ASSESSING RESILIENCE IN COFFEE DEPENDENT COMMUNITIES OF HONDURAS, NICARAGUA AND HAITI







Agroecology and Rural Livelihoods Group (ARLG)

1. INTRODUCTION

he current scope and severity of challenges facing smallholder farmers and farmworkers in coffeedependent communities calls for a new perspective on how best to nurture meaningful change within these populations. Predictions for areas that will remain suitable for Arabica coffee production point at reduced future capacity for production in certain regions. According to scenarios for Central America, some communities that were the focus of this study will either need to abandon coffee cultivation altogether, or significantly alter production practices. These assertions have serious implications; especially so for farmers who have cultivated coffee for generations, with both land and identity tied up in its production. Previous attention toward sustainability is now expanding to a focus on resilience, where a holistic approach encourages simultaneous attention toward land, people and markets, as well as the conditions and events that serve to either strengthen or weaken them. Increasing the resilience of coffee dependent communities is not only critical to the livelihoods smallholder producers of and farmworkers, but also to the national economies of coffee-growing countries and broader regional and national environmental conservation.

The aim of this study was to better understand vulnerabilities in coffee dependent communities in Central America and the Caribbean, and to contribute to strengthening resilience interventions and metrics in these contexts. We placed a special emphasis on household and community resilience to climate change, food insecurity, and coffee price/market volatility. Target populations were smallholder coffee farmers and laborers on large estates, who were participating in projects funded and supported by Lutheran World Relief (LWR) in Honduras, Nicaragua and Haiti (Figure 1).

Guiding questions for this research were:

1) What available resources do they draw on (i.e., what are the strengths and vulnerabilities of these smallholder farmer households)?

- 2) What challenges are these households and communities facing (i.e., what are the main categories of shocks and stresses identified)?
- 3) How are households responding to shocks and stresses (i.e., what are their coping strategies)? and

4) How are LWR interventions/projects shifting local resilience capacities?

The purpose of this research brief is to share the results of a study on resilience dynamics in coffeedependent communities of Central America and the Caribbean. (The full research report can be accessed from https://lwr.org/what-we-do/resilience). This brief is directed toward practitioners, researchers, policy makers and coffee industry actors that work with smallholder coffee farmers.

KEY FINDINGS

- Diverse shade management continues to stand out as a critical practice for more resilient coffee agroecosystems.
- ▶ Farmer organizations are key for smallholders to attain or strengthen social networks that provide critical support, ranging from access to better markets to adaptive on-farm management strategies.
- Drought, coffee leaf rust, food insecurity and coffee marketing were perceived as some of the most serious challenges to strengthening household resilience in coffee-dependent communities.
- Resilience work requires engagement both directly with households and at a higher systems level, which could translate into engaging cooperatives, industry associations, academic institutions, governments, or some combination of all of these players.
- The specialty coffee industry will be stronger and more resilient when all parties along the supply chain value their co-dependence and make decisions and investments that maximize benefits to each party.





Figure 1. Location of study sites



2. CONTEXT AND FRAMING

S mallholder coffee producers represent the largest sector of an approximate total of 14 to 25 million coffee farmers globally (1). Most coffee growing areas fall within biodiversity hotspots (2), and farm management within these contexts leads to distinct livelihood outcomes, including levels of food security, poverty and natural resources conservation (3). Mesoamerican smallholder coffee farmers tend to manage their agroecosystems for subsistence production (e.g., maize), as well as for local and global markets (e.g., coffee) (3-6). The crops that support the livelihoods of smallholder coffee farmers and agricultural workers are subject to multiple shocks

and stressors related to market access, price fluctuations, supply chain constraints, pest outbreaks, climatic pressures, as well as socioeconomic and political dynamics. Recent research on the impacts of climate change in Central America's coffee sector suggests that the region's producers face challenges that affect not only the productivity and quality of their crops (e.g., coffee leaf rust or *roya*, extreme weather, changing seasonality, water availability)(7), but that can also affect the future viability of their livelihoods (e.g., projected changes in suitability for producing Arabica coffee)(8).

