___________________________________________________________________________

Agricultural Practices

1. Approximately what percentage of members of your organization own their own land?

2. What is the average size of landholdings in your organization or community as a whole?

3. In general terms, how would you describe your members’ food production practices?
   a) Traditional
   b) Agroecological, with or without new practices
   c) Conventional with fertilizers and/or pesticides
   d) A mix (describe): ______________________

4. In general, what are the practices employed by the members of your organization for food production? Please select all that apply.
   a) We save seeds / we buy seeds from the community / we trade seeds / we have a seed bank / we buy commercial seeds / we practice a mix of seed saving and seed buying (describe): _________________
   b) We buy organic fertilizers / we make our own organic fertilizers / we buy chemical fertilizers / a mix of making our own and buying fertilizers
c) We manage pests with organic inputs / we remove pests mechanically by hand / we use pesticides / we don’t have pests / we use a mixture of these alternatives
d) We produce for subsistence / We produce mainly to sell / We produce for both subsistence and sale

5. How do you access water for irrigation in your community?
a) Rain water
b) Well water
c) River water
d) Spring water
e) Water from the mountain
f) Other: ____________________________

6. Which natural disasters or climate events have affected your community in the last year?
a) Drought
b) Flooding
c) Hail
d) Strong winds
e) Storms
f) High temperatures
g) Freezes
h) Other: ____________________________

7. What are the main crops grown by your organization’s members?
a) Basic grains (corn, beans, others)
b) Fruit trees
c) Vegetables
d) Medicinal plants
e) Spices
f) Honey and other bee products
g) Mushrooms
h) Ornamental plants
i) Plants for use in ceremonies or religious events
j) Trees for firewood
k) Trees for shade
l) Chickens or other birds
m) Pigs
n) Cows
Sheep
p) Goats

Labor Migration

8. As a consequence of the pandemic, do you know if there has been migration from your community to other cities in Guatemala or to neighboring countries? If yes, where has this migration been?
   a) Yes, there has been migration from our community to ____________
   b) Yes, there has been migration from our community to other regions of Guatemala
   c) Yes, there has been migration from our community to Mexico
   d) Yes, there has been migration from our community to the US
   e) Yes, there has been migration from our community to another country: ____________
   f) There has been no migration
   g) I don't know if there has been migration

5 As a consequence of the pandemic, do you know if there has been migration from other regions or countries to your community? From where?
   a) Yes, people have come to look for work in our community from this city(s) ___________________________________________
   b) Yes, people from our community have returned because there was no work where they were
   c) There has been no migration to our community
   d) I don't know if there has been migration

6. In your organization and as a result of the pandemic, have your members had to look for more work than normal outside the plots where people usually work?
   a) Yes, members of our organization have had to go out to get more work than normal outside their plots
   b) They have always had to go looking for work outside the plot to supplement the income of the families
   c) No, this crisis has not forced our community to look for other jobs outside the plot.

7. Have you noticed any change in the amount of remittances that normally come from the United States to your community?
   a) Yes, we have learned that remittances have increased
b) Yes, we have learned that remittances have been reduced
c) We have not heard of changes in remittances

8. In general, have you noticed increases or reductions in wages received from agricultural jobs in the community?
   a) Yes, wages have gone down
   b) Yes, wages have increased
   c) I have not heard of a change in the wages received in the community

Food Production

9. What is affecting the members of your organization the most in food production? (For example: growing more food than other non-food products, lack of market to sell products, difficulty in getting tools or products) Please describe in detail the changes or challenges.

10. In general, are these changes related to the coronavirus or are they independent of the pandemic?
    a. Yes, they have to do with the pandemic
    b. Some changes have to do with the pandemic, others do not
    c. No (it is climatic, economic or other reasons), please describe:_____________

11. Planting is usually a family affair, which can take place with celebrations or ceremonies in each family. Do you know if the pandemic had any impact on traditional planting activities on your plot?
    a. Yes (we couldn't meet like before)
    b. There was no impact, the activities were normal

Marketing Agricultural Products

12. What changes at the market level have you noticed in your organization or community? In other words, what changes are there in what people can buy and sell?

