

Cultivating Sustainability:

Food systems cases,
challenges, and solutions
from Costa Rica

Edited by
Olivia Sylvester
Mary Little



University for Peace



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Francisco Rojas Aravena, Rector



First edition

Cultivating Sustainability: Food systems cases, challenges, and solutions from Costa Rica

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University for Peace

San José, Costa Rica, 2025

The University for Peace was established by the United Nations General Assembly Resolution 35/55 of December 1980.

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ISBN Electronic Publication 978-9930-542-67-5

Cover photo taken by Olivia Sylvester

Graphic Design: P. Digital, San José, July 2025.



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Foreword

The implementation of SDG2: The case of Costa Rica

Francisco Rojas Aravena

The international system is undergoing a profound transformation. We are in the midst of a complex transition. The system of norms has been disrespected. Wars and conflicts have been exacerbated, and tensions are rising along with the political polarization of national systems. Multilateralism and the United Nations are under attack. A direct consequence of this is that all these conflicts generate more poverty and more hunger, in a context where multilateralism finds it difficult to mitigate and respond to these emerging challenges and threats to a large part of humanity.

The University for Peace, established by the United Nations General Assembly in 1980, Resolution 35/55, is a global entity, with activities in 4 continents in 12 cities, training new leaders for peace and conflict resolution through dialogue, speech, mediation, and the development of second-track diplomacy activities. Through research, UPEACE analyzes the root causes of conflicts and situations that can provoke them. The definition of the results and policy recommendations help the different actors make better and more informed decisions. The research expressed in this book delves into Costa Rican case studies from which important lessons can be drawn for other developing and middle-developed countries.

In this scenario of growing instability, international cooperation faces the challenge of building bridges between global tensions and the needs of the most vulnerable sectors. The climate crisis and conflicts over natural resources amplify existing inequalities, while political polarization makes it difficult to implement coordinated solutions. Against this backdrop, it is imperative that global leadership prioritizes joint approaches capable of addressing not only the immediate consequences, but also the structural roots of these problems. Technological innovation and the promotion of social justice can act as catalysts to transform

current dynamics and move towards a more equitable and sustainable world.

Efforts to eradicate hunger and to ensure universal access to nutritious food have acquired unprecedented relevance. International organizations and governments are seeking to implement strategies that not only address food production, but also sustainable approaches that respond to current climate and socioeconomic challenges. However, questions are increasingly being raised on issues related to the 2030 Agenda, making it difficult to move forward with its full implementation.

Against this backdrop of growing uncertainties, international actors must renew their commitment to cooperation and innovative solutions that address the root causes of these crises. Fragmented and unilateral responses have proven to be insufficient, underscoring the need for a more holistic and inclusive approach. The climate crisis, which is worsening by the day, cannot be separated from the resource conflicts and economic inequalities that permeate our societies.

Strengthening global and regional coalitions is a crucial step in restructuring existing policies. Moreover, local solutions, adapted to the specific realities of each community, play an indispensable role in mitigating the social and economic impacts of crises. Now is the time to align sustainable development with social justice, to ensure that resources are distributed equitably and that systems are resilient in the face of the adversities that lie ahead.

The Global Food Crises 2025 report shows a heartbreaking situation. At least 280 million people in 59 countries are facing an acute food crisis. This is the result of wars and conflicts, as we have pointed out. An aspect of decreasing importance is the climate crisis affecting our Common Home, the planet, together with the increase of economic and social inequalities.

The United Nations Sustainable Development Goal 2 (SDG2) aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture by 2030. The UN emphasizes that achieving this goal requires transforming food systems to be resilient, equitable, and environmentally sustainable. Progress towards the SDG2 targets is lagging due to conflicts, economic shocks, and extreme weather events.

FAO advocates agroecology as a transformative approach towards sustainable food systems. In 2018, it launched the 10 Elements of Agroecology framework, which emphasizes diversity, knowledge co-creation, and responsible governance to balance ecological and social outcomes. FAO's 2018 resolutions also highlighted partnerships with farmers' organizations to integrate local knowledge into global agricultural agendas. Recent UN reports highlight the need to address structural causes of hunger, such as inequality and unsustainable practices, while advocating for local and equitable solutions.

In this context, the Latin American and Caribbean region faces particularly pronounced challenges due to its historical structural inequality. These disparities are manifested in inequitable access to agricultural resources, unequal land distribution, and the concentration of wealth in a few sectors. In addition, the region's geographic and climatic diversity poses unique challenges that require solutions adapted to local conditions. For example, strengthening agroecological strategies in rural communities is key to generating sustainable and resilient food systems.

The linkages between the climate crisis, food insecurity, and poverty call for a multidimensional approach. Agroecological initiatives and sustainable natural resource management practices not only help mitigate the effects of extreme weather events but also promote broader social justice by empowering vulnerable communities. These strategies demand close cooperation between governments, non-governmental organizations, and the private sector to ensure a transition to inclusive and sustainable agricultural models.

Costa Rica is a century-old democracy. It is a country with no military spending as a result of having abolished the armed forces since 1948. It is a country that advocates the defense of Human Rights. Despite the difficulties, it promotes criteria for greater equity, particularly in the agricultural sector.

Costa Rica is making many efforts to align with SDG2 through organizations working for more sustainable agrifood systems. At the national level, for example, the Agro-environmental Agenda prioritizes climate-resilient practices, as well as food systems efficiency, sustainable and adequate soil management, integrated water management, and integrated ecosystem and biodiversity

management. Despite progress, notable challenges remain, such as rising food basket costs, high pesticide use, contamination of water sources, and lack of support for agroecological and organic projects.

This book, *Cultivating Sustainability: Case studies of food Systems, challenges and solutions from Costa Rica*, is timely because Latin America and the Caribbean is the most unequal region in the world, and this inequity is reflected in land tenure and hunger; this is further exacerbated by the climate crises in the region, a situation from which Costa Rica does not escape.

I congratulate Olivia Sylvester, Director of the Department of Environment and Development at UPeace for coordinating the researchers who contribute to the work and for her editing work. The analysis carried out by the authors is key to discovering the challenges faced at the national level in the implementation of SDG2, as well as to extrapolate lessons learned from local cases to other contexts. This book presents a comprehensive analysis from the national to the local level and contributes to the situated knowledge on food systems in Latin America and beyond.

Frankfurt, 23 May 2025.

Introduction

Olivia Sylvester and Mary Little

Costa Rica has a deeply rooted history in agriculture. The nuances of this history, however, are not well known to those who visit this ‘Green Republic’ (Evans, 1999). Over the past decades we have been teaching students and visitors about food systems in Costa Rica; these visitors know very little about the current and historic detrimental impacts of industrial farming in this country. Why do people know so little about these topics? One of the reasons is that Costa Rica has created a green and sustainable image for itself; this image, has intentionally made invisible the social and environmental contradictions that this country is facing in its agricultural sector.

Specifically, Costa Rica and Latin America do not have strong regulations on pesticide application (Hilber et al., 2024; Vargas Castro, 2022). The latter is highlighted in Chapter 2 by Sylvester et al., who share recent studies illustrating how Costa Rica has one of the highest concentrations of pesticide use per land area in the world and here 20 of the world’s 22 most highly hazardous pesticides are used (UNDP, 2022), of which some have been prohibited for over 15 years in the European Union due to their harmful health impacts (Gaberell & Viret, 2020). These pesticides have contaminated ground and water sources, leaving entire communities in Cartago without potable drinking water (Pomareda García, 2025). Industrial farming practices in Costa Rica have fumigated community schools (Chacón Soto, 2023) and have encroached upon, and contaminated, protected wetlands (FECON, 2019). These detrimental impacts of industrial farming in Costa Rica are not new. For instance, the well-documented links among the use of DBCP (nemagón) and human sterility and cancer in the 1960s and 1970s (Crespo, 2016); or the violent invasion of Indigenous Territories by the United Fruit Company in the late 19th century (Lansing, 2014).

Understanding this violent context surrounding export-oriented, extractivist, industrial farming is important when we look at the strong histories of more sustainable practices in the country. Our understanding of the destruction created by industrial farming

in such a short historical period (Chapter 1), can help us to place the deserved value on the struggles of the farmers and producers that choose to grow their food in harmonious ways with the land and its other beings; these producers include local communities and Indigenous Nations in Costa Rica who practice traditional ways of farming, ways that the Western world has called forms of agroecology (Chapters 1-3).

Despite the active agroecological practices and movements in Costa Rica, and a national organic law, many challenges remain to for those who wish to practice organic or agroecological farming. In Chapter 2, Sylvester et al. examine the laws, policies, programmes, and movements in relation to these farming practices and found a strong legal backing for organic farming (strongly influenced by grassroots movements), with a lack of adequate implementation. These public policies have a strong emphasis on maintaining industrial farming practices, based on Western scientific knowledge and technology, to fit an agroexport development model, while minimizing environmental impacts. The latter is drastically different from agroecological models, models based on traditional and Indigenous knowledge, for the health and well-being of producers and consumers. In Chapter 8, Villhauer illustrates how policies being implemented in Costa Rica related to conservation and climate change mitigation (i.e., REDD+), can threaten the continuity of Indigenous food systems, and examines how Indigenous people have actively resisted this threat by participating in decolonizing such programmes. Despite a lack of national support for agroecology in Costa Rica, in Chapter 3, Cerdas provides an overview of multiple agroecological initiatives in country. Although these initiatives are diverse and numerous, Cerdas describes how their sustained impact will depend on collective capacity to build alliances and grassroots networks while at the same time influencing public policy.

In addition to examining food systems at the national scale, the authors of our book also analyze cases, challenges, and solutions at the local level. Sustainable agricultural practices provide the framework for analysis and structural changes by placing family, rural farmers, and women-led agriculture at the center. In Chapter 9, Urraca and Vasconcelos-Vásquez use interviews to evaluate how gender norms have evolved and women's role in the coffee industry and gradually becoming more visible and recognized. In Chapter 6, Perkins and Cantor implement a case

study of the Monteverde region to critically examine the dialectical relationship between institutional support and sustainable food production in the context of rapid socio-economic change. While in Chapter 4, Breitfeller et al. apply the sustainable livelihoods resilience approach to examine how the COVID-19 pandemic affected these ecotourism-dependent communities' food (in) security in Monteverde and the Osa Peninsula.

Sustainable food production has grown worldwide, but Latin America is rooted in agroecological practices that are profound and evolving. Recognizing the importance of this science, social movement, and varied set of practices, we have decided to publish a work highlighting the creative practices and contributions Costa Rica has made to this field. As researchers we are endlessly inspired by regenerative agricultural practices of rural people in this country and their connections with customers. In Chapter 5, Little explores how short food supply chains that directly deliver agroecological products support local commoning. In Chapter 7, Ruttenberg examines the role of community-supported agriculture initiatives in making links among local farmers with Osa Peninsula residents to diversify the economy and create agroecology networks.

The growing need to address the detrimental impacts of industrial farming, as well as to promote and scale regenerative agroecological farming, sparked our process of gathering experiences from partners across the country. The result is this book, *Cultivating Sustainability: Food systems cases, challenges, and solutions from Costa Rica*. Many hands wrote the chapters, which together exemplify the strength and solidarity of sustainable farming. This collection shows the leading role of women, Indigenous peoples, families and rural communities, and grassroots activism in a process of maintaining centuries of traditional knowledge that melds with natural scientific practices. Consequently, we see and define sustainable agriculture as returning to many millennial practices that safeguard the ecosystem biodiversity that underpins our social relations (Carolan, 2006; Vasilescu et al., 2023). We thank all the contributors to this book for helping us learn these invaluable lessons.

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Chapter 1

Food production in the 21st century: Key concepts and debates

Olivia Sylvester

Introduction

Data at the global level indicate that we are not progressing towards meeting our global Sustainable Development Goal (SDG) 2, to end hunger, achieve food security and nutrition, and promote sustainable agriculture. Specifically, the United Nations 2024 State of the World's Food Security Report illustrates that: 1) undernourishment has been on the rise since 2019, and that 2) around nine percent of the global population (713-715 million) faced hunger in 2023, which has also been on the rise since 2019. These data clearly demonstrate that elements of our food system need change. This change is pressing considering that our climate crisis has added another layer of complexity to achieving food security and studies have clearly illustrated that climate variability can change the quantity and quality of food we currently produce (Smith & Myers, 2018; Wheeler & von Braun, 2013). Within this context, experts have made a global call to rethink the way we produce food to avert both food insecurity and other related social and environmental crises.

The Global SDG 2 has many targets that were created to address the growing food insecurity crisis. Different food production approaches are practiced in an attempt to meet these targets, and the world is currently debating how to best achieve said targets. This chapter was written to better understand some of the key concepts upon which SDG 2 and its targets are based on, as well as to provide a brief overview of some contemporary debates that surround SDG 2 and that are linked to our capacity to meet its targets. This chapter thus serves as a point of reference for those learning about and/or working with SDG 2. Secondly, this chapter provides context for some of the concepts that authors in this book have examined. This chapter is organized as follows. First, I provide an overview of the two overarching food production models: agroecological and industrial. Second, I examine other

key terms used to describe food production, many of which fall within the latter two categories, agroecological or industrial (depending on how they are put into practice). Lastly, I discuss several debates that surround efforts to achieve SDG 2.

Food Production Models

There are two overarching food production models: industrial and agroecological. In this section, I will first review these models highlighting their origins, main principles, and applications. Second, I will describe other key agriculture terms that can be associated with one or both agricultural models depending upon how they are practiced (i.e., sustainable agriculture, organic, sustainable agriculture intensification, climate-smart agriculture, and regenerative agriculture). The latter list is not comprehensive; however, it provides an overview of concepts used in the fields of agriculture and food production.

Industrial Agriculture

The industrial agricultural model, sometimes referred to as modern agriculture, is based on a reductionist approach to ecosystems; its goal is to grow one or few species in a given land area to maximize yields and to decrease costs of production by exploiting economies of scale (Horrigan et al., 2002; Kremen et al., 2012). Industrial agriculture relies on synthetic chemical inputs for farming (e.g., pesticides and synthetic fertilizers) to maximize short-term farm productivity. Rarely, if ever, are the externalities of industrial farming incorporated into the calculation of costs of production. Examples of such externalities include contamination of waterways and soils, biodiversity loss, and the deterioration of health of industrial farmworkers.