3. CONCEPTS AND METHODS

o guide our work, we used LWR's definition of resilience, as "the capacity of a system (e.g., a community) to absorb the impacts of shocks and stressors, to adapt to change, and to potentially transform, in a manner that enables the achievement of development results" (9). Our research framework brought together selected concepts from the resilience literature, agroecology, the sustainable livelihoods framework and principles from participatory action research (PAR). Following early resilience theory from the field of ecology (10) and its application to development studies (11, 12), resilience can be divided into three types of capacities that respond to shocks and stressors, including capacities to 1) absorb, 2) adapt and/or 3) transform. In this context, shocks are perceived as sudden, many times unexpected, events that impact the system and can have short or long-term repercussions; stressors, on the other hand, are longer-term trends that undermine a system's performance and may increase its vulnerability (9).

Through a case study approach we integrated a variety of sources to analyze contemporary situations, with the goal of explaining the how and/or why of observed phenomena (13). We explored resilience dynamics within three countries and contexts (Honduras, Nicaragua and Haiti), and applied a mixed-methods approach to analyze gualitative and quantitative data from projects executed by local counter-parts. Methodological instruments included a literature review, household surveys, focus groups and key actor interviews over the 2015/2016 coffee harvest season. This approach highlighted characteristics that are unique to place, while also allowing for comparison across sites to identify more generalizable trends and recommendations.

4. CASE STUDIES

he cases for this study represented a mix of resilience approaches and contexts (Figure 1), which included a diversity of partner organizations¹, as follows: 1) In Honduras, we worked with a project focused on diversification, food security and improved coffee production, which engaged climate change and resilience as the project evolved; 2) In Nicaragua, the project was specifically focused on resilience, and is designed as a collaboration aiming to integrate livelihood diversification, climate monitoring, and agricultural management to strengthen resilience capacities of smallholder coffee farmers and farmworkers; and 3) In Haiti, the project targeted coffee plantation renovation, income diversification, strengthening local capacity to respond to climate change, and building social capital in smallholder coffee cooperatives.

4.1 STRENGTHS AND VULNERABILITIES OF SMALLHOLDER FARMER HOUSEHOLDS

Determining both the actual and perceived resource levels within households, organizations, communities, and regions is critical to designing effective resilience interventions (Figure 2). A resilience lens can provide a holistic view to elucidate how and why the various categories interact; for example, why human and social assets are critical considerations, even if the core focus is on agricultural production. The following sections provide a snapshot of asset levels based on household surveys conducted in each of the case study sites.

¹ In Honduras, the main partner organization was the Christian Organization for Honduran Integrated Development (OCDIH, for its Spanish acronym); In Nicaragua the main partner organizations were CAFENICA, Centro Humboldt and Centro Intereclesial de Estudios Teológicos y Sociales (CIEETS for its Spanish acronym); and in Haiti the main partner was RECOCARNO (Réseau des Coopératives Caféières de la RégionNord, or in English - the Network of Northern Coffee-Growing Cooperatives).





Natural Assets

Agricultural trends observed across all sites include decreasing yields (a function of recent damage from roya and other pests/diseases, and production lags that accompany the intense renovation of coffee plots), increasing costs of production, and questions about future suitability of coffee given climate predictions. High levels of diverse shade and reports of good soil in Haiti are likely linked to the place coffee holds as a 'keystone species²' within their shade-grown, perennial polyculture system, where almost no synthetic inputs are applied. Respondents in Nicaragua and Honduras, on the other hand, reported 'tierra cansada' or wornout land that is a combined result of deforestation and soil degradation. In our literature review to determine agroecological practices for increased resilience, diverse shade management continues to stand out as the most promising practice, with links to both improved soil health and pest and disease suppression (14).

Social Assets/Networks

Strong producer organizations likely contributed to high scores for social assets in Nicaragua, where participants reported few associations but high satisfaction with the quality of their affiliations. Survey respondents and key actors mentioned the important role of cooperatives, and local and international NGOs. Occasional mention was made of family, church and school. Although we did not assess informal networks, Haitian respondents discussed the importance of community cohesion and 'konbit' (collective work). This illustrates the critical importance of "...informal social interactions (that) are communities' best resources for maintaining their capacities to build social resilience and to change collective direction"(15). Notably, there was no or little mention of government intervention and/or support from the coffee supply chain.