13. Have you had trouble selling your produce?
    a) Yes, due to market closure
    b) Yes, due to lack of access to seeds
c) Yes, for other reasons

d) No, it has been better because now I can sell to my neighbors

14. Has it been difficult to access food?
   a) Yes, due to market closures
   b) Yes, due to lack of food in the stores (lack of supply)
   c) Yes, due to lack of water or other circumstances outside the impacts of the pandemic

15. How have the transport and mobility measures imposed by the government affected you?
   a) There is no public transport between the house and the market and we have to walk,
   b) We have to wait for a pickup or taxi
   c) We’ve stopped going place outside the house
   d) It takes a long time to get around
   e) It's dangerous (assaults, a lot of people on the pickups)
   f) F. Other effects

16. Where did you use to sell your products?
   a) Most members of our organization or community produce only for their own families (subsistence)
   b) Sales were local between neighbors
   c) Sales were local to the community market
   d) Sales were in regional market places
   e) Other options: ____________________________

17. Can you continue to sell in the places specified above?
   a) Yes
   b) No
   c) In some yes and in others, no (describe): ____________________________

18. Where did you used to buy your products?
   a) A community store
   b) The market (describe): ____________________________
   c) Other (describe): ____________________________

19. ¿Can you continue to buy goods there?
   a) Yes
   b) No
   c) In some yes and in others, no (describe): ____________________________
20. When traditional markets do not work, what new ways of selling your products have emerged since the start of the pandemic?
   a) a. By online transfers
   b) b. By shipments via Guatex
   c) c. By product baskets (describe: ____________________)
   d) d. By barter (describe: ____________________)

21. Have you noticed examples of solidarity as a result of the pandemic in which your members have been involved?
   a) Yes, describe: ________________________________
   b) No

22. Are there new or other forms of selling your products that your organization would like to utilize?
   a) Yes, describe: ________________________________
   b) No

23. Have you noticed scarcity in any food products in your community?
   a) Yes, which ones?: ________________________________
   b) No

24. For exporters only: If you export, how has the pandemic affected your organization / community's exports?

25. Which exported products have been most affected during the pandemic?

Community Impacts:

26. ¿How has each social group been affected by the pandemic?

For each group, select the number which most matches your opinion. 1 = Not at all; 2 = Very little; 3 = A little bit; 4 = Moderately; 5 = Highly.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Very little</th>
<th>A little</th>
<th>Moderately</th>
<th>Highly</th>
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<td>Women</td>
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<td>Group</td>
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<td>Men</td>
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<td>The Elderly</td>
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<td>Boys</td>
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<td>Girls</td>
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<td>People with disabilities</td>
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<td>The entire community</td>
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<tr>
<td>Another group:</td>
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</tbody>
</table>

27. Specifically, what effects has the pandemic had on the lives and work load of women producers?

**Alternatives during this pandemic**

28. ¿ Have you noticed more or heard of new initiatives that include bartering?
   a) Bartering already existed before the pandemic
   b) Now there is more frequency of bartering than before the pandemic
   c) Now there are new types of bartering between communities

29. ¿ Have you noticed more or heard of new initiatives that include saving or exchanging seeds?
   a) Yes (describe which seeds were saved or traded before and after the pandemic):
      ______________________________
   b) No
30. What benefits has agroecology brought your community in confronting this pandemic? Select all the options that apply.
   a) Strengthening the social fabric of the community
   b) Increased solidarity in the community
   c) Strengthening local markets
   d) Increase in local production
   e) Greater self-reliance
   f) Greater appreciation of traditional knowledge
   g) Others (describe): __________________________