Industrial agriculture is a product of the Green Revolution (GR), a period associated with increased research on grain crops to increase their productivity; crops developed during this period were called high-yielding varieties (HYVs; Greenland, 1975). High yield crops developed during the green revolution period were driven by a larger historical desire of industrialized countries seeking solutions to growing urban populations and a loss soil fertility; the loss in soil fertility was due, in part, to a progressive replacement of family farming systems in Europe with specialized, monoculture farms growing food for urban spaces (Perfecto et al., 2009). The scientific study of soil fertility led to

the findings that plants require nutrients in specific proportions and that nutrient deficiencies limit plant growth (e.g., Liebig's Law of the Minimum; Perfecto et al., 2009). With the production of synthetic fertilizers to increase crop growth, researchers also modified crops to increase their capacity to absorb synthetic fertilizers (Greenland, 1975).

Perfecto et al. (2009) describe how increases in fertilizers to support higher crop yields created the need to increase water and pesticide use on farms. Specifically, fertilizers such as nitrogen were used in high concentrations that would be toxic to plants if they were not diluted with large amounts of water. Furthermore, densely planted monoculture farms became affected by increases in crop pests (as compared to pre-industrial agriculture techniques that relied on multi-cropping, agroforestry, and crop rotation to control for crop pests). These crop pests were handled with synthetic chemical pesticides—many of which were developed for biochemical warfare—that were readily available in the post-World War II period. One example of a biocide used in biochemical warfare and used as crop pesticides is DDT (dichloro-diphenyl-trichloroethane). Thus, industrial agriculture became associated with high-yield crops that required the use of synthetic fertilizers and pesticides, a trio called the Green Revolution package that was commercialized by agriculture companies.

Industrial agriculture, and specifically the Green Revolution, was credited for decreasing hunger for some communities and people. Pingali (2012) reports an increase in food supply for some staple grains in some areas (e.g., rice in Southeast Asia and India) and an associated decrease in these food crop prices; furthermore, an increase in farm productivity can be linked to poverty reduction for some farmers. However, the positive impacts of industrial agriculture on hunger and food access are contingent on who were the recipients of the Green Revolution technologies. Pingali (2012) reports on disproportionate impacts of the GR. Specifically, this author describes how technologies were offered to intensify favorable agricultural land and thus farmers in marginal areas, or those that did not have access to intense irrigation such as rain-fed farms, had decreased access to apply GR technologies. Furthermore, technologies were more accessible for those who had the money or could access credit to purchase the GR package, i.e., those with land or other forms of capital. Lastly, men were targeted more than women as recipients of technology transfer.

Although most of the literature on the GR discusses how its goals were to increase food production to combat hunger (see Norman Bourlag's Nobel Lecture, 1970), there were other motives for exporting an industrial model of food production from the countries such as the United States to countries of the Global South (e.g., India, Pakistan & Mexico). As Vandana Shiva (2016) explains, the GR represented a choice to breed seed varieties that produced high yields under optimum conditions (e.g., high quantities of water, fertilizers, and pesticides; the GR also represented an imperial choice to produce seeds that could be sold to the developing world via loans from the World Bank or USAID, creating debt and dependance; Cleaver Jr., 1972). Shiva (2016) highlights that the GR was a choice *not to start by* developing seeds that were better able to withstand drought or pests, supporting traditional methods of increasing yields, and creating technology that was independent of foreign inputs.

Many studies have described the negative externalities associated with industrial agriculture and the GR. Scholars describe a list of these externalities including: pesticide contamination of water and soils, humans suffering pesticide intoxication, declining water tables, overuse of antibiotics in industrial livestock farming, depletion of soil fertility, soil erosion, biodiversity loss, loss of mid-size farms, and increased vulnerability to climate shocks (IAASTD, 2009; Union of Concerned Scientists [UCS] 2019). Furthermore, industrial agriculture has been associated with nutritional transitions because widely produced commodity crops (e.g., corn, soy) are increasingly used in processed and junk foods, lowering the nutritional quality of modern diets (Jaffe & Gentler, 2006; UCS 2019). Nutrition transitions are also a result of few industrial crops taking over large tracts of land and eliminating spaces of traditional crop production (e.g., wheat farming replacing the use of millets in India or pineapple and banana expansion replacing traditional bean and corn farming in Costa Rica). Pesticide toxicity is also increasingly coming to light with the World Health Organization's declaring the glyphosate pesticide as a probable human carcinogen (i.e., a group 2A carcinogen; IARC, 2016) and the associated lawsuits against glyphosate producing companies (Bayer-Monsanto) in relation to human cancer cases (Levin, 2018).

Agroecology

Agroecology is farming in a way that mimics natural ecosystems, promotes on-farm diversity, and does not use synthetic chemical inputs (e.g., fertilizers, pesticides). In a classic text, Altieri (1987) defines agroecology as a “a more environmentally and socially sensitive approach to agriculture, one that focuses not only on production, but also on the ecological sustainability of the production system” (p. 4). In this text, Altieri highlights that this definition requires a societal system that supports agroecology in areas beyond agricultural fields. Altieri provides one of the first academic overviews of agroecological food production, and these principles are based on millennial Indigenous wisdom. For many Indigenous peoples, agroecology has a unique name or names in an Indigenous language and the practices of agroecology are part of Indigenous identity. For example, sēbliwak Bribri women in Costa Rica have described their farming as a way to follow the Creator’s teachings and to ensure that the land stays healthy and alive and fulfills its purpose; they have also described farming without chemicals as a way to respect the land (Sylvester & García Segura, 2016). Some of the key social, cultural, and ecological principles of agroecological farming are highlighted in Table 1. Although this list of principles is not exhaustive, it provides a starting point to understand this concept. The FAO (2018) provides a list of 10 elements of agroecology; similarly, the High-Level Panel of Experts on Food Security and Nutrition (HLPE, 2019) published 13 principles of agroecology.

Table 1

A Summary of Some of the Principles Associated with the Ecological and Sociocultural Dimensions of Agroecology.

Agroecology Dimension	Principles	Reference
Ecological	Promote ecological relationships/synergies (e.g., companion planting, biological pest control)	Kremen et al., 2012; Third World Network & SOCLA, 2015
	Use natural versus synthetic chemical inputs (e.g., green manures, compost, nitrogen-fixing plants, nutrient recycling)	
	Promote genetic conservation and biodiversity (e.g., polycultures, agroforestry, seed saving, crop-wild relatives)	
	Enrich soil health (e.g., compost, nitrogen-fixing plants, cover crops/mulching, crop rotations)	
	Nutrient cycling (energy, nutrients, water; tree planting, cover crops, nitrogen-fixing plants, livestock-crop mixtures, rainwater capture)	
Sociocultural	Prioritize traditional and Indigenous knowledge and practices	Altieri & Toledo, 2011; Martínez-Torres & Rosset, 2014; Sylvester & García Segura, 2016
	Decrease farmer dependence on external inputs and build autonomy from unfavorable and unjust markets	
	Encourage farmer-to-farmer knowledge sharing and seed exchanges to build social networks and preserve cultural knowledge	
	Promote food sovereignty	

It is important to note that there are many other terms to describe agricultural models. However, the two overarching historic models of food production are industrial and agroecological. In the next section, I provide some definitions of other key terms; however, this list is not comprehensive as there are new terms and concepts being created frequently, such as permaculture, ecological agriculture, among others. What I wish to highlight here is that despite a plethora of terms, their core goals will likely be related to either industrial or agroecological practices, both models having distinct underlying principles both for food production, trade, nutrition and food access; and distinct ethics regarding our relationship to the land and to people.

Specifically, industrial agriculture is based on humans exerting power over nature and viewing the land (soil, water, plants, and animals) as expendable resources for human use. Agroecology, on the other hand, is based on respect for the ecological relationships among elements of a system and centers human and land health for present and future generations. Agroecology contemplates dignified human livelihoods, equity, and circular and solidarity economies (FAO, 2018); whereas industrial farming is based on neoliberal market economics, economies of scale, with the goal of increasing food production (increasing economic efficiency) often with little regard for human and environmental externalities in the process.

Other Key Terms to Describe Food Production

Sustainable Agriculture

Sustainable agriculture is a subjective term whose definition depends on the person using it. For example, sustainable farming might refer to some principles of agroecological farming. Similarly, sustainable farming can be related to an industrial production model that uses less synthetic chemical inputs (e.g., sustainable agriculture intensification). The subjectivity of this term is exemplified in the chapter by Sylvester et al. (2025) in this book regarding the state of organic and agroecological farming in Costa Rica.

Organic

The term organic has many definitions. Some define organic in ways similar to agroecology (e.g., Reganold & Wachter, 2016).

However, although the terms agroecology and organic were historically associated, the term organic has come to be defined by the rules and regulations of national laws and international organic standards (Seufert et al., 2017). Therefore, to understand what is meant by organic agriculture, one needs to understand regulations regarding organic certifications and labeling.

Despite a lack of a single definition of organic agriculture, there are some principles common to many organic regulations because international agencies have worked to harmonize international standards. For instance, Seufert et al. (2017, p. 14) explain how organic agriculture is commonly defined as “a chemical-free management system, based on avoiding synthetic inputs, and relying on natural substances instead.” Definitions of organic focus mainly on allowed and prohibited inputs on farms.

The similarities among organic and agroecological farming are related to inputs, i.e., both forms of farming do not use synthetic chemical pesticides. Organic certification, however, does not preclude monoculture farming whereas agroecological farming promotes multi-cropping; this is why you can have an organic farm dedicated to only one or a few crops. Organic certifications also do not place strong emphasis on social dimensions of farming whereas this is a strong component of the agroecological model. Seufert et al. (2017) analyzed organic regulations from a set of representative countries across the world and found that few regulations discussed social aspects of farming with a few exceptions; for example, the IFOAM standard recommends some basic rights, social security systems and labor protections for organic farm workers, the Ugandan regulation talks about social justice, and the Mexican regulation briefly mentions social standards.

It is important to note that even though some organic principles coincide with agroecology (e.g., being free of genetically engineered crops and free of synthetic pesticides), an organic farm can still follow an industrial, extractivist logic and deviate from other agroecological principles of diversity, biocultural heritage, strengthening local markets and food sovereignty of consumers and producers. Thus, an organic farm can be pesticide and GMO free but still be an expansive industrial monoculture with little regard for water and soil conservation or for farmers’ and/or neighbouring communities’ well-being.

Sustainable Agriculture Intensification (SAI)

Sustainable agriculture intensification (SAI) has slightly diverse definitions depending upon the authors. For example, Godfray & Garnett (2014) define SAI as a model to increase food production, more sustainably, on existing agricultural land using a broad range of production methods to do so (Godfray & Garnett, 2014). Pretty (2018, p. 1) defines SAI as a situation when production is maintained or increased while progressing toward substantial enhancement of environmental outcomes making “...better use of natural and human resources (such as land, water, biodiversity, and knowledge) and technologies.” Pretty (2018) further shares that SAI is an open concept that emphasizes outcomes rather than means. In other words, SAI may look differently depending upon the farm. One farm may increase the use of agroecological techniques, such as incorporating trees on farm for shade and increased diversity; another farm may practice low-tillage to conserve soils; whereas another farm may continue to use pesticides but in a targeted way to reduce pesticide use and residues, or any combination of the latter.

It has been debated if SAI differs from conventional industrial farming or if SAI is just a buzzword to continue implementing destructive practices. Struik & Kuyper (2017) share how both terms, “*sustainable*” and “*intensification*” are ambiguous, and do not often share equal weight, putting emphasis on intensification and sustainable being merely a buzzword. SAI can also reframe sustainability discourses, making them void of their social and political content. As Struik & Kuyper (2017) highlight, SAI focuses on ecological production and efficiency and leaves out sustainability topics related to equity and justice (i.e., a socially just distribution and allocation of land and food resources).

Climate-Smart Agriculture (CSA)

Climate-smart agriculture (CSA) is defined as practices that meet one or more of three goals: 1) sustainability increasing agricultural productivity, 2) adapting and building resilience to climate change, and 3) reducing greenhouse gas emissions (Lipper et al., 2014). In this sense, CSA incorporates the idea of SAI and additionally highlights climate adaptation, resilience, and mitigation. Similar to SAI, what CSA looks like will depend upon one’s subjective understanding of the terms “climate-

smart” and “sustainable.” CSA techniques may be agroecological in nature, such as promoting increased forest cover on farms to prevent erosion and increase water tables (Neate, 2013; Taylor, 2018). At the same time, the term CSA can be used to continue to promote destructive practices such as is the case when planting herbicide-tolerant crops is described as climate-smart (e.g., Roundup Ready® crops).

Let’s break down the relationship to using herbicide-tolerant crops and climate change, since this relationship is not intuitive. Roundup Ready® crops, for example, are crops genetically modified to tolerate chemical herbicide Roundup®, which contains the active ingredient that is the probable carcinogen, glyphosate (Bayer, 2024). Thus, if a farmer is growing a pesticide tolerant crop, such as soy or maize, these pesticides can be applied to a large area of land to kill competing plants (weeds) on farms, but the main food commodity survives because it is tolerant to this chemical pesticide. The argument that using such herbicide tolerant crops is climate smart stems from the following. Since chemical pesticides are used on weeds, there is less need to plough the soil and use mechanized weed control. Less mechanical weeding means less soil disruption and, as a result, less erosion. Because soil is also a carbon sink, meaning it absorbs greenhouse gasses such as CO₂, it is thus important in carbon sequestration. Thus, the argument is that using chemical weed control promotes low tillage farming and as a result supports carbon sequestration (Kovak et al., 2022). This latter argument ignores the environmental and human health concerns of applying chemical pesticides that have been deemed probable carcinogens such as glyphosate, to herbicide-tolerant crops (Neate, 2013; Taylor, 2018).