² In ecological communities, keystone species play a key role by maintaining the structure and integrity of the community (14).

Physical Assets

Recent droughts throughout Central America and the Caribbean have highlighted the importance of water storage and irrigation capacities. In both Honduras and Nicaragua, over three-quarters of households reported having some capacity for water storage, whereas in Haiti just over one-third reported similar infrastructure. Only a fraction of households reported any irrigation beyond hand watering, with over a quarter in each country reporting some type of onfarm irrigation system. Nicaragua had the best infrastructure for coffee production, including better roads, processing and storage facilities. Hondurans struggle with poor roads and infrastructure, but producers were developing small-scale processing facilities. Haiti reported adequate coffee storage facilities, but lacked processing and transportation facilities. Food storage capacity is also critical, and in Honduras and Nicaragua, where storage infrastructure has been an area of focus (either through NGO or government projects), respondents mentioned improvements in options and fewer postharvest losses. In Haiti, however, most farmers stored dry beans (both for food and future seed) in sacks within the house, and reported high levels of loss from insects and other pests.

Political/Cultural Assets

Although survey questions did not solicit responses directly related to political or cultural assets, these categories surfaced as important factors in focus groups and/or key actor interviews. Recent political turmoil in Haiti and Honduras, and upcoming elections in Nicaragua, are critical considerations and a reminder of the inextricable tie between political context and resilience capacities. Though asset levels are critical to understanding the relative position from which individuals are operating, we must also consider "... all those societal factors that both facilitate and constrain people's abilities to access assets, to gain capabilities for learning, and to become part of the decision-making process" (16, p. 9).

Financial Assets

Overall, fewer than half of the survey respondents reported profitability from agricultural activities. Results for access to credit were mixed; where credit is available, interest rates were often high, and loans were taken out of necessity (for inputs and labor costs), more than choice (investing in improvements). In Honduras, financial concerns were more about inadequate financial management skills than access to loans. Access to financing options was especially low in Nicaragua, where there was a perception that much of the investment has been directed toward the larger coffee estates instead of reaching smallholder farmers. In Haiti, access to credit was crucial for the diversification strategy of 'ti komes' or buying and reselling of goods; without the initial cash infusion to purchase goods, there is no hope of generating income for the household. Haitians noted that lack of credit was a limiting factor in terms of their ability to increase their household resilience.

The access to markets data does not describe the ways in which farmers actually get their product to the market (Figure 2.) In Nicaragua, surveyed farmers were members of producer cooperatives that have reliable contracts, and sell at least a portion of their coffee under fair trade or other certifications. In Honduras, reliable access to markets was through intermediaries (coyotes) who offer the advantage of cash up-front, but often pay lower prices and provide no other support or technical assistance. In Haiti, farmers were able to sell their harvest to their local cooperatives, facilitated by the strong relationship with the cooperatives comprising RECOCARNO, who in turn is currently struggling to find external markets for the coffee. Producers across the board mentioned financial help from projects (micro-loans) and premiums - providing benefit to the producer - but often indirectly and inconsistently, and not necessarily in the moments of greatest need.





Human Assets

Educational data represented only formal education levels, revealing very low levels for this category in each country. Even though our study did not include any metrics for gauging practical farming knowledge, farmers reported that climate change has diminished the usefulness of accumulated, historical knowledge. In other words, climate change confounds farmers by challenging lessons extracted through trial and error over the years, and 'knowing' how to farm in a particular site (16). Unpredictable periods of drought and off-cycle rains affect workloads, leaving blocks of 'waiting time' and periods where delayed work from one crop impacts work on another. Each site reported some period of food insecurity, and ongoing droughts and price increases for staple grains were a cause of concern that levels of food insecurity will rise in the coming year.

4.2 MAIN CATEGORIES OF SHOCKS AND STRESSORS

Farmers reported drought and *roya* as two of the most severe threats to resilience that they have faced in the last three years (Figure 3). Survey respondents also cited food insecurity as a constant stressor, although responses about duration and severity varied by country. In Honduras and Haiti, farmers were most concerned with drought and food insecurity. And while *roya* was reported as a stressor in all countries, there was more concern about it in Nicaragua, where farmers reported more problems associated with *roya* than drought.