31. What positive (good) things have you noticed since the pandemic?
   a) More people are growing their own food
   b) More recognition to those who produce the food
   c) Greater proportion of examples of solidarity
   d) Greater communication with the family
   e) Greater appreciation of nature
   f) Less pollution (less car traffic, less noise pollution, ...)
   g) Others (describe): __________________________

32. How has your organization or community responded to the pandemic? What support mechanisms have been provided?
   a) There have been educational campaigns: with promoters / with posters / on TV / on radio
   b) Teachers have individually visited their students
   c) Health promoters have visited patients in their homes
   d) People with cars have transported people or goods to make up for the lack of transport (free, charging)
   e) They have formed new community groups
   f) Extensions have been given to pay for electricity and water services
   g) The local government has supported with: ________________________
   h) Others (please describe): __________________________

33. Do you know if members of your organization or your community have received foreign aid (from Guatemala) or international (outside of Guatemala)? (Select all that apply.)
   a) Yes, there has been more foreign aid from Guatemala than normal (describe)
   b) Yes, there has been normal foreign aid from Guatemala (describe)
   c) Yes, there has been more international aid than normal (describe)
   d) Yes, there has been normal international aid (describe)
   e) We have not known if external or international aid has been received
Appendix B: Individual farmer interview protocol

‘Experiencias de pequeños productores agrícolas en tiempos de la pandemia del COVID-19’

Testimonios de la Comunidad

Instrucciones:

Seleccionar los productores:

Por favor seleccione 12 productores de su comunidad (miembros de la organización) para grabar por Whatsapp. Por favor no incluya a más de una persona de cada hogar familiar.

Selezione:
- 3 mujeres adultas productoras/socias
- 3 hombres adultos productores/socios
- 3 ancianos/as con más de 60 años, mínimo una mujer y un hombre
- 3 jóvenes, de 18-21 años, mínimo una mujer y un hombre

Pasos para hacer la grabación:

1. Prepare el teléfono para grabar una respuesta por Whatsapp.
2. Describa el proyecto en sus propias palabras a la persona. Su nombre será confidencial. La participación durará 15 minutos en total. El participante recibirá Q50 para su participación.
3. Pregúntele si quieren participar voluntariamente.
4. Empiece la grabación.
5. Al principio de la grabación, por favor diga su nombre (la persona haciendo las preguntas) y el nombre de su organización.

Preguntas para los productores:

6. ¿Cuál es su nombre? (Si no quiere incluir su nombre, respetamos su privacidad.)
7. ¿Qué edad tiene?
8. ¿En qué aldea y departamento reside?
9. ¿Usted está casada/o?
10. ¿Usted tiene hijos/as?
11. ¿Qué es el tamaño de su terreno?  
12. ¿Cuáles cultivos produce usted? ¿Cuáles son criollos o tradicionales?  
13. ¿Usted maneja prácticas agroecológicas o convencionales? ¿Cuáles? ¿Usa fertilizantes, insecticidas o pesticidas sintéticas?  
14. ¿Qué impacto ha tenido la pandemia en su producción de alimentos durante 2020?  
   a. ¿Cómo cambió la siembra durante la pandemia?  
   b. ¿Cómo fue la cosecha durante la pandemia? ¿Fue mejor o peor que antes?  
   c. ¿Cambiaron las ceremonias tradicionales con respecto a la agricultura durante la pandemia?  
   d. ¿Cómo cambió la venta de los alimentos durante la pandemia?  
   e. ¿Cómo fue la alimentación durante la pandemia? ¿Cuánto comió su familia de su cosecha durante la pandemia, aproximadamente poco, la mitad, o mucho?  
   f. ¿Cuáles productos pudo usted comercializar durante la pandemia?  
   g. ¿Ha participado en alternativas como agroecología durante la pandemia?  
   h. ¿Ha hecho trueques o intercambio de productos durante la pandemia? Por favor explica.  
15. ¿Qué impacto ha tenido la pandemia para usted cómo mujer y madre/hombre y padre/anciano/joven?  
16. Si la persona menciona un tema de nuestra encuesta por favor pregunta: ¿Usted puede decir más sobre XXX?  
17. **Importante:** ¿Usted está dispuesto a compartir su número de teléfono con la investigadora para que ella lo/la pueda contactar para una conversación adicional si fuera necesario aclarar algo?  