Indigenous Agriculture

Indigenous agriculture can refer to millennial practices by Indigenous Peoples regarding food production. The terms used to refer to these practices are diverse in the world’s over 4,000 Indigenous languages (IWGIA, 2019). I encourage readers to explore such concepts in Indigenous languages that are living practices, but that have been systematically and violently made invisible via our recent colonial agricultural history. For example, the Bribri people in Costa Rica have described their farming as a way to follow the Creator, Sibö’s, teachings and to ensure that the land stays healthy and alive and fulfills its purpose (Sylvester

& García Segura, 2016). Different elements of Bribri farming are the original principles of what the Western world calls agroecological principles, however, these concepts have distinct names and explanations in the Bribri language. For example, the Bribri concept Të, describes the process of shifting cultivation to ensure the land has time to rest and regenerate after producing a given crop such as corn (Sylvester & García Segura, 2016). Additionally, the Bribri concept batséitsè refers to any action in day-to-day life that guarantees the permanence of seeds, plants, and food (Sylvester & García Segura, 2025).

Concepts and Debates Associated with SDG 2

In this section I outline some of the key debates and concepts that are important to understanding approaches regarding our Global SDG 2.

Producing More Food Versus Increasing Food Access

The growing number of undernourished, a growing population expected to reach over 9 billion by 2050, the growing middle class (who are predicted to increase their consumption of meat and dairy), and climate variability (FAO et al., 2018; Godfray et al., 2010), have been used to justify initiatives to increase global food production. Although increasing food production may become important, increasing food access is a widely overlooked solution to address food insecurity and deserves more attention. Overemphasizing increasing food production, in fact, may not aid in hunger or undernourishment reduction if we analyze current and historical data. In 2017, specifically, researchers have stated that we produced enough food to feed our population of 7.6 billion, yet 815 million people still went hungry (FAO, 2017). Similarly, we produced 2.5 billion tonnes of cereals in 2017; this alone is enough to satisfy the caloric needs of 7.5 billion people (Tudge, 2017). The fact that people can remain hungry even when enough food is being produced to meet caloric demands is not new. Amartya Sen (1981) described this phenomenon extensively when studying famines in Bengal in 1943, Bangladesh in 1974, and in Ethiopia from 1972-74. Specifically, Sen found that these famines occurred despite sufficient food being available, challenging theorizing that famine can be explained by food shortage; instead, Sen found that famines were related to food access and distribution. We also have seen this when food is available, but

such food transport and aid is deliberately blocked, even though using starvation as a weapon of war is prohibited under different provisions of international law (Conley & de Waal, 2020). Conley & de Waal (2020) describe these ‘starvation crimes’ as produced by leaders’ decisions to serve political, military or economic goals. For instance, in 2024 the United Nations Special Committee found Israel’s warfare methods in Gaza consistent with genocide, including use of starvation as a weapon of war (OHCHR, 2024).

Increasing food access requires a better understanding of our dominant food production system. Decreasing food waste is another example that would increase the food available for human consumption. According to the FAO (2013), around one third of the food produced for human consumption is either lost or wasted. The FAO (2017) estimates if we reduced food loss and waste by just one-fourth in 2016, it would have been enough to feed all of the world’s hungry in that year, and then some. We also currently experience uneven food access because of our food growing and use choices. According to the FAO (2012), the livestock industry uses more land than any other agriculture sector; specifically, 33% of croplands are used to grow food for livestock and 36% of our agricultural products are used to feed livestock. The production of meat and dairy leads to enormous energy loss because cereals have to be grown to be converted into animal feed, instead of using them directly as human food. Uneven food access is also linked to gender, race, and ethnicity. Studies illustrate that women skip meals or eat less during household food shortages, such as those linked to climate change impacts, leaving the food available for other family members (Alston & Akhter, 2016; Ravon, 2016). Nira Ramachandran (2006) found that across 11 villages in the Punjab state in India, there were sharp differences in nutrient quality among men and women. Although boys and girls had similar caloric intakes in these villages, girls were given more cereals while boys were given more milk and fats. In the USA, for instance, one in five children is at risk of hunger; if you consider only Black or Hispanic children, this number becomes one in three (USDA, 2014, cited in Fukuda-Parr, 2016). In Canada, Indigenous households are twice as likely to experience food insecurity as non-Indigenous households; and Indigenous women are more likely to be food insecure than Indigenous men (Council of Canadian Academies, 2014).

Can Agroecology be Scaled-up?

Agroecology is increasingly recognized as a model to achieve SDG 2 as well as our other sustainable development goals (FAO, 2018; IAASTD 2009). While the FAO (2018) has described how agroecological principles link to sustainable agriculture, poverty reduction, gender equality as well as all 17 SDGs, the FAO also reports challenges to scale up agroecological production; some of the reported challenges are: 1) a lack of awareness among policymakers, 2) a lack of an enabling environment to support farmer transitions, and 3) current market structures that are developed as vertical value chains for single products, which are based on economies of scale and organized around neoliberal trade (FAO, 2018). Despite these challenges, there are many opportunities associated with scaling-up agroecology including: 1) the recognition that industrial agriculture has created a suite of destructive impacts on the land and people, 2) the well documented links among agroecology and climate resilience, 3) agroecology's potential for job creation for rural youth, 4) the fact that agroecology can meet growing consumer demands for healthy diets, and 5) agroecology's role in increased food sovereignty, a scenario increasingly important during times of crisis, such as the Covid-19 pandemic (Little & Sylvester, 2022; FAO, 2018), or during the crisis caused by the collapse of the socialist bloc in Europe and the US trade embargo (blockade) on Cuba (Rosset et al, 2011).

There are historic and contemporary attempts to scale-up agroecology; however, there are many impediments to such scaling, such as the stronghold of industrial farming, based on the green revolution principles, that is intertwined with national and international political agendas and has seen an influx of corporate goals and finance, via lobbying and other forms of investment (see the section below in this chapter on *The Role of Finance in Our Food Production Systems*). One key historic case of rapid agroecological scaling is from Cuba, where the Campesino-a-Campesino social methodology was used by the National Association of Small Farmers (ANAP) to build a national grassroots agroecology movement (Rosset et al., 2011). The MST movement (landless workers movement) in Brazil is another successful example of agroecological scaling; currently, the MST has the largest operation of organic rice production in Latin America (Chagas & Stropasolas, 2023).

In Argentina, municipalities are working at scaling agroecology, via farmer-to-farmer knowledge sharing and the creation of local agroecological food markets (DW, 2019); during an interview in 2023, I was informed about the draft law for the promotion of agroecology in Argentina (Ministerio de Economía, 2021). It is important to note that there can be notable differences in the outcomes when agroecology is scaled out from a bottom-up approach (e.g., the grassroots movement in Cuba) or as a top-down initiative via public policies (Giraldo & McCune, 2019). Giraldo and McCune (2019, p.1) explain how at the national level social movements can face risks when they "...are absorbed in collaborations with the State in order to build public policy for taking agroecology to scale." The latter is evidenced in the chapter by Sylvester et al. (2025) in this book.

The Use of Genetically Engineered Crops: A Global Debate

Genetically modified (GM) and genetically engineered (GE) crops are two terms that are often used synonymously; however, these terms do not mean the same thing. Edmisten (n.d., para. 1) differentiates among these two terms:

Genetic modification refers to a range of methods (such as selection, hybridization, and induced mutation) used to alter the genetic composition of domesticated plants and animals to achieve a desired result. Genetic engineering is one type of genetic modification that involves the intentional introduction of a targeted change in a plant, animal, or microbial gene sequence to achieve a specific result.

In other words, genetic modification is a term that can refer to the thousands of years of plant domestication and selection by humans as well as modifications that happen as a natural process of plants or crops adaptation to their environments. The latter is very different from the use of more recent transgenic practices, i.e., a form of engineering where "...a gene is moved from one non-closely related species to another," (Edmisten, n.d., para. 5), a change not possible through conventional breeding. Examples of GE crops are GE soybeans, maize, and cotton, soybeans being the most widely cultivated GE crop (Bonny, 2016).

Genetically modified herbicide-tolerant (GMHT) crops are crops that contain a gene making them tolerant to broad-spectrum

herbicides; if a crop is tolerant to an herbicide, it means that herbicides can be applied to an entire field and the GE plant will continue to grow. Crops containing herbicide-tolerant traits and those with insect resistant traits comprise over 80% of the GE crops grown globally (Bonny, 2016). The most common GMHT is glyphosate-tolerant soy mentioned above in the section on climate smart agriculture (e.g., Roundup Ready® crops).

GMHT crops are praised by their supporters because they are proposed to make weed management simpler, they require less ploughing or mechanized weed control and thus contribute to soil conservation, and as a result leave more soil to capture carbon dioxide and mitigate climate change (Heard et al., 2003). At the same time, GMHT crops are highly controversial, because they require the continued use of pesticides, such as Roundup® that contains the carcinogen glyphosate (WHO, 2025). GMHT are used with broad spectrum herbicides, meaning chemicals that kill all plants in an area, and thus, this can lead to the elimination of other biodiversity and important food sources for animals, including birds (Heard et al., 2003). Furthermore, the indiscriminate application of herbicides to GMHT crops can and has created herbicide and specifically glyphosate-resistant weeds; the latter means that farmers will either need to use more of this toxic chemical on farms with GMHT crops and/or apply other chemicals to address this resistance (Bonny, 2016).

Another common GE crop is genetically engineered Bt crops; these are plants that have been engineered to contain bacteria genes from the bacterium *Bacillus thuringiensis* (Bt) and these Bt genes make proteins that have insecticidal properties and kill some insect pests (Tabashnik et al., 2013). Bt crops reduce the need for spraying of insecticides for pest reduction, which can save time for farmers and reduces chemicals loads on farms; Bt crops however, need to be continually researched because insects can adapt to insecticides and, similar to herbicide resistance, insects can also develop resistance to Bt and other toxins (Tabashnik et al., 2013).

An overview of the examples of GM herbicide-tolerant and Bt crops illustrates why the evaluation of this technology should be crop and context specific. There are however, growing overall concerns about the research, development and control of GM crops. Specifically, farmers purchasing seeds from Bayer (Monsanto),

must pay more for these seeds because they have been genetically modified, and they must sign a “Technology Agreement”; this agreement has a “Terminator Clause” that requires a farmer to promise not to save or plant any of the seed produced from their crop to protect Monsanto’s research investment into GM seeds (Ohlgart, 2002). These agreements ensure that farmers continue to purchase seeds from corporations instead of saving seeds for replanting in the next farming season. Furthermore, herbicide-tolerant varieties only function with specific herbicides (e.g., Roundup®), herbicides that are sold by the same companies selling the GM seeds. For these and other reasons, GM crop research and development has been described as a way to increase farmers’ dependence on corporate-led agribusiness (Jacobsen et al., 2013).

The Role of Finance in our Food Production System

Financialization refers to the process whereby financial markets, motives, institutions, and elites have influenced food production, access and trade (Epstein, 2002 cited in Burch & Lawrence, 2009). Following suit of other economic sectors, the agrifood sector has increasingly become a site of investment for large institutional investors and their instruments (i.e., banks, insurance companies, private equity companies, and sovereign wealth and hedge funds; Clapp & Isakson, 2018). In 2006, for example, Schrodgers, a global investment manager, created the Alternative Solutions Agriculture Fund (with assets of 6 billion USD) to generate high returns from investment in grain, livestock, coffee, and sugar; the UK Emergent Asset Management (EAM) created the African Agricultural Land Fund (with assets over 500 million USD) to offer opportunities to invest in improved farming techniques in the sub-Saharan agricultural sector (Burch & Lawrence, 2009). In 2008, Goldman Sachs, a private equity investment firm, invested 300 million USD to purchase more than 10 poultry farms in China (South China Morning Post [SCMP], 2008).

Sovereign wealth funds (SWFs) are investment funds created by governments and are increasingly being used in the agrifood sector, often so that investment receiving countries grow food for the investor country to increase their food security (e.g., Saudi Arabia set up a SWF to invest in agriculture in Sudan, Pakistan, and Kazakhstan; Burch & Lawrence, 2009). Hedge funds, an investment tool to manage funds for a small number of wealthy clients, are also linked to multiple agricultural commodities

including maize, coffee, sugar, soybeans, rice, wheat, cotton, palm oil, and cattle, among others. Hedge funds are not regulated in the same way as other public investment tools and thus engage in trading associated with a high degree of risk (e.g., short selling or futures trading). Some food prices are thus subject to the volatility of these financial markets, something that has been suggested as a driver of food price spikes during the global financial crisis of 2007/08. Specifically, the subprime mortgage crisis in the United States, caused investors to divert their investments to mineral and food markets; this influx of new investments in food commodities such as wheat, rice, maize and soybeans raised the price of these and other food staples (UN, 2011).

There is concern that the increasing financialization of our food system can result in the prioritization of shareholder value in agribusiness. Clapp and Isakson (2018, p. 7) explain that “like corporations elsewhere in the economy, agribusinesses have adopted the stance that the primary function of firms is to generate profit for shareholders, prioritizing this function ahead of all societal goals, such as providing nutritious food and decent livelihoods.” To satisfy shareholders’ demands, executives of agribusiness corporations seek quick profit increases at the cost of investment in other areas of food security including food product development, workplace safety, and environmental sustainability; furthermore, lowering costs to increase profits can also result in mergers and acquisitions in the agrifood sector (e.g., the merger of Bayer and Monsanto or Amazon’s investment in Whole Foods; Clapp & Isakson, 2018).

Scholars have examined the financialization of the agrifood sector and questioned its impact on current and future food security. For example, Burch and Lawrence (2009, p. 277) describe how the future of our agrifood system could become dependent of the trajectories and decisions of large investment funds; specifically, they explain if:

...their activities mainly serve the primary sector ...or if they seek to manipulate the food supply in a world in which there is increasing competition for food resources, this may well come at the expense of the power exercised by producers and consumers in the global South, and the retail sector everywhere.

Food producers and consumers are increasingly experiencing the consolidation of power and wealth within our food system. Private financial institutions encourage farmers to buy insurance for climate-related crop losses or to protect them from crop price volatility (Clapp & Isakson, 2018). Large supermarket chains provide credit and banking services to consumers, linking "... food acquisition to the provision of credit by the same provider locks in consumers and heightens their dependence on these firms for both financial security and food security" (e.g., Walmart or Loblaws; Clapp & Isakson, 2018, p. 13). Furthermore, as agribusinesses are increasingly shaped by the demands of wealthy shareholders, producers and consumers will have less choice and influence what food is being produced.