Figure 3. Most severe shock/stressor faced by coffee farmers

Major shocks and stressors	Impacts	Honduras responses	Nicaragua responses	Haiti responses
Drought and irregular rainfall impacting all crops	Lower yields and quality for both food and cash crops	Staggered plantings, exploring irrigation options, seeking more technical assistance	Shade regulation, cover crops, systems for water harvesting and water conservation, climate monitoring stations	Helplessness in facing drought, interest in shorter season crops, irrigation & planting trees to change microclimates
Lower coffee earnings	Food insecurity, delayed/skipped crop management, children kept from school, prevents 'ti komes' coping strategy of reselling goods, given no initial cash to invest	Try short term storage to try to catch any mid- harvest upswings in price, exploring viability of other cash crops (eg. cacao, malanga)	Intercropping & exploring new crops (eg. turmeric, ginger and passion fruit) to lessen dependence on coffee, reliance on family labor instead of hiring for help with harvests, look for work off-farm	Committed to staying in coffee despite disastrous losses over past two seasons, give coffee to co-op hoping for good price
Living hand to mouth	No extra cash for future investments or emergencies, inhibits desire to take risks with diversification strategies (can't afford to invest in 'unproven' ideas), few (if any) contingency plans	Diversifying crops to have something to rely on if one fails; try to manage resources more efficiently; seek credit and financial opportunities	Farmworkers discussing the need to emigrate to find work	Subsistence farming practices, selling assets and micro-commerce to stay afloat
Lower coffee yield and quality	Increased incidence of pests and diseases, lack of access to coffee buyers, concern about quality impacts of transitions to more resistant coffee varietals	Farmers relatively new to coffee production and are still seeking technical assistance, lacking processing infrastructure and hoping to establish relationships with direct buyers	Renovation of old and damaged coffee plots, demonstration plots to assess tradeoffs of new varietals (yield/quality, disease resistance), farmer field schools and phone network for disseminating information	Higher demand for resistant varieties, renovating old or damaged coffee plots, testing fungicide treatments, additional technical assistance, loans for renovation and better coffee market
Lack of access to financing or very high interest rates	Food insecurity, delayed/skipped crop management (eg., limits fertilizing or pruning), no infrastructure improvements (eg., establishing irrigation)	Seeking to improve financial management skills and access to credit	Work trades among neighbors, revolving credit accounts, input substitutions	Work trades among neighbors, family sacrifices to cover most desperate need(s)
Prices for food staples rising	Seasonal food insecurity, exacerbated by losses from poor storage and lower yields from subsistence production due to drought	Ration food, loans for food, more crops for consumption (instead of selling), off-farm work, improved crop storage, plant more diverse crops and homegardens	Rationing food, seed banks, improved food storage, food plans to calculate family needs and gardens for dietary diversity	Survive on breadfruit, take out loans for food, look for alternatives, such as shorter season bean varieties (more drought resistant)

Table 1. Major shocks and stressors and reported impacts and responses



4.3 HOUSEHOLDS RESPONSES TO SHOCKS AND STRESSORS (COPING STRATEGIES)

In focus group discussions, farmers reported a series of coping strategies to respond to perceived shocks and stressors (see Table 1 for a synthesis of these findings). Farmers discussed other shocks and stressors in addition to drought, roya and food insecurity. Some of these, such as 'living hand to mouth' or barely having enough to survive, represent the poverty traps faced by these populations that require multidimensional responses. To better understand the interactions between impacts from shocks and stressors and how coffee farmers and farmworkers are responding, we took rapid inventories through open-ended survey questions and a seasonal calendar activity (Figure 4). The majority of Nicaraguan respondents reported positive coping mechanisms (i.e., an improved position, where they feel better off as a function of their action), Honduras reported about half positive and half neutral (neither worse or better off), whereas in Haiti most responses were neutral to negative (i.e., a worse over-all position) - indicating a path toward greater vulnerability and even more urgency for building resilience capacity in these communities.