Por favor mande cada grabación a Anika Rice por Whatsapp o correo electrónico.  

**Appendix C: Organizational contexts**  

This appendix provides more detailed descriptions of the context of each organization, their programs, and pandemic responses (beyond what was appropriate in the body of the study).  

**Red Kuchub’al**  

Red Kuchub’al is a regional network of producers in western Guatemala that promotes agroecological practices on the plot level and solidarity economies on the community level (see Calderón et al., 2018). *Kuchub’al* is a Maya Quiché word meaning
“solidarity and community work”.\(^\text{17}\) By promoting integrated agroecological plots (parceles integradas agroecológicas) and facilitating processing, brand development, and economic exchange, Red Kuchub’al explicitly links economic networks to agroecological practices. Their model of economic solidarity has “one central node,” according to the organization’s director, “which is the agroecological value chain: production, transformation [processing], and commercialization of diverse products.” Its organizational philosophy regarding agroecology sees its network as a socio-political movement which provides a platform for community-based organizations to expand their economic solidarity models from a community level to a municipal, departmental and national level.

**AMEDIPK**

Established in 1998, AMEDIPK organizers are social workers, farmers and activists. The group focuses on agroecological practices such as composting, native seed saving, and ancestral agriculture. While they participate in farmer-to-farmer exchanges, they are not affiliated with a national or regional agroecology or food sovereignty organization. During the pandemic, AMEDIPK’s focus was on plot level practices and food security, namely via expanding subsistence gardens in their community. “AMEDIPK had a specific pandemic strategy. We supported families in building 110 new subsistence vegetable gardens, which is a lot higher than the 25 or 30 in previous years,” says an AMEDIPK employee and organizer. “We reallocated funds from other projects, from the forest fire fund and our conservation fund... to respond according to the economic crisis at our hands.” At an

\(^{17}\) [https://www.kuchubal.org/](https://www.kuchubal.org/)
organizational level, AMEDIPK also prepared traditional medicinal plant recipes for strengthening the immune system and shared the products and recipes within their network. The organization wants to work on strengthening their brand in order to sell to more consumers.

Mercadito Campesino

Mercadito Campesino was founded in 2015 as a women-led bi-weekly market in central Las Cruces that aims to create income opportunities for producers, promote agroecological practices, and promote food sovereignty. The physical marketplace was shut down during the pandemic, but the market continued virtually. As a member of REDSAG (Red Nacional por la Defensa de la Soberanía Alimentaria), a nation-wide network for seed exchange and food sovereignty, they receive and host hands-on agroecological trainings at a local field school. Mercadito Campesino’s larger average landholdings make it one of the outliers in this study, although landholdings across the study are considered small. Producer members farm on 2.19 hectares on average (as reported by the organization, Table 1) of staple crops for local markets (school lunch program; bi-weekly market in Las Cruces) and regional markets, namely bananas, cassava, beans and maize.

The group faces several constraints in terms of implementing agroecological practices at scale, namely due to local extractive industries and the political organizing efforts required to resist them. While landholdings in this area are larger than the other study sites, 80% of farmers in the group rent their land, and organizers report farmers’
tenure (both renters and owners) being threatened by the expansion of large-scale industrial farms growing papaya (*Carica papaya*), teak (*Tectona grandis*) and beechwood (*Gmelina arborea*). Organizers are concerned about pesticide drift from papaya farms onto their producers’ crops. Additionally, a looming threat of petroleum extraction in Las Cruces is expected to displace producers in the municipality’s most desirable farmland with the Ministry of Energy and Mining already having granted licenses to oil companies.