Lastly, agribusinesses play significant roles in our global food production via food systems research and lobbying. For instance, in the 2020 DW documentary "Bayer and the Bees," one can see the stronghold that agribusiness has in our food production and its research. Specifically in this documentary, it illustrates how massive bee die offs were found to be caused by neonicotinoids produced by the company Bayer; beekeepers then protested, and Bayer tried to silence the beekeepers and scientists. The French government then issued a study on bee deaths and Bayer's chemicals; scientists report that Bayer tried to influence the scientific studies by imposing their own allowable thresholds as well as their own research methods. The French government study was made public, that in fact these chemicals were causing massive bee decline, and still Bayer reached out directly to scientists requesting their silence.

Corporations also play noteworthy roles in our food system via lobbying. Agribusinesses can influence governance and policy via their public-private partnerships; the latter is becoming increasingly present as many governments have cut back on public funding (as part of their neoliberal economic strategies) and increased their engagement with private partners to provide funding and support (iPES Food, 2023). International research groups and organizations also have strong ties with the private sector that can lead to the widening of their influence. The Consultative Group on International Agricultural Research (CGIAR), for example, received near 100 million dollars from the Bill and Melinda Gates Foundation in 2020; the FAO also has a partnership with CropLife, a pesticide lobby organization with

many agribusiness firms as members (iPES Food, 2023). When Agri-food firms provide funding, they are often then privy to influence policy and decision-making regarding food (iPES Food, 2023). An example of the latter is Monsanto which hired the Irish lobby firm, Red Flag Consulting, to set up a fake pro-glyphosate ‘grassroots farmers’ movement, organized to oppose a prospective EU ban on glyphosate (Boren & Nelson, 2018).

Conclusion

In this chapter, I have provided an overview of two dominant food production approaches: agroecological and industrial; it is important to note that food production does not always follow the principles of either of these models to a tee, and one can look at the values that guide food production to determine where a practice falls on the spectrum from agroecological to industrial. Despite these models being the dominant Western concepts related to food production, it is important to note that Indigenous cultures have their own terms, based on their cosmovisions and languages, to describe food production. It is also important to highlight that many agroecology practices are learned and/or appropriated from Indigenous agriculture and Indigenous care for the land; thus, readers are encouraged to address the topic of food production in the languages and the cultures of the food producers and to respect international biocultural heritage protocol and Indigenous rights when doing so. Beyond the two dominant food production models, agroecological and industrial, I have also defined other concepts that are related to these models, i.e., organic production, sustainable agriculture intensification (SAI), and climate-smart agriculture. The latter terms and concepts are built upon further by authors in this book in the context of Costa Rica. Lastly, this chapter outlines some key concepts and debates that surround SDG 2; these provide a frame of reference for the upcoming chapters and are important to understanding some of the trends related to food systems within Costa Rica and beyond.

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Chapter 2

Organic agriculture and agroecology in Costa Rica: The good, the bad, and the ugly

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Introduction

Recent studies have illustrated that Costa Rica has one of the highest concentrations of pesticide use per land area in the world (Vargas Castro, 2022; FAO 2011). In 2022, the United Nations Development Programme (UNDP) did a longitudinal study and reported that Costa Rica had, on average, 34.35 kg of active pesticide ingredients per hectare of land during the period of 2012 to 2020, with the range going from 24.6 to 47.1 kg during this period. These data are for pesticide use in agriculture which does not include pesticide use in pastures which is much lower (i.e., around 1.47kg/hectare; Vargas Castro, 2022). Within this pesticide use, Costa Rica uses 20 of the world's 22 most highly hazardous pesticides (Vargas Castro, 2022), of which some have been prohibited for over 15 years in the European Union due to their harmful health impacts (e.g., paraquat which was banned in the EU in 2007; Gaberell & Viret, 2020).

In addition to highly hazardous pesticide use in Costa Rica, transnational businesses farming cash crops are contributing to the expansion of industrial farming. Specifically, Costa Rica is a leading global exporter of pineapple (OEC, 2021), a market that generates around one billion USD a year (Rodríguez, 2021). Monoculture expansion is described in-depth in Ramin & Sylvester (2024), and some of the impacts include deforestation and poor soil management, both of which lead to increased sedimentation in rivers; the latter then affects water flow, aquatic life, and can lead to flooding. Agricultural run-off can also contaminate rivers, community water sources, and wetlands. Specifically, a study by O'neal Coto (2017), illustrates the contamination of the Térraba-Sierpe wetland with agrochemicals used in the pineapple industry. Furthermore, industrial farming has encroached into Costa Rica's protected areas, including protected wetlands (Rodríguez, 2021).

This model of industrial farming—with monocultures and excessive use of pesticides—has exacerbated socioenvironmental problems in Costa Rica. For example, Cuadrado-Quesada (2020) demonstrates how this model has transformed areas occupied by forests and springs dedicated to aquifer recharge into monocultures. The land use change has also caused various springs to dry out, and many communities, which are located close to industrial farms have been left without access to water, especially during the dry season (Ramin & Sylvester, 2024). Industrial farming has replaced traditional crops such as beans, corn and manioc into cash crops for export (Cuadrado-Quesada, 2020).

The key responsible entities who should not have allowed such socioenvironmental disasters to occur are the government and its institutions such as the Ministry of Environment and Energy (MINAE), Ministry of Agriculture and Livestock (MAG), Ministry of Health (MINSa) and the Costa Rican Institute for Water and Sewage (AyA) among others. Costa Rica has been suffering from these problems at least since the late 1990s, and even before then (Hilje et al, 1991). This means that many different government administrations have not been able to properly supervise and control the growing industrial farming and its intensive use of agrochemicals. There is enough legislation in Costa Rica to protect forests and water; however, there has been a clear failure of enforcement of existing legislation and monitoring (Cuadrado-Quesada, 2022). Humans and nature suffer this suite of harmful consequences.

Alongside intensive expansion of industrial farming, Costa Rican farmers hold a rich body of agroecological and organic farming knowledge. Specifically, many farmers have been practicing agroecology for generations (Sylvester & Little, 2020), and for Indigenous farmers, since time immemorial (Sylvester & García Segura, 2017). In this chapter we define agroecology as “farming in a way that mimics natural ecosystems, promotes on-farm diversity, and that does not use synthetic, chemical, inputs” (e.g., fertilizers, pesticides; Sylvester 2025). Organic farming, prior to the institutionalization and appropriation of the term, had been used synonymously with agroecology; however, organic is now a term that is defined by private or public certification bodies. Seufert et al. (2017, p. 11) explain that “...what distinguishes organic from ‘sustainable’ or ‘agroecological’ management is

that organic practices are well defined and, in many countries, regulated by laws [and] regulation and certification is central to the current concept of organic agriculture in most countries.” Thus, for the purpose of this article, we define organic farming as it is defined in the Costa Rican Law on Development, Promotion, and Encouragement of Organic Agriculture No. 8591 (Article 5), as:

All agricultural activities and their agroindustry, that are based in natural systems to maintain and recover soil fertility, biological diversity and adequate water resource management, and that promote biological cycles in soil use. These activities reject the use of synthetic agrochemicals, whose toxic effects affect human health and the environment as well as the use of transgenic organisms.

The specific goal of this chapter is to examine the current state of organic agriculture and agroecology in Costa Rica. Secondly, we provide a critical analysis of how different governments policies created to support organic agriculture have not been implemented as well as how these governments have allocated few resources to support smallholder organic farmers. We do so via an analysis of 1) the laws, programmes, and policies regarding organic and sustainable agriculture and 2) interviews with key actors that are working in these fields at different scales; these actors include farmers, activists, organic market founders, and state ministry of agriculture staff. This chapter starts with a brief historical context of agroecological and organic production in Costa Rica. We then analyze the existing organic and sustainable agricultural laws, programmes, and policies (Costa Rica does not have any agroecology laws, as we outline below); in doing so we present some of their successes as well as challenges and close this section by summarizing some wider challenges with practicing organic agriculture in Costa Rica. Next, we examine a few grassroots organizations, movements, and markets supporting organic agriculture and agroecology before closing with our conclusions and recommendations.

Literature Review

Agroecological & Organic Production in Costa Rica: A Brief Contextual Background

Agroecology has been practiced since time immemorial by eight nations of Indigenous Peoples in Costa Rica. Agroecology in Western literature is often described as a science, a movement, and a practice (Wezel et al, 2009). For example, Altieri (1987, p. 4) defines agroecology as a “...more environmentally and socially sensitive approach to agriculture, one that focuses not only on production, but also on the ecological sustainability of the production system.” Altieri (1987) also highlights that this definition requires a societal system that supports agroecology in areas beyond agricultural fields. For Indigenous peoples, however, agroecology is part of their identity. For example, sèbliwak Bribri women in Costa Rica have described their farming as a way to follow the Creator’s teachings and to ensure that the land stays healthy and alive and fulfills its purpose; they have also described farming without chemicals as a way to respect the land (Sylvester & García Segura, 2016). Bribri researcher Alí García Segura describes the concept Bribripa má batséitsè to illustrate how agroecology is part of language and identity (Sylvester & García Segura, 2025). Specifically, the concept of batséitsè refers to any action that guarantees the permeance of seeds, plants, and food; it is a practice in daily life that guarantees the permanent existence of seeds or food (among other products). Principles that are now central to Western concepts of organic and agroecological production in Costa Rica and elsewhere are based on Indigenous culture and wisdom. The latter is important to note at the outset of this chapter since some texts illustrate the origins of organic or agriculture farming in the 20th century. However, such reporting is often an appropriation of Indigenous wisdom and fails to acknowledge and respect the centuries of Indigenous practices that have sustained such production and illustrates the coloniality of research in these fields. Moving forward in this chapter, we will focus on the state laws and policies that refer to organic and sustainable farming, keeping in mind our profound respect for the Indigenous wisdom these fields are based on.

In the 1980s, organic production in Costa Rica in the Spanish language was originally called ecological (*agricultura ecológica*) or chemical-free production (*producción sin químicos*); producers

started to organize nationally to support ecological production, in part as a national response of those who wished to abandon the Green Revolution principles (Chaves, 2005). Similarly in the 1980s, structural adjustment programmes were being implemented and a small group of farmers along with staff from the Universidad de Costa Rica (UCR) and the Universidad Nacional (UNA) decided to advocate for farming projects what were less destructive and chemical intensive; this initiative resulted in the creation of *Teproca*, the Alternative Agricultural Experimental Production and Commercialization Workshop in Cartago (el Taller Experimental de Producción y Comercialización Agrícola Alternativa RL), which was the first of its kind at the national level (Pomareda García, 2019). It is interesting to note the use of the word ‘alternative’ for less-destructive practices; this highlights how normalized intensive industrial farming had become by the 1980s. *Teproca* then created a national business to sell organic products (Jugar del Valle SA), which was supported by Japanese cooperation via training about organic fertilizers and biological control (Pomareda García, 2019).

In the 1990s, additional organizations were founded, for example, ANAO, the National Association for Organic Agriculture (la Asociación Nacional de Agricultura Orgánica); these organizations came together to form a national movement called MAOCO, The National Movement for Costa Rican Organic Agriculture (El Movimiento de Agricultura Orgánica Costarricense; Chaves, 2005). MAOCO was instrumental in the creation of Costa Rica’s 2007 Law on the Development, Promotion, and Encouragement of Organic Agriculture at a time when Costa Rica signed the Central America-United States Free Trade Agreement (CAFTA-DR). MAOCO was concerned with the implications this Free Trade Agreement would have on the expansion of industrial agricultural production for export and its destructive practices (Sáenz-Segura et al., 2017).

This brief history illustrates how the term ecological agriculture was shaped nationally in Costa Rica under the umbrella of organic production (instead of the term agroecological). In our chapter, we further illustrate how although the laws use the term organic, the public policies are more focused on sustainable agriculture (instead of organic). We now present our qualitative research approach where we used both document analysis as well as semi-structured interviews to gather our data.

Methodology

The results of this chapter are from both primary and secondary data collection. Specifically, we carried out a document analysis (Bowen, 2009) of national laws, agendas, and public policies, to better understand the legal and policy landscape of organic agriculture and agroecology in Costa Rica as well as the potential for scaling of these practices. We reviewed first the key laws regarding organic agriculture; after this we asked our participants (Table 1) who work in either agroecology, sustainable farming and/or organic agriculture to provide us with lists of other public policies that are linked to the latter topics. A total of three laws were reviewed that relate to organic agriculture (years 1995, 1997, & 2007) and four other contemporary public policies (whose dates range from 2018 to present) were analyzed (see findings). We used thematic analysis of these policies, using a priori themes that included: organic, agroecological, & sustainable farming. Other themes presented in our analysis emerged inductively.

To complement this document analysis, we carried out five semi-structured interviews with professionals working in the fields of organic agriculture and agroecology; we invited these professionals using snowball and heterogeneous sampling (Table 1). Heterogeneous sampling was used to ensure we spoke to people working both in the public agricultural sector as well as in grassroots organic and agroecological organizations. The professionals who participated work at different scales and types of organizations, i.e., from the public organizations at the national scale (i.e., ministry of agriculture, public universities) to grassroots organizations at the local or national scales.

These interviews were semi-structured and addressed themes related to the state of organic agriculture and/or agroecology in Costa Rica and the successes and challenges regarding the implementation of related laws, policies, and agendas; for members of grassroots organization, we asked about their history and contemporary work in supporting and promoting organic agriculture and/or agroecology. The interviews were done online or in-person and were recorded, transcribed, and analyzed using qualitative content analysis. All participants gave their consent to use their names and personal identities in this research (although anonymity was offered but not chosen). This research was approved by the University for Peace Research Ethics Committee, as part of Dr. Sylvester's four-year research programme on Agriculture

& Water in Costa Rica. Authors Sylvester & Cuadrado-Quesada’s extensive experience in agriculture, water management, and agroecology in Costa Rica provided contextual knowledge that complemented and validated the patterns emerging from the document and interview analyses.