Climate change

Drought and effects from roya were reported as the two factors requiring the most urgent response. In Haiti, the overwhelming response to these shocks/stressors was 'we did nothing.' It is unclear whether this reflects an underlying sense of defeat, or a calculated choice of where and how to invest effort and resources. In both Nicaragua and Honduras, the majority of respondents felt that their coping mechanisms had left them in a better position. Farmers in all countries mentioned that they are taking the hits and attempting to stay afloat, but are also considering how they can adjust practices to get ahead. The climate stations and plan for an early alert system are one example of a potential transformation in Nicaragua, through a belief that access to information and an effective communications network can and will inform and inspire behavior change.



Coffee price/income instability

Although the instability of coffee price was a perceived vulnerability across the board, the survey respondents were acutely aware that real change on this issue would have to happen at a systems level. The "C" market, where the commodity price of coffee is set, was recognized as the nexus of control, and while farmers mentioned responses such as trying to improve coffee yield and/or quality, or gaming the sale date - these were seen as marginally effective. When facing low prices, other strategies included cutting input costs, taking out loans and attempts at diversifying household income sources. The impact of low prices is especially problematic for farmworkers, since they are considered an 'input' and when costs are being cut, their already low daily wages are at risk. In Honduras (60%) and Haiti (36%) respondents said they felt results were the same, regardless of their coping mechanism, which most often was working on incremental improvements in yield and quality. In Nicaragua, a slight majority (43%) felt their responses were leaving them better off, but nearly as many (40%) felt they were seeing essentially no change from their efforts. This likely reflects the deep sense of helplessness felt by most coffee producers and laborers on this issue.

Food Security

Of the strategies mentioned, including crop diversification, seeking credit/taking out loans, offfarm labor and rationing food, the perception was that these generally resulted in positive/neutral effects in Honduras (response for each was 48%), nearly equal for Nicaragua (45/43%), and either neutral or negative for Haiti (36%/39%). Although we were not able to fully examine why similar responses produce results that are perceived differently, recent work suggests that households that have historically accumulated more livelihood assets are in a better position to utilize new or additional resources (17). Diversification was recognized as an important option for improving food security, but respondents mentioned that it requires investments of time, resources and a willingness to learn. These are requisites for success and reflect an ongoing challenge connected to lack of sufficient training and support for new endeavors.



Figure 4. Perception of effectiveness of coping strategies for different shocks or stressors





4.4 EFFECTS OF DEVELOPMENT INTERVENTIONS ON RESILIENCE CAPACITIES

In each of the case study sites, LWR has targeted its interventions specifically focusing on producers' dependence on coffee. One approach for assessing project efforts to increase resilience in coffeedependent communities is to categorize the interventions in terms of the resilience capacity they are targeting, and use recent vulnerability and resilience assessments to identify programmatic gaps and opportunities (Table 2). We used the following definitions for this categorization:

Absorptive capacity – the ability of a system to prepare for, mitigate or prevent the impacts of negative events using predetermined coping responses in order to preserve and restore essential basic structures and functions (11, 18-20).

Adaptive capacity – the ability of a system to adjust, modify or change its characteristics and actions to moderate potential, future damage and to take advantage of opportunities, all in order to continue functioning without major qualitative changes in function or structural identity (19, 21, 22).

Transformative capacity – the ability to create a fundamentally new social-ecological system when ecological, political, social, or economic conditions make the existing system untenable (23).

In all three countries, project interventions responded, either directly or indirectly, to the shocks and stressors identified as most severe by farmers (drought, *roya* and food insecurity). The Nicaragua project stands out as best aligning project objectives or desired effects with what we found as most pressing to farmers, however, despite the fact that inadequate access to financing was identified as a significant stressor, the project lacks a financial component. In addition, there was an implicit understanding that farmer organizations are important to further strengthen activities and changes that are promoted by projects; even when this was not be explicit in project objectives.