**MCEV**

*Mujeres Caminando por la Esperanza de Vida* (MCEV) is a newly formed women’s group (established 2019), organizing both female and male producers as well as supporting women of domestic violence. MCEV is in the initial phases of group formation, and is receiving social and agroecological training through a larger organization, Movimiento de Trabajadores Campesinos (MTC). MCEV women organizers’ interests in community development, improving employment and education opportunities, and ultimately improving women’s living conditions is driving them to seek out and share trainings in agroecology. MCEV faced myriad constraints during the pandemic due to their germinal stage. Organizers were enthusiastic about participating in this study as a way to perform outreach in their community and gain access to diagnostic information about the effects of the pandemic. To date, the young organization does not have mechanisms to deliver food aid, organize pop-up markets, generate the capacity for online sales or create other forms of income generation.
ACPC

Asociación de Comités de Productores Comunitarios (ACPC), although founded in 2003, has antecedents in the 1970s within the Progressive Catholic Action Movement. It is a grassroots organization working with various small communities in the Xesiguan River watershed on steep hillsides above Rabinal. Volunteer community members serve as agroecological *promotores*, training locals in traditional ancestral Maya Achí agriculture as well as introduced agroecological practices. Agroforestry, drought mitigation, soil conservation and producing for subsistence are the primary foci, along with the development of new markets that do not create dependency on outside actors (see Einbinder & Morales, 2020). During the pandemic, production continued with little disruption due to the isolation of these communities from the city of Rabinal. Decreases in consumption had to do with some members’ plummeting income in the context of reliance on purchased food, rather than difficulties accessing their plots, accessing labor, or accessing inputs (few producers use external inputs). Although connected with donors and development organizations, the constraints of the market remained a challenge during the pandemic and household incomes suffered. ACPC did, however, expand programming during the pandemic to include a neighboring community of 20 men and women farming on marginal land. Leaders of the organization knew about this community’s existing needs and its vulnerability to food insecurity, but the pandemic was the catalyst for starting the new project. As of May 2020, the new group has received demonstrations and training from
ACPC in planting diversified drought-resistant crops. Community-level bartering and a women’s cooperative were also instrumental to exchanging goods at a community level.

**Qachuu Aloom**

Qachuu Aloom, meaning “mother earth” in Maya-Achi, works to recover traditional farming practices and heirloom crops in three communities in Baja Verapaz. Self-described as a “predominantly ‘feminine’ organization,” Qachuu Aloom centers economic opportunities for local women while recognizing the dignity of women conserving seeds and seed knowledge over generations, many of whom were killed in local massacres during Guatemala’s internal armed conflict. Central to their work is the seed commercialization program, which buys excess seeds back from member producers and sells them locally and regionally. Agroecological training promotes the establishment of permanent gardens for food sovereignty, and also works to involve youth in creative ways (see Einbinder & Morales, 2020).

During the pandemic, seed buying and selling was halted and then completely put on hold, when mobility restrictions prevented the organization from reaching its members across four municipalities, and market restrictions prevented seed sales in local stores. Qachuu Aloom was, however, able to buy fresh produce from its producer members in proximity to Rabinal, where the organization is based. On a small scale, producers sold subsistence products like squash, beans and fruit to Qachuu Aloom, which redistributed the produce to families in need along with direct food aid (e.g. grains and cooking oil). They also

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gave out an increased number of seed packets to local families, both members and non-members. Qachuu Aloom focused on facilitating home gardens for family consumption during the pandemic, and included a focus on medicinal plant production. “Our members increased their medicinal herb production, and diversified to more species,” says a former staff member of Qachuu Aloom. “We focused on medicinal plant production and preparation as prevention, so that community members would not risk going to the local health center and contract or spread the virus.”