Table 1
Participants Interviewed in this Study and Their Affiliations

Participant's Name	Position/Affiliation	Interview Date (s)	Notes
Guido Barrientos Matamoros	Works with public universities, the National Council of Rectors, and the National Programme Estado de la Nación	23/08 2024	Supporting the National Agroecological Network, Researcher about National Organic Agriculture
Mayra López	Co-founder of the Organic Market (Feria del Trueque)	28/08 2024	Over 30 years in working with the development of organic agriculture
Mauricio Chacón Navarro	Ministry of Agriculture (MAG)	30/08 2024	Has worked in multiple areas of the MAG including organic agriculture
Hannia Villalobos	Organic Farmer at Rinconcito Orgánico and former member of MAOCO	24/09 2024	Studied social work and has organized and attended multiple national and international conferences on organic agriculture
Erlinda Quesada	Member of FRENASAPP	26/08 2024	Over 30 years in participation environmental movements
Juan Arguedas Chaverri	Independent consultant	22/10 2024	Coordinator of COPROALDE for 15 years

Findings

Unpacking the Conventional and Organic Agricultural Legal and Policy Landscape

Organic Agricultural Laws

Costa Rica has two national laws regarding organic agriculture: the Organic Environmental Law (*Ley Orgánica del Ambiente*) No. 7554 and the Law on Development, Promotion, and Encouragement of Organic Agriculture No. 8591 (*Ley de Desarrollo, Promoción y Fomento de la Actividad Agropecuaria Orgánica*). Costa Rica has no national laws for agroecology; however, the Organic Environmental Law defines ecological agriculture and organic agriculture as synonymous (Article 73). In this section, we first review these laws; in the next section, we expand on their strengths and limitations in practice.

The Organic Environmental Law No. 7554 was created in 1995. It was inspired by Article 50 of the Constitution that states “everyone has the right to enjoy a healthy and ecologically sustainable environment in which to develop, as well as the duty to preserve it” (Article 2b, *Ley Orgánica del Ambiente*). The Organic Environmental Law equates ecological or biological agriculture as synonymous with organic agriculture and specifically defines these practices as agriculture that “employs methods and systems compatible with ecological protection and improvement without the use of synthetic chemical products of inputs” (Article 73). In article 73, it is further detailed that the state will “promote organic agriculture on an equal footing with conventional agriculture and agribusiness.” Organic products must be certified as organic by a third-party organization authorized by the Costa Rican Ministry of Agriculture and Livestock (herein the MAG) or another agency accredited by the state (Article 74). In case the organic product is only for local consumption in Costa Rica, a participatory certification is permitted (Article 74). The participatory certification is elaborated on below in the section on the 2007 Law on Development, Promotion and Encouragement of Organic Agriculture (No. 8591).

The requirements and regulations outlined in the Organic Environmental Law are further supported by the Phytosanitary Protection Law No. 7664 (1997). In Article 11 of this Phytosanitary Law, it states that State Phytosanitary Services is responsible

for keeping an updated registry of organic producers in the country in addition to monitoring their compliance. It also establishes the State Phytosanitary Service as a distributor of organic certification and accreditation. Furthermore, Transitory II of this Phytosanitary Protection Law outlines “to encourage organic production, the State will cover the costs of certification for a period of up to two years for farmers who demonstrate, to the State Phytosanitary Service, that they are small organic producers and are not financially able to pay for certification.”

In 2007, the Law on Development, Promotion, and Encouragement of Organic Agriculture No. 8591 was created. This law “promotes organic agriculture, with the purpose of achieving an effective benefit for human, animal and plant health as a whole, as a complement for the development of public policies related to the use of soil, water resources and biodiversity” (Article 2). In Article 3, the law highlights the need to prioritize support for small and medium producers, gender equity, and respect for cultural diversity. Article 5 reiterates that organic agriculture is synonymous with ecological or biological agriculture and on previous state definitions of organic agriculture; specifically, it defines organic agricultural activities as:

All agricultural activity and agroindustry that is based on natural systems to maintain and recover soil fertility, biological diversity and adequate management of water resources, and that promotes biological cycles in the use of the soil. This activity rejects the use of synthetic agrochemicals, whose toxic impacts affect human and environmental health, as well as the use of transgenic organisms. In addition to contributing to environmental balance, this activity tends to support a socio-cultural balance regarding indigenous and peasant community organization, it integrates traditional knowledge to current practices, it generates fair working conditions and defends the people’s right to produce healthy food, prioritizing the use of local resources.

This law outlines several articles that promote training, incentivizing and the growth of organic agriculture in Costa Rica. For example, Article 11 highlights that the MAG along with the Ministry of Environment (MINAE) and the Ministry of Public Education, will develop training programmes to promote organic

agriculture. Furthermore, Article 16 outlines how the MAG will promote a permanent programme for the promotion of organic products for domestic consumption; Article 20 promotes the people's rights to use and exchange traditional seeds to promote traditional genetic heritage; Article 24 authorizes public banks to support easy access to credit for organic producers; Article 26 articulates tax exemptions for organized groups of organic producers registered with the MAG on equipment and up to one work truck, among other tax exemptions; and Article 30 describes a fund that can support the costs of transition to organic farming for small and medium producers; specifically stating that the National Production Council's Agricultural Sector Productive Reconversion Program was created to finance the transition processes involved in moving from conventional to organic production (Article 30).

The law includes a unique participatory certification for groups of farmers who need a certification of their organic products to sell on the national market only (Article 5). Article 14 of this law states that the rules for the participatory certification of groups will be defined by the MAG and must include the following elements: 1) the participation of one person or group of organic producers and one organization of consumers, 2) have defined a set of principles and values that include all the national norms for organic production, 3) training for people who will implement a participatory certification, 4) verification instruments on the farm.

The Regulation of Law No. 8591 (2009) further expands upon the execution and requirements of Law No. 8591. Firstly, it established the creation of the Department of Organic Agriculture as a new department within the MAG to be the specialized technical unit in charge of promoting organic agriculture alongside the National Program of Organic Agriculture (PNAO; Regulation to the Law No. 8591, 2009). The Department of Organic Production has the following objective:

To guide the development of organic production at the national level through the mechanisms and actions established in laws and regulations, which favour the promotion of this activity as well as the chains of improvement in quality and environmental and health safety (MAG, n.d., para. 2).

Successes and Challenges with the Implementation of Organic Agricultural Laws

Despite strong legal backing for organic agriculture (defined in Costa Rica as synonymous with ecological agriculture), there are challenges in its implementation. Via interviews with professionals working in organizations related to organic agriculture (Table 1) and additional field research by Sylvester, we outline some of these challenges here.

First and foremost, in Article 73 of the Organic Environmental Law, it states that the state will “promote organic agriculture on an equal footing with conventional agriculture and agribusiness.” However, this has not been the case in practice. Specifically, Mauricio Chacón, who has worked with the MAG for 36 years and specifically worked in the Department of Organic Production, reported that as of August 2024, there were only 3 staff members working in this Department. Chacón explained that the state organic legislation “...covers many areas...and it has many areas for development within which in some it is materially impossible to fulfill them when the unit is composed of three people at this moment.” The latter is corroborated with data from 2022 when chapter author Sylvester from the University for Peace hosted a meeting on Organic Agriculture in Costa Rica, and the invitee from the MAG reported again that there were only three staff working at the Department of Organic Agriculture and described a lack of staff allocated to this form of agricultural production.

In a news article interview with the National Movement for Costa Rican Organic Agriculture (MAOCO), Martinez (2024) reported that as of September 2024, there were no longer any staff members currently working with the MAG on the following: inspections on organic farms, follow-up for transition processes, and/or providing support for organic producer associations and Organic Producer Groups (GPOs). In this interview, MAOCO also outlined that the head of the Ministry of Agriculture, Victor Carvajal Porras, closed the few jobs associated with organic agriculture and that in 2024, both the National Commission of Organic Agricultural Activity and the Department of Organic Production have been closed; these closures were not yet official, but were reported in the name of institutional restructuring (Martinez, 2024). In a radio interview, MAOCO members discussed the uncertainties of this restructuring, expressing concerns that restructuring would eliminate MAOCO’s participation in the National Commission for

Organic Agriculture and that organic agriculture would be united under wider programmes of sustainability (Duamani Echandi, 2024).

That the Department of Organic Production is allocated so few employees directly contradicts the Organic Environmental Law (Article 73) that illustrates state support on *a level playing field* with conventional agriculture. The lack of support and resources for the Department of Organic Production is also contradictory to other articles of state law that outline how the MAG will develop training programmes to promote organic agriculture (Article 11) as well as support a permanent program for the promotion of organic products for domestic consumption (Article 16; Law on Development, Promotion, and Encouragement of Organic Agriculture, 2007). The closure of the Department of Organic Production is also in direct violation of the Law on Development, Promotion, and Encouragement of Organic Agriculture (2007) that reads, “Through a specialized office, the MAG will allocate the human and material resources necessary to fulfill the purposes of this Law” (Article 10).

Mauricio Chacón shared how one could conceptualize that Costa Rica is currently at the basic level regarding organic agriculture, which includes the presence of a national agency for the registration and control of organic producers (ARAO), incentives for farmers in transition to organic, and support for producers in restoring their farms. In an interview with Mayra López, co-founder of one of San José’s Organic Farmer’s Markets (Feria Orgánica del Trueque), she explained that there are many strengths in Costa Rica’s legislation; and, if this legislation is adequately implemented, it could solve some of the challenges with organic agriculture. She explained:

Although certainly [organic agriculture in Costa Rica] has many weaknesses, however, if the Law of Encouragement were complied with, it would be great progress...if we talk about transition programs that support the transition from conventional agriculture to organic agriculture... with follow-up on the farm with resources to support the transition with infrastructure. For example, in Costa Rica, producing without protected environments has become very difficult, therefore they [the Department of Organic Agriculture] can support, advise and follow up on these transitions.

Participants we interviewed highlighted that state support for organic producers is not currently sufficient. Mayra López shared that active support from the MAG is needed so diagnoses can be made regarding which farms are more apt for making a transition to organic farming and so resources can be dedicated to such transitions, and both of these actions are stipulated in the Law on Development, Promotion, and Encouragement of Organic Agriculture (2007). Mayra also explained how she and others have been requesting a national organic seal (for certified national products) and a national regulation and marketing for this seal but have not received state support on this issue.

Hannia Villalobos described an example of this support through a project in 2008 for rainwater capture that was financed by the MAG with funds from the Inter-American Development Bank (IDB); she furthermore described how certified organic producers that are starting their transition process to organic can access funds for this transition. Although these options exist, Hannia and other participants still mentioned that this support is not enough. She shared that:

Unfortunately, at this moment the State is not providing support. If support for conventional agriculture is very limited, support for organic production is practically invisible...despite the fact there is a whole legal framework and laws...created for organic production.

Guido Barrientos described that this lack of support was not always the case in the past. He specified that the funding that the MAG received to support organic agriculture, i.e., 0.1% of the tax on gasoline (Article 5, Tax Simplification and Efficiency Law N° 8114, 2001), was subject to decisions of a National Commission for Organic Agriculture; this commission included people from the MAG and also representatives from civil society, i.e., from the National Movement for Costa Rican Organic Agriculture (MAOCO). However, the current Costa Rican government, eliminated this National Commission and now the very small amount of money allocated to organic agriculture is often allocated by the MAG to what is called *best agricultural practices*—a term expanded upon in the next section.

Public Policies Linked to Sustainable Agriculture

Mauricio Chacón, from the MAG, described many other national programmes that are linked to sustainable agriculture that have both organic and agroecological principles incorporated, which we discuss in this section. Specifically, he defined sustainable agriculture as “agriculture that, without renouncing productive and economic efficiency, seeks to minimize negative environmental impacts and maximize positive environmental impacts.” He also shared that the goal of the MAG is to support farmers increase their production without resulting in the irrational use of natural resources and without increasing greenhouse gas emissions or negatively affecting ecosystem services, such as water and forests. Here we describe a few of the other public policies that incorporate the above definition of sustainability and examine the extent to which they have integrated agroecological and organic principles.

The AgroEnvironmental Agenda.

La Agenda Agroambiente, Decreto Ejecutivo N° 43288-MINAE-MAG (2021) La Ministra de Ambiente y Energía, El Ministro de Agricultura y Ganadería

This national agenda has the goal of bringing together environmental and agriculture sectors regarding climate action, sustainable soil and biodiversity management, bioeconomy, empowerment of farmers, and collaborative action between the public and private sectors (MAG et al., n.d.). The latter relates specifically to the alliance between the MAG and the MINAE and was designed to implement different international programmes related to sustainability and climate action. For example, one of its goals is to implement part of Costa Rica’s commitment to the Glasgow Pact regarding forests and land use via Sustainable Landscapes; specifically it has a goal to “...maintain Costa Rica’s territory as a resilient forest and agricultural landscape capable of producing commodities with zero net deforestation and consolidate its transformation into a carbon neutral landscape with low pesticide consumption and conservation of high-value forests” (MAG et al, n.d., p. 9).

This agenda has six themes, one of them being related to agro-landscapes, and the action items for this theme include: rehabilitation and recovery of biophysical ecosystem elements, recovery of ecosystem connectivity, increase the efficiency of

food systems, sustainable and adequate management of soils (based on the soil capacity), integrated water management, and integrated ecosystem and biodiversity management (MAG et al., n.d., p. 28). The third theme is related to bioeconomy, production chains, and food and nutrition security, and specifically details organic agriculture and the use of bio-inputs. Additionally, the sixth theme in this agenda is regarding valuing rural inhabitants and one of its action items is to promote the use of non-synthetic inputs for agriculture and livestock farming (MAG et al., n.d., p. 29). In the latter elements from this agenda, it can be observed that the priority focus is on organic agriculture principles in this document, although it does include a few principles that overlap with the FAO's 10 principles of agroecology, i.e., soil conservation and application of circular economy, and positive interactions among biodiversity and agriculture (FAO, 2024).

Public policy for the Costa Rican agricultural sector (2022-2032).

Política Pública para el Sector Agropecuario 2023-2032, Decreto Ejecutivo N° 43887-MAG – (2023), El Ministerio de Agricultura y Ganadería

In this policy created by the MAG (2023), it is highlighted that although Costa Rica has a complex institutional structure for its agricultural sector, and mechanisms for inter-institutional cooperation, coordination has been weak and insufficient. The MAG (2023) calls for a modernization of the agricultural sector, stating it needs “an institutionality that is effective, efficient, modern, technified, would support governance, and improve decision-making to support, guide and stimulate the social and economic development of the sector (p. 19).” Although this policy does mention principles regarding sustainable agriculture, there is much more of a focus on efficiency, technology, and modernization, all of which are principles of industrial agriculture carried forward from the Green Revolution. It also focuses on increasing productivity via resistant seeds, and sourcing of genetic material nationally or internationally to support this goal (p. 25). The latter is also very much in line with industrial agricultural practices, since organic agriculture does not allow genetically engineered seeds, and agroecology emphasizes traditional and local seeds and seed sovereignty for producers and consumers. This policy also places emphasis on access to finance and insurance policies

for the agricultural sector, market-based solutions and lending schemes that mirror the agro-imperialism of the Green Revolution (Abarca Hernández, 2020).

When discussing natural resources, there is an emphasis on their efficient use (MAG, 2023, p. 25). There is, however, mention of the relationship between agriculture and the environment and sustainable production. In this section there is mention of organic production, Nationally Appropriate Mitigation Actions (NAMAs), and the Costa Rican Ecological Blue Flag programme. One of their action items is to support good agricultural practices that protect human health, the environment, soil regeneration, and the protection of water and forests (p. 25). Still, in this section the principal objective clearly relates to efficiency, financial sustainability, and markets; it states: to contribute to the increase in productivity and sustainability of agriculture through efficient agricultural production, through efficient mechanisms to meet the challenges of the market (MAG 2023, p. 25).

The National Development & Public Investment Plan 2023-2026.

Plan Nacional de Desarrollo e Inversión Pública 2023-2026
Rogelio Fernández Güell, Ministerio de Planificación Nacional y Política Económica

In the National Development and Public Investment Plan (2022), one section is dedicated to the agricultural sector. This section has various objectives, most of which are focused on increasing production, sustainable production, climate action, and water security. To fulfill these objectives, the emphasis is on scientific and technological knowledge. When discussing sustainability, the emphasis is on Nationally Appropriate Mitigation Actions (NAMAs) for agriculture and livestock. There is no mention of agroecology or organic agriculture specifically, however, there is mention of “good agricultural practices that minimize the risk of failing to comply with the maximum limits of pesticide residues” (p. 224).

The National Decarbonization Plan (2018-2050).

Plan de Descarbonización Compromiso del Gobierno del Bicentenario (2019) Decreto Ejecutivo N° 41581-MINAE, El Ministerio de Ambiente y Energía

Two of the 10 goals of the National Decarbonization Plan are related to agriculture. Specifically, goal 8 is the support for agrofood systems that are highly efficient and that generate goods for export and for local consumption that have low carbon footprints; goal 9 is creating an eco-competitive livestock model based on production efficiency and a decrease in greenhouse gas emissions (p. 31). The action items are linked to climate action in the form of NAMAS in coffee, banana, sugarcane, and rice as well as in the livestock sector. The actions proposed are directed at climate efficient technology, circular economy, and scaling of these processes. Specifically, it states the actions proposed for the period of 2031 to 2050 are to “scale and transform for a highly productive agriculture sector, low in carbon, and resilient and that contributes to the Costa Rican circular bioeconomy” (p. 57).

Strengths and Challenges Regarding Public Policies Linked to Sustainable Agriculture

The analysis in the previous section illustrates that Costa Rica has numerous public policies and agendas that incorporate sustainable agriculture principles. Some of these policies specifically mention organic agriculture, while others incorporate principles of both organic and agroecological production. However, the main terminology refers to sustainable agriculture and the overarching emphasis in all the above policies is on increasing efficiency and productivity via circular bioeconomy and technological intervention, while at the same time, decreasing the agricultural sector’s greenhouse gas emissions and protecting water and forest resources. Another strong emphasis is on NAMAs in the agriculture sector, with emphasis on crops with larger-scale production in the country (i.e., livestock, coffee, banana, sugarcane, and rice). Although these climate and environmental goals are extremely important, it is noteworthy that when sustainable practices are mentioned, there has been a highlighting of reducing pesticide residues, rather than a scaling of fully organic or agroecological practices. The latter focuses more on the needs of the export market (and subsequently international consumers) versus the health of local producers.

Hannia Villalobos, a farmer working in the organic sector for 30 years, shared that what she feels is lacking is a state with a national policy for organic agriculture, such as the national policy in Denmark, a policy that is respected despite the changes in

governments. Hannia shared multiple other challenges including the fact that there are very few opportunities for organic farmers and there are also a series of limitations that discourage farmers from this sector; the latter is evidenced in the above section that illustrates that most policies are related more to broader concepts of sustainability and climate action but are not directed specifically to the organic sector. She provided an example of a limitation regarding access to organic seeds, for instance, where seeds are often lacking, and organic producers have to purchase chemically treated seeds and wash them three times. She also explained that in organic agriculture it is prohibited to grow in pots, and she asked "...how can organic agriculture grow with so many limitations?" Guido Barrientos echoed this point, sharing "...with so many regulations...they [the producers] are drowning... they are strongly repressing them to the point that many are talking about abandoning [organic farming]." Guido mentioned that the latter is the case for small and medium producers. The situation is different, however, for larger scale farming for export; in the latter, Guido mentioned how the certification serves as to illustrate a set of required practices for export to the EU or the United States, for instance.

Wider Challenges with Organic Agriculture and Agroecology as Expressed by Participants

Thus far, we have described some of the successes and challenges regarding organic and agroecological laws, policies, and programmes. However, some of the participants interviewed added challenges that go beyond these specific laws, policies, and programmes, and should be highlighted here. These challenges provide a wider context as to why, beyond state legislation and support, people can be discouraged from producing food in general, let alone producing food in an organic or agroecological way.

Two participants (Guido and Hannia) both mentioned the lack of recognition given to agriculture as a pillar for Costa Rica's development. This has resulted in many people not wanting to continue farming or in their youth deciding not to learn farming. Guido shared how important it is to work to revalue farming and emphasized the value of the campesino culture. He shared that agroecology is a good start for this process, stating "...it has become very sensitive to think that someone is going to develop their life from agriculture, right? In the countryside...the living conditions... result in parents telling their children to study...

and see if they find a better place.” The latter is also a sentiment expressed to author Sylvester in her research in different farms across the country.

Both Hannia and Guido, as well as Erlinda Quesada, also shared the lack of concern for either food security and/or food sovereignty for Costa Ricans. These three participants discussed Costa Rica’s agroexport food model, which means producing food for export while importing basic food staples. Guido and Erlinda shared how this was part of Costa Rica’s plan in the late 1980s and early 1990s, and thus, local production of basic grains such as beans and rice has dropped drastically. Guido shared specifically how this agroexport model increases Costa Rican’s vulnerability to international priorities and the volatility of export markets; thus, food security if defined as having access to imported food is not enough, and what is needed is national policy for food sovereignty. Erlinda Quesada specifically shared that the state promotion of an agroexport model is a misleading policy since it forces smallholder producers to participate in industrial farming and as a result stop producing basic foods for households. She shared how this policy was sold to them to increase local economies to then buy their food products, however, it has not been a profitable model for local communities, whose economies have not grown from participating in industrial farming and instead it has caused increased poverty as well as health and environmental destruction.

Many farmers Sylvester has worked with, including those interviewed here, have described the negative impacts resulting from this agroexport model and the need to have a wider discussion about development in Costa Rica. Guido shared how he feels we need to “...redefine what national development means or what kind of development we want and what is the role of agriculture in this development.” Erlinda Quesada shared a similar concern and added that it is important to dismantle discourses that have been imposed on Costa Ricans, and especially youth, such as the idea that living and working in rural areas is synonymous with being poor. She reaffirmed that rurality is part of her culture and local, organic, food production has always been important for human and environmental well-being, a trend that became evidently clear during the Covid-19 pandemic, where urban places were those that suffered most.

Hannia also shared another important point, i.e., that there is also a strong pressure, nationally and globally, from powerful actors in the pesticide industry. Guido added to this by explaining that the training provided by institutions in Costa Rica is also tainted by external visions, specifically training includes the vision of those that are promoting the sale and use of pesticides. These testimonies are corroborated by recent data that illustrates how has been a 36 percent increase in pesticide use in Central America (from 1999 to 2020); this increase not unique to Central America but also present in most continents, with the largest increase (119%) being in South America (Heinrich-Böll-Stiftung et al., 2022).

Grassroots Organizations Supporting Organic Agriculture & Agroecology

COPROALDE

For example, the COPROALDE network (La Red COPROALDE), which stands for Coordinator of NGOs with Alternative Projects for Development was founded in 1988; it is a “a group of organizations with independent origins and tasks that share the same commitment to contribute to the formation of a national movement for an alternative rural development, relying, in part, on the agroecology strategy” (Mora Castellano, 1994, p. 14). COPROALDE originated with funding from the Lutheran Church in Germany which was promoting social-environmental development projects in Costa Rica (Mora Castellano, 1994). COPROALDE was also articulated with the Latin American & Caribbean Agroecological Movement (Movimiento Agroecológico Latinoamericano y del Caribe) and with the Mesoamerican Network of Alternative Agriculture (La Red Mesoamericana de Agricultura Alternativa; Mora Castellano, 1994). At the time of writing this chapter, COPROALDE was no longer active.

As per our interview with Juan Arguedas, who served as COPROALDE’s coordinator for 15 years, this network was crucial to Costa Rica’s organic agriculture for two reasons. First, it supported the formation of Costa Rica’s national organic movement (MAOCO) and it participated in the creation of Costa Rica’s Organic Agriculture Law (8591); specifically, this network was instrumental in promoting the participatory organic certification (an alternative to the market-based driven certifications). In what Juan described as COPROALDE’s second

phase of action, this network participated in Central American processes regarding sustainable agriculture using the *campesino a campesino* methodology. Their focus was on sustainable agriculture since they felt that the field of organic agriculture was centered around commercial certifications that were serving export markets. Thus, by focusing on sustainable agriculture more broadly, they were able to center local markets, self-sufficiency of farmers and communities, and horizontal interactions among farmers and between farmers and consumers.

MAOCO

MAOCO, the Movement for Costa Rican Organic Agriculture (Movimiento por la Agricultura Orgánica Costarricense), was founded in 2000 (Chaves, 2005). It has been described as a social movement made up of organizations of organic producers, NGOs, universities and state entities that have the common goal of promoting organic production as a proposal for rural and national development (Chaves, 2005). The political context during the period MAOCO was formed is important to understanding some of MAOCO's achievements. Specifically, in 2006, the Central America-United States Free Trade Agreement (CAFTA-DR) was signed; this event was faced with strong social resistance, due to its implications for the expansion of industrial agricultural production for export. In this context of the resistance of this free trade agreement, by peasants and smallholder producers, among other opposing groups, MAOCO's was instrumental in achieving the approval of the 2007 Law on Development, Promotion, and Encouragement of Organic Agriculture (Sáenz-Segura et al., 2017). Sáenz-Segura et al. (2017), describe how "a large part of the boom in the production and sale of organic products in Costa Rica is due to the fact that MAOCO undertakes activities to promote this type of production, protected by the legal resources provided by Law No. 8591" (p. 103). Thus, this is one example of how a social movement has been instrumental not only in the creation of a law to encourage and promote organic agriculture but also in creation of regional strategies for longer-term development of sustainable practices (Chaves, 2005). It is important to note that although MAOCO refers to organic agriculture, its vision has historically gone beyond the elimination of pesticides and has focused on a way of life that goes beyond individual practices, which they called a new rurality, that considers intergenerational integration on farms, livelihood support for smallholders, and local markets

for sale and consumption (Chaves, 2005). Hannia Villalobos, a former member of MAOCO, shared how MAOCO had very strong origins and how their movement was shared as an international success story, however, she feels it has been weakened over time. Despite these challenges, she highlighted that MAOCO is still present and resisting the recent events associated with the of the Costa Rican Department of Organic Agriculture (see Martinez, 2024).

FRENASAPP

Another national movement that has organized to resist the expansion of industrial farming and to support agroecological and organic farming is the National Front of the Sectors Affected by Pineapple Production or FRENASAPP (Frente Nacional de Sectores Afectados por la Producción de Piña). This movement originated in 2007 which coincided with grassroots resistance against the company Agroindustrial Tico Verde, that was growing pineapple in the highland of the Guácimo county (Cerdas Vega & Ulate Segura, 2024). Some of the key aims of FRENASAPP are to: 1) strengthen community organization to resist against the negative effects of the pineapple expansion, 2) call attention to the fact that this is a problem of national scope that demands urgent attention by government institutions, and to 3) denounce all of the existing violations of national and international law committed by the pineapple industry in Costa Rica (Cuadrado-Quesada 2020). In February 2024, a national FRENASAPP meeting was held in San José, Costa Rica, co-organized by Erlinda Quesada and authors Sylvester and Benavides (Figure 1).



Figure 1: *Visual Map, Co-Created by Members of FRENASAPP During a National Meeting in February 2024, Illustrating the Locations of the Organization's Members. Photo taken by Olivia Sylvester.*

In our interview with Erlinda Quesada, she explained that prior to this 2024 FRENASAPP meeting, the movement was less active and that this meeting was important to revitalize their movement. During this meeting multiple objectives of the movement were discussed including the support for regional events regarding not only pineapple but also other key issues regarding the negative human and land health impacts of industrial farming and pesticides in Costa Rica. Thus, even though FRENASAPP was formed as a national front for the sectors affected by industrial pineapple production, this movement now encompasses individuals, cooperatives, associations, university staff, agricultural unions, environmental activists, and land defenders all working on elements of the impacts of industrial farming in Costa Rica. One of the outcomes of this 2024 meeting was also a dialogue about alternative forms of rural food production and development, something that aligns with the vision of MAOCO described in the previous section.

Other movements

COPROALDE, MAOCO and FRENASAPP are three key national movements started via grassroots activism whose goals and visions are related to the resistance of the negative impacts of

industrial farming and the promotion of organic and agroecological practices; however, these are not the only national movements. We briefly mention a few more movements that promote organic or agroecological production, acknowledging that due to the scope of this chapter, there will be many movements that we are unable to discuss. There is a national network called the Costa Rican Network of Ecological Agriculture (*Red Costarricense de Agricultura Ecológica*) as well as a group called *Agroecología de Costa Rica*; both of which were mentioned by our interview participants. It is worth noting that there are many women's organizations that promote organic and agroecological practices in Costa Rica. One organization of this nature is the Costa Rican Rural Women's Network (*Red de Mujeres Rurales de Costa Rica*). This national network is organized around multiple principles, including: supporting women's agroecological practices, the denouncement of the expansion of monocultures and their pesticide contamination, women's access to land and political participation (among many other principles; Leiva Correio, 2020).

It is also important to note that many grassroots movements to support organic agriculture and agroecology may not have documentation in English and/or Spanish, the languages of the literature reviewed for this article, and may still be organized groups working in these movements. It is important to recall that many agroecology and organic practices are mainly learned, and/or appropriated from, Indigenous agriculture and care for the land. Author Sylvester has worked with members of the Bribri Indigenous Peoples in Costa Rica and specifically the *sébliwak* Bribri group whose farming is based on millennial agroecological practices (Sylvester & García Segura, 2016). For example, for Bribri people, organic and agroecological farming cannot be described as a set of practices in a vacuum; instead, these are lifeways that are part of Bribri identity (Sylvester & García Segura, 2025; Sylvester & García Segura, 2016). The latter is but one example of Indigenous groups and networks in Costa Rica that support agroecology as a part of their daily life. Others include the National Alliance for of Indigenous Women in Costa Rica (*La Alianza Nacional de Mujeres Indígenas en Costa Rica*) and Indigenous Women in Defense of the Southern Territories (*Mujeres Indígenas en Defensa de los Territorios del Sur*).

Guido Barrientos also made an important point, citing his previous research about organic agriculture in Costa Rica (Barrientos

Matamoros, 2020). He stated that many organic producers he interviewed discussed organic agriculture as a way of life, which goes far beyond the existing regulations for organic agriculture. The latter has also been the experience of author Sylvester, who has seen smallholder organic farmers in Costa Rica adopt a holistic ecological and socially just approach to farming, like that of international definitions of agroecology (FAO, 2024).

National Markets for Organic & Agroecological Products

The Organic Market: Feria del Trueque.

The Feria del Trueque is the only certified organic farmer's market in San José, Costa Rica, that was founded in 1999. Co-founder of the Feria del Trueque, Mayra López, described it as a:

Meeting place between producers of healthier products and consumers, it transcends the mere commercial exchange of buying and selling products. It establishes a relationship of trust and solidarity between producers and consumers, and, from the beginning, it has always been thought of as a space for building a social network.



Figure 2: *The Feria del Trueque, October 2024. Photo by Wen Jia.*

Mayra described that one of the market's goals is that consumers get to know the producers' farms. Thus, periodically, they organize tours to these farms for consumers to meet the families behind the scenes growing their food and to learn about the challenges producers go through to get their food to the market. This connection has resulted, she explained, in having loyal, long-term consumers at their market. At the market, they also organize workshops and talks, for example, related to compost, nutrition, and climate change among other topics. Guido Barrientos shared how this direct contact with farmers is important to eliminate interventions in our food chains and to create "...a true relationship between the producer and the consumer..." since, currently "...everything has become so impersonal, and we do not know what we are eating."

Mayra explained that this market is small because of lack of resources for promotion; promotion is an activity, she explained, that the government should oversee, since the 2007 Law on Development, Promotion, and Encouragement of Organic Agriculture, establishes that the MAG has the obligation to implement these spaces for promotion of organic agriculture. Specifically, article 6 of this law states that "the MAG is responsible for the promotion, development, administration, and control of organic agriculture." While the market is small, farmers selling there are dedicated to promoting nutritious produce. Hannia Villalobos commented that her satisfaction in arriving at the market to give people a product that is free of pesticides is unparalleled.

Unlike other countries in Latin America, such as Argentina, Costa Rica does not have agroecological markets. However, farmers that are not certified organic, do sell their products at other markets and describe to their customers their practices that might be chemical-free, in transition to organic, and/or agroecological or produced using Indigenous practices. One example of this is the Feria Verde de Aranjuez, where stalls illustrate that farmers are either certified organic, conventional, or in-transition.

National Training

As we discussed above, as dictated by the National Law (8591) the MAG is the institution indicated to provide training and accompaniment to organic producers and those in a transition to organic production. At the same time, it is important to note

that the National Learning Institute (INA, Instituto Nacional de Aprendizaje) has a National Centre Specialized in Organic Agriculture (CNEAO) in Oreamuno, Cartago. This Centre offers free training sessions on organic production.

Discussion

The specific goal of this chapter was to examine the current state of organic agriculture and agroecology in Costa Rica. To do so, we examined laws, policies, and programmes in relation to these farming practices and interviewed key actors that are working in these fields at different scales; these actors included farmers, activists, organic market founders, and Ministry of Agriculture staff. By no means was our analysis exhaustive; however, it does provide a starting point to see some of the strengths as well as challenges with organic agriculture. Secondly, we have illustrated how organic agriculture has a more prominent place in laws, policies and programmes versus agroecology in Costa Rica. Historically, there were many terms used to describe sustainable farming in Costa Rica (chemical free, ecological etc), but with the creation of the 2007 law, the term was streamlined into organic. There is currently no agroecological legislation, legislation that is present in other countries in the region (e.g. LeCoq et al, 2020). We found that although some agroecological practices are mentioned in national policies and agendas (such as circular economy, the protection of water and forests, and the support for rural livelihoods), the only legal framework is for organic agriculture. Within public policies, the main conceptual framework is neither organic nor agroecology, but instead sustainable farming using best practices.

Overall, we found that Costa Rica has strong policies to support organic agriculture and those interested in transitioning to organic production. The creation of one of these laws is also due to the strong advocacy of civil society organizations (such as MAOCO). The main challenge, however, is regarding the laws' implementation. Specifically, multiple participants shared the potential of the 2007 Law on Development, Promotion, and Encouragement of Organic Agriculture (8591), and they also shared how it is not being adequately implemented. There were a few reasons stated for the latter including a lack of resources and personnel working in the national organic department (three at the time of writing this chapter). The latter is extremely

concerning given that it directly contradicts Costa Rica's Organic Environmental Law 7554 (Article 73) which outlines that state support for organic production will be on *a level playing field* with conventional agriculture, and this is clearly not the case.

The lack of support and resources for the Department of Organic Production is also contradictory to other articles of state law that outline how the MAG will develop training programmes to promote organic agriculture (Article 11, Law 8591) as well as support a permanent program for the promotion of organic products for domestic consumption (Article 16, Law 8591). The Law 8591 also illustrates where the funding will come from so the MAG can support producers who wish to transition from conventional farming to organic (0.1% tax on gasoline goes to the MAG to support organic production; Article 5, Tax Simplification and Efficiency Law N° 8114, 2001). Participants illustrated that although there has been some monetary or in-kind support for organic producers in the past, this support is currently almost non-existent.

Civil society groups have played key roles in keeping organic agriculture alive in Costa Rica. Despite the fact that the law states that the MAG should promote organic products for domestic consumption (Article 16, Law 8591), currently this role has been taken on by civil society groups. One example of this is the Feria del Trueque, Costa Rica's only certified organic market. Similarly, other civil society organizations we spoke with promote organic and agroecological farming without any current support from the MAG. The latter illustrates what Guido Barrientos shared, i.e., that the current Costa Rican government eliminated this National Commission of Organic Agriculture and now the very small amount of money allocated to organic agriculture is often allocated by the MAG to what is called "best agricultural practices."

It is important to highlight that 'best agricultural practices' is a subjective term. Even though there may be many state programmes that support practices that mirror organic or agroecological farming, such as practices that are pesticide free, or those that protect water and forests, the language in public policies is subjective being that it uses the term "sustainable" and/or "good practices." Furthermore, the language used in Costa Rica's public policies is a mere extension of the Green Revolution principles.

Specifically, these policies are focused on modernization of the agricultural sector, on efficiency and financial sustainability, meeting the demands of markets, the production of commodities for export, lowering pesticide consumption or residues on food products, eco-competitive livestock models. The latter are principles of industrial agriculture carried forward from the Green Revolution (Perfecto et al., 2009). The Public Policy for the Costa Rican Agricultural Sector (2023-2032) also places emphasis on access to finance and insurance policies for the agricultural sector; such market-based solutions and lending schemes, mirror the agro-imperialism of the Green Revolution (Abarca Hernández, 2020). Industrial agroexport food production models, based on satisfying international market demands, and increasing dependence on corporate seed-food production packages (seeds and associated chemical inputs) as well as international finance, has consistently resulted in the sidelining the health, well-being, and food security of local populations, and Costa Rica is no exception (Goebel McDermott & Montero Mora, 2023; Patel, 2013; Wittman et al. 2010). Such sustainable agriculture intensification models, that seeks to increase food production more “sustainably,” usually based on intensifying production on existing farm land (Naeem et al., 2021; Godfray & Garnett, 2014), and that are often devoid of meaningful transformation in our food systems, are some of the reasons why the FAO and others (2022), have reported how we are moving backwards in our efforts to end hunger and that we urgently need to accept that food insecurity cannot be solved only through increased food production (Sylvester 2020).

Within Costa Rica’s public policies, there is also terminology related to resilience, circular bioeconomy, and lowering greenhouse gas emissions; however, all are within the context of commodity export markets and increasing production. The AgroEnvironmental Agenda has the greatest emphasis on environmental protected and integrated resources management, and in contrast to the other public policies, it mentions “valuing rural inhabitants.” To value rural inhabitants, one action item detailed is to promote the use of non-synthetic inputs for agriculture and livestock farming (MAG et al., n.d., p. 29). While the latter is very important, there is also a grave contraction with other policies, such as the Public Policy for the Costa Rican Agricultural Sector (2023-2032). The latter policy seeks maximizing productivity with improved seeds (local or imported; p. 26), instead of supporting seed sovereignty for local producers, and it seeks modernization via Western technology

transfer, instead of valuing farmer traditional knowledge and horizontal farmer-to-farmer knowledge exchanges (e.g., Rosset et al., 2011). Another contradiction exists in the National Development & Public Investment Plan, which has the goal of minimizing the risk of failing to comply with the maximum limits of pesticide residues. A focus on minimizing pesticide residues only speaks to the goal of keeping food within the regulations of international markets and speaks nothing to valuing the needs of local producers, whose health and lives are at risk while applying highly hazardous pesticides.

After our analysis, it is evident that these public policies have a strong emphasis on maintaining industrial farming practices, based on Western scientific knowledge and technology, to fit an agroexport development model, while minimizing environmental impacts. The latter is drastically different from agroecological models, models based on traditional and Indigenous knowledge, for the health and well-being of producers and consumers. Even with the Organic Law 8591 and other public policies, these contradictions are evident. For instance, in the Public Policy for the Costa Rican Agricultural Sector (2022-2032), increasing productivity via resistant seeds is highlighted; to do so, it is suggested to source genetic material nationally or internationally (p. 25). While Article 20 of the Organic Law 8591 promotes people's rights to use and exchange traditional seeds to safeguard traditional genetic heritage, sourcing resistant seeds is also often equated with herbicide resistance (ISAAA, 2020). We have seen the dire impacts of dependence on such herbicide-tolerant seeds internationally. For instance, state promotion of these seeds and associated chemical inputs, has resulted in farmer dependence on such packages; then, if economic shocks occur (due to low crop outputs, climate crises, or other related conflict), farmers can no longer purchase such inputs, and this has resulted in severe economic debt, which in some cases has led to farmer suicides (Thomas & De Tavernier, 2017). These nuances illustrate that it is not enough to blame the challenges with organic farming in Costa Rica on a lack of staff and resources in the organic sector, there are also political incongruences that illustrate drastically different priorities across sectors working with food production, and a persistent emphasis on production for export markets at the cost of local needs and well-being.

Overall, we found a disproportionate focus on an agroexport development model, designed for the profit of few. This trend of disproportionate Costa Rican state support for agroindustry at the cost of local food producers has been reported elsewhere in the context of crops such as pineapple (Ramin & Sylvester, 2024) and rice (Rivero, 2024). These skewed priorities become even clearer when we hear of local farmers' multiple challenges when trying to use less toxic inputs on their farmers (organic seeds and urea for bio-inputs) but find these inputs hard to source in-country, while the accessibility of synthetic chemical inputs and pesticides abound.

The organic certification itself also presented various barriers to producers who wish to become certified. These barriers go beyond the detailed reporting to an accredited certifier or the costs associated with certification and include the lack of state support for a national logo for national organic production, something organic farmers have been advocating for with no success. Costa Rica is one of the only countries, to our knowledge, that has a participatory certification for groups of organic producers; this programme has great potential to support local producers, however, the current lack of state support for those interested in this transition, many have found this process untenable (Sylvester, personal observation).

The role of social movements created in Costa Rica has been on one hand to counter the socio-environmental problems caused by industrial farming, such as excessive use of pesticides and monocultures, pre-dominantly pineapples and bananas, and, on the other, to support agroecological, Indigenous and organic farming. Their love and care for Costa Rica's people and nature has been exceptional, especially in the areas where the government has neglected to fulfil their duties as a caretaker. Many communities, NGOs, individuals, artists, academics, researchers, among others continue to be observant and demanding socioenvironmental protection from the government and their institutions. In Costa Rica, the even minimal actions taken by the government has been when social movements have demanded it.

Conclusion

The state of organic and agroecological farming in Costa Rica is situated in a context of a country whose past and present administration has prioritized the industrial farming practices

of the green revolution (Goebel McDermott & Montero Mora, 2023; Abarca Hernández, 2020). Our interviewees, as well as research by this chapter authors, illustrate how deep industrial farming characterized by monoculture and excessive use of agrochemicals penetrated sectors of Costa Rican society. Our interviewees illustrate how this is linked both to pesticide corporations' influence on the state as well as how education about industrial farming practices is inculcated in public universities that train agricultural extension workers. We reiterate from our introduction that Costa Rica uses 20 of the world's 22 most highly hazardous pesticides (Vargas Castro, 2022), of which some have been prohibited for over 15 years in the European Union due to their harmful health impacts. Paraquat, a pesticide used widely in Costa Rica, for example, is banned in over 40 countries, due to its acute toxicity and fatal poisonings, and its long-term links to Parkinson's disease and increased incidence of leukemia, lymphoma, skin and brain cancer (Public Eye et al., 2017). Chlorothalonil, an agricultural fungicide and probable carcinogen, has contaminated multiple community sources of water with results of the scale of this contamination still pending (Pomareda García, 2025).

Lastly, we highlight that civil society organizations have historically and still play an invaluable role in supporting the well-being of farmers, consumers and the land in Costa Rica's agricultural sector. MAOCO, as reported here, due to concerns of the impact of the CAFTA-DR on Costa Rica's food production, advocated for the Law on Development, Promotion, and Encouragement of Organic Agriculture No. 8591. The market, called *Feria del Trueque*, is a group of producers that alone have created a space for the promotion of organic food as well as training around this topic. An endless number of other organizations advocating for increased well-being, justice, and health are active in Costa Rica, some of which are mentioned in this chapter (e.g., FRENASAPP and diverse agroecological networks), however, any left out is not due to their lack of importance, but rather our limited space to share them all.

Acknowledgements

We thank all the individuals who shared their lived experiences with us and granted us permission to share these experiences publicly in the form of this chapter.

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Chapter 3

Agroecology in Costa Rica: Experiences, actors, and transforming territories

Gerardo Cerdas Vega

Agroecology as Experience: Pathways to Understanding the Web of Life

This chapter is the result of research conducted between 2023 and 2024, supported by the Center for the Valorization of Agri-Food and Handcrafted Products Differentiated by Their Biocultural Qualities and Geographical Origin (CADENAGRO) at the School of Agricultural Sciences of the Universidad Nacional. During this period, an exploratory identification of agroecological experiences in Costa Rica was conducted, encompassing farms, marketing spaces, and educational and/or organizational initiatives that promote agroecology. These initiatives present an alternative to the conventional agri-food model, which is characterized by high dependence on external inputs, large-scale monocultures, biodiversity loss, soil degradation, water resource contamination, and agrobiodiversity erosion, among other well-documented global impacts (Gliessman et al., 2023). In contrast, the identified experiences seek to foster sustainable practices, crop diversification, the recovery of local knowledge, community participation, and socio-environmental resilience, aligning with the principles of agroecology as a comprehensive approach to transforming agri-food systems. During the data collection process, which included both quantitative and qualitative data, interviews were conducted to understand what agroecology means to the participants, their views on the current agri-food system, and the necessity of progressing towards true sustainability in food production. The objective was not only to characterize the agricultural practices developed, but also to understand the trajectories of these people, their perspectives, feelings, and expectations regarding their work. We sought to deepen our understanding of what we call the “meanings of agroecology,” conceived as a living experience for those building it, beyond mere data and figures. The primary quantitative findings of the

study have been published elsewhere (See Cerdas & Mora, 2025) so this chapter provides an opportunity to better comprehend the perceptions, meanings, and disputes surrounding agroecology as it consolidates in the country.

Indeed, in this chapter, we are interested in questioning the subjective and experiential dimension of the people involved in the construction of agroecology in Costa Rica, understanding that these individuals come from very diverse backgrounds and that there is no single understanding of the processes in which they are immersed. As Giraldo (2022, 2024) emphasizes, agroecology transcends being merely a science or set of practices—it constitutes a complex, diverse social movement seeking to transform food systems while addressing inequality, environmental degradation, hunger, and the decline of rural/urban communities. So, from a political standpoint, agroecology advocates for social justice and peasant livelihoods, gender equity in territorial development, access to productive resources and food sovereignty, solidarity economies and sustainable territories bridging urban-rural divides (Val & Rosset, 2022).

Thus, understanding how this diverse group of actors experiences and engages with processes that are both broad in scope and deeply rooted in the uniqueness of their local contexts represents a complex challenge. Each person lives and integrates agroecology based on their personal history, social position, and worldview. This implies recognizing how individuals interpret and reframe agroecological principles according to their own trajectories, values, and contexts. Moreover, this approach helps to identify the tensions, lessons, and opportunities that arise from the interaction among these actors, who contribute to agroecology not only with their knowledge and practices but also with their emotions, expectations, and resistance, weaving together a diverse mosaic that shapes this transformative movement.

A key reading approach is what Giraldo (2022, 2024) calls agroecologies of return, emerging, and historical, three categories that explain how agroecology develops according to different social, historical, and territorial contexts. These categories reflect the origins and transformative dynamics of agroecological initiatives, as well as the perspectives of the actors involved. Agroecologies of return emerge in contexts of acute crises, such as natural disasters, economic collapses, or socio-environmental conflicts, aiming to restore sustainable ways of life after the breakdown

of traditional systems. Current examples include communities affected by agribusiness or mining, suffering from land loss, deteriorating health due to pesticide exposure, and limited access to healthy food, who turn to agroecology as an alternative.

Emerging agroecologies, according to Giraldo (2022, p. 139), “invent agroecologies where none previously existed” and arise as new forms of struggle. Urban unsustainability—marked by economic precarity, political crises, and alienation—drives new generations to explore alternative lifestyles, ranging from migrations to rural areas (neo-rural populations) to urban agroecologies linked with local markets and territorial networks. Other key processes include re-peasantization, where people disillusioned with monoculture shift to agroecological practices, and “agroecologization,” promoted through formal and informal educational processes that foster new subjectivities in struggle, such as feminist agroecologies and networks of agroecological migrants (Giraldo, 2022, 2024).

Finally, historical agroecologies encompass traditional agricultural practices and a vast biocultural heritage developed through centuries of co-evolution with local environments. Although not always politically organized, these agroecologies have resisted colonialism, global capitalism, and developmentalism for decades or even centuries. They thrive in areas rich in biocultural diversity, producing essential food and preserving landscapes of exceptional biodiversity. Indigenous communities, as guardians of these territories, inhabit some of the planet’s best-preserved areas, and women play a crucial role as custodians of agrobiodiversity, essential for the present and future of agri-food systems (Giraldo, 2022, 2024).

These agroecological variants manifest in Costa Rica, reflecting diverse trajectories and underlying motivations. Some people adopted agroecology after experiencing pesticide poisoning, losing their livelihoods due to agroindustrial expansion or unemployment. Others, particularly youth, see it as an anticapitalist project rooted in land reconnection, solidarity, and alternative life paths. Women’s groups also stand out, reclaiming campesino knowledge related to agroecological crop management and food sovereignty, alongside agrarian activists who shifted toward a campesino lifestyle and individuals who, after years in various professions, found in agroecology a way to redefine

their personal projects. Others come from conventional farming backgrounds but eventually transitioned to organic agriculture or agroecology.

Thus, approaching agroecology from people's perspectives means exploring how they perceive their practice and the challenges they face. In this sense, agroecology should be seen as a praxis integrated with nature, rather than above or against it. It transcends the dominant economic analysis of agriculture (Giraldo & Toro, 2020), which, under hegemonic patterns, has become a key driver of today's socio-environmental crisis. Its logic of externality, exploitation, and domination over nature has critically contributed to the current state of ecological collapse (Shiva, 1991; Patel, 2013; Moore, 2020; Marques, 2023; Gliessman, 2023). This involves studying food systems while considering the physical, cultural, social, and economic environments in which people live, shop, prepare, and consume food (Carolan, 2022).

In this context, the concepts of "environmental affectivity" (Giraldo & Toro, 2020) and "methodoesthesis / epistemo-esthesis" (Noguera, 2016, 2020) offer meaningful interpretive keys. According to Giraldo and Toro (2020), the ongoing civilizational collapse is fundamentally an affective issue, stemming from the split between reason and emotion imposed by modernity. This calls for recognizing that our survival (both individual and collective) depends on repositioning our role within the web of life and fostering a regime of affectivity with other beings, rather than solely transforming the material, politico-economic, and technological relations of society. In other words, the solutions we imagine and implement must go beyond economic or political dimensions: they require an ethical and aesthetic revolution that redefines how we experience and inhabit the world.

It is about being open to the power that emerges "when we recognize ourselves as affected by encounters with the sentient beings" (Giraldo & Toro, 2020, p. 15), exploring environmental affectivity or empathy, which attunes us to a living world of which we are participants, not mere witnesses. This empathy or affectivity enables us to intertwine our trajectories with those of multiple beings in an "ecology of intersensibilities" (Giraldo & Toro, 2020, p. 15), through which our dwelling is not merely passive presence in inert spaces but rather an openness to being affected by places that listen to us and speak to us in a "language

of the earth composed of sensitivities, aesthetics, empathies, and intuitions” (Giraldo & Toro, 2020, p. 15). This perspective refers to a form of knowledge deeply intertwined with the realm of the sensible—an *environmental epistemo-aesthesis* that foregrounds sensations, sensitivity, senses, and affects (Giraldo & Toro, 2020, p. 23). It challenges the position of dominance over nature that we have internalized within modern civilization and instead fosters an understanding of ourselves as part of complex and dense webs of interdependence.

The environmental knowledge of farming, fishing, herding, and Indigenous communities, built through direct contact with their surroundings, is rooted in environmental empathy, allowing them to attune to the world’s affective and aesthetic states. These *vernacular knowledges* are valued for fostering an environmental ethic based on moderation, sufficiency, and aesthetic trust, where appropriateness is recognized through sensory perception (Giraldo & Toro, 2020). This is not about idealizing rural communities but acknowledging their knowledge as a key *epistemo-aesthetic* foundation that keeps them—and us—in direct connection with inhabiting the world. Linked to praxis, this knowledge sustains the reproduction of families, communities, and other beings in specific ecological contexts that shape the possibilities of their existence.

From this perspective, agroecology is not just a model for producing poison-free or “organic” food but a deliberate strategy intertwining collective knowledge with the production and reproduction of life. It forms a natural and social fabric projected dialogically, involving those who produce, buy, consume, and share food in a food system. Thus, it is crucial to understand how agroecological practice not only transforms production but also shapes subjectivities and life paths for those in this social movement. More than an economic strategy, agroecology engages people in a web of meanings and relationships that transcends productivity, encompassing ethical, cultural, and political dimensions. Patricia Noguera et al. (2020) describe this as *epistemo-esthesis* or *episteme-body-earth*, where everything merges with the land and emerges transformed, including our consciousness and knowledge, moving beyond the subject-object relationship.

These reflections do not seek to establish a theoretical framework or provide a systematic perspective on how to understand the

experiences of those involved in the development of agroecology in Costa Rica. Rather, they aim to suggest aspects that can be enriched through dialogue with the perspectives of its own protagonists. Indeed, thinking about agroecological experiences not only in terms of profitability, markets, and technology but also through the integrative experience of the relationship with the land (soil) and the myriad living beings that cohabit the world with us opens up enriching and transformative perspectives. It is the very actors who construct these experiences, and the reflections shared within the framework of this study help us to better understand them, while also expanding our vision of agroecology's potential in the country and the challenges for its practice and scaling up.

Methodology

The research was exploratory in nature and was based on the use of online surveys, interviews, and document review. Data collection was carried out using both primary and secondary sources, from August 2023 to November 2024. A total of 203 people responded to the survey, and 16 interviews were conducted. On one hand, semi-structured electronic surveys were implemented, combining closed and open-ended questions, aimed at a pre-identified list of agroecological experiences in Costa Rica. The surveys were sent via email and social media; to expand the reach of the study, the non-probabilistic sampling technique known as snowball sampling was used, where each respondent provided new contacts. This method allowed for the validation of previously identified experiences and the discovery of new initiatives, which were progressively included in the sample.

The survey was the primary data collection instrument and was structured into four sections: a) General information on agroecological experience, b) History and organizational potential, c) Implemented agroecological practices, d) Vision and positioning on agroecology and the sustainability of agri-food systems. This approach enabled the collection of both quantitative and qualitative information. Quantitative data were tabulated using MS Excel, while qualitative information was coded and organized using QDA Miner (for survey responses) and Atlas.ti (for interviews). The study identified a diversity of agroecological experiences, including: 146 farms, 20 commercialization experiences and 37 educational or organizational initiatives.

Table 1
Details on Participants (Surveys and Interviews)

Participants	Codes	Actor profile
SURVEYS		
Production Experiences (Farms, Plots, Production Units)	“Fincas_1” to “Fincas_143”	Agricultural Producers, Peasants, Indigenous People, Women, Migrants, Farm Managers.
Commercialization Experiences (Markets, Online Stores, Others)	Comerc 1” to “Comerc 20”	Coordinators or Managers of the Market or Commercialization Experience
Educational or Organizational Experiences	“Educ_Org 1” to “Educ_Org 36”	Coordinators or Managers of the Educational / Organizational Experience
Total		199
INTERVIEWS		
Agroecological Producers	Prod_agro1	Agroecological Producer
	Prod_agro2	Agroecological Producer
	Prod_agro3	Agroecological Producer
	Prod_agro4	Agroecological Producer
	Prod_agro5	Agroecological Producer
	Prod_agro6	Agroecological Producer
	Prod_agro7	Agroecological Producer
Agroecology Specialists	Esp_agro1	Member of an NGO
	Esp_agro2	Member of an Agroecological Collective
	Esp_agro3	Member of an NGO
	Esp_agro4	Representative of Local/ Municipal Government
	Esp_agro5	Representative of Local/ Municipal Government
	Esp_agro6	Member of an Agroecological Collective
Académicos en agroecología	Acad_agro1	Academic at a Public University
	Acad_agro2	Academic in an Interdisciplinary Research Program
	Acad_agro3	Academic at a Public University
Total		16

Note. Own elaboration, 2024.

The study was conducted in Costa Rica, covering 62 cantons (73.8% of the nation's 84 cantons), representing the country's ecological and socioeconomic diversity. Importantly, this work did not aim to census existing agroecological initiatives but rather to map them exploratorily, generating baseline data for future research. Our analysis focuses on four key dimensions: a) Transition motivations and implementation processes, b) The meaning of agroecology, c) Visions for agroecology