Country	Project outcomes	Resilience capacity
Honduras	Families increase food production from their own land	
	Families increase household income from selling goods produced on their land	
	Families diminish the amount of post-harvest loss of food crops	Absorptive
	Families eat a more diverse diet by incorporating new foods grown on their land	Adaptive
Nicaragua	Coffee producing families create farm plans and establish nurseries	Adaptive
	Coffee producing families implement agricultural management best practices	Adaptive
	Coffee-dependent families have established a climate monitoring and early-warning system	Adaptive
	Community trainings around climate change and adaptation strategies	Adaptive
	Coffee producing families have completed climate change adaptation plans	Adaptive
	Coffee producing families establish kitchen gardens	Adaptive
	Farmworker families diversify their diets and improve food security	Adaptive
Haití	Increase coffee production and revenue through resistant varieties, improved shade management, soil fertility and ecological services	
	Increase revenue sources and improve market chain for diversified products	
	Facilitate access to credit and technical assistance	Adaptive

Table 2. Categorization of project interventions from a resilience perspective



5. DEVELOPMENT OPPORTUNITIES

certain end of path end of path dependency and past being the best predictors of future. With intentional planning, this means "... actors in the system and, by extension, the system itself, (can) anticipate the future based on experience rather than simply react(ing) to present conditions" (24). Climate models and monitoring activities represent one example of this - where with intentional planning and data that is regional, instead of limited to a single plot, coffee farmers can adjust their practices and/or make informed decisions about the future suitability of their land for particular crops/varieties. This improved ability to act, based on lessons learned, speaks to the value of investment in skills building and knowledge sharing that LWR is pursuing. Being able to draw out community knowledge around context, and connecting that to other knowledge and resources that are unavailable within communities, could help to develop long-term plans that include contingencies, while also building individual capacity and supportive networks to execute plans.

In contrast to direct supply chain partnerships within the coffee industry, international development partners could play a unique role, since they can be committed to coffee-dependent communities independent of whether households continue in coffee or switch to another crop. Three main steps toward action are: 1) focusing, first, on helping households to stabilize and make plans for a viable future; 2) investing in people and communities so that their own improved resilience capacity allows them tofare better in the face of shocks and stresses; and 3) leveraging the stability generated through a higher resilience capacity to support further development (25). A suggested pathway for best accomplishing these steps includes combining multiple interventions, capitalizing on existing structures, incorporating both human learning and gender equity, and further strengthening and developing social capital (organizational affiliations and networks). This will require a view toward longer-term investments with communities, since "... the ultimate impact of a resilience intervention should not be measured in term of the speed at which people or households get back to their original level of income/assets...but rather by the types of adequate responses put in place by the households in the face of adverse events" (26). The precarious position of most of these farmers prevents them from accurately 'taking stock' of how specific interventions affect their livelihood outcomes. This type of reflection is an area ripe for collaboration among farmers. development organizations and researchers, which unfortunately is rarely a part of project cycles.





6. RECOMMENDATIONS

In the name of resilience there is a need to reconceive of the traditional relationship of production by farmers and project support from supply chain partners to a more accurate manifestation of the mutual reliance among these parties. Existing relationships need to move past the idea of projects and programs to reflect the interdependence of coffee producers, farmworkers and other supply chain participants. Ideally, that change in conceptualization would result in additional investments in those communities for the long term, or restructuring of allocation of profits along the chain, so that producers and other actors 'at origin' can make the needed investments to ensure a longterm supply that approaches resilience.

With similarities to agroecology, where the approach offers principles instead of prescriptions, resilience work is not about finding and applying the appropriate technological package. Instead, it is about knowing a place and being sensitive and responsive to what works and what does not work. Ideally, helping households to stabilize and make plans for a viable and resilient future will mean combining multiple interventions, capitalizing on existing structures, and ensuring women's empowerment (25). Resilience interventions require longer-term visions that tackle issues at multiple levels and time scales, and from different angles.

Investing in the agroforestry polyculture systems maintained by smallholder coffee farmers can be supported through diversification strategies (both for income and biodiversity) that bolster both ecological and human well-being in these coffee dependent communities. However, these activities should have a focus on diversifying risk instead of a focus on diversifying activities, and involve households in benefits/burdens assessing (tradeoffs) of diversification strategies. As alluded to previously, even when the focus of interventions is agricultural production, the focus of resilience interventions needs to be multi-faceted. Resilience programming should seek to be holistic, and include components focused on developing individual assets (agency, decision-making skills, gender equity) and strengthening social support networks in order for the interventions to reach their full potential.



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