**GPPLU**

Grupo de Pequeños Productores La Unión (GPPLU) formed in El Estor, Izabal in 2004 with a focus on Indigenous rights to land and life. The group began with a native tree planting initiative in an effort to restore dry, rocky and infertile soils that were reportedly deforested by decades of mining operations that began in the 1940s. While all of the GPPLU members own their own land, much of it is infertile or of “lower quality for farming.” Although they remain staunchly independent of other groups, GPPLU has received trainings and organizational support from community development and environmental non-profits such as ASECSA (Asociación de Servicios Comunitarios de Salud)\(^\text{19}\) and Madre Selva.\(^\text{20}\)

GPPLU’s actions during the pandemic were limited to food security concerns and plot-level agroecology support. On seven occasions between October 2020 and March 2021, GPPLU received food aid from partner organizations and distributed products to families in need.

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\(^{19}\) For more information, see [https://asecsaguatemala.org/2018/](https://asecsaguatemala.org/2018/)

\(^{20}\) For more information, see [http://madreselva.org.gt/](http://madreselva.org.gt/)
They also stored extra basic grains at the beginning of the pandemic in order to redistribute in November when harvests were wiped out by storms. The organization did not focus on marketing support for members, whether formal or informal, as a matter of philosophy. “In the communities there are self-appointed people who take goods to market,” says a GPPLU organizer and Indigenous rights activist. “So it’s not the organization’s work to do. We respect the individual decisions of families about where and whether they will travel to a market, as well as those of local leaders, especially during the pandemic.”

Existing climactic, land, and resource constraints have been amplified during the pandemic in the El Estor area. The decrease in production levels during the pandemic for these producers is in part due to Hurricane Eta and Iota’s devastating flooding and destruction of farmland in October - November 2020. Many of the producers in their networks were displaced from their homes and had little or no government support in relocating during pandemic closures. Many had total harvest losses as well, emblematic of the multi-layered vulnerability to environmental, social and economic shocks. GPPLU organizers, especially women, are tasked with demanding political organizing and legal work associated with mining operations that are displacing local people and diverting water (see Deonandan et al., 2017).

**Mancomunidad Copan Ch’ortí’**

Mancomunidad Copan Ch’ortí’ is a non-governmental coalition of Indigenous leaders from four municipalities in the Ch’ortí’ territory, which carries out rural development and climate change adaptation programs. Working in four-year cycles, the group’s projects that
address rural poverty, educational programming, and agricultural extension ended in late 2019. The new cycle of 2020-2024 projects were being planned and codified in early 2020 after the election of new Mancomunidad Copan Ch’orti’ leaders in mid-January 2020. The pandemic’s arrival during this period of programmatic pause left many of the communities served by Mancomunidad Copan Ch’orti’ without active programming or communication with leaders, extensionists and staff. Organizational staff contends that their producer members scored highly in terms of agroecological engagement as a result of individual practice more so than organizational efforts. While there is no agroecology-specific programming in the group’s agricultural extension, several visionary promotores (farmer-promoters) collaborate with staff members to receive and share agroecological knowledge amongst themselves. Soil infertility, lack of water, and the prevalence of chemical fertilizers offered by the state and local governments are significant barriers to agroecological education, according to a staff member.

During the pandemic, Mancomunidad Copan Ch’orti’ producers were able to plant and harvest their corn crops in the season’s first agricultural cycle (May-July), but had severe setbacks with the second harvest (August-November). Beans and maize that were planted in August and September 2020 were flooded and largely washed out by the October and November hurricanes Eta and Iota, leaving many families with low grain stores and critical food security situations. Because the hurricanes washed out two central bridges in Camotán and Jocotán, 50% of the Mancomunidad Copan Ch’orti’ communities lost access to main roads, to the urban centers, and communication with the organization – an added logistical challenge after eight months of pandemic restrictions. The 2020 gap in
programming, coupled with the effects of the two storms hindered Mancomunidad Copan Ch’orti’s ability to enact coordinated programming to help farmers produce or market their products. Some producers maintained market access during the pandemic, namely farmers in the Olopa municipality who did not lose access to roads and were able to continue selling products like bananas and coffee at medium or low levels as trade opened up in the latter half of 2020.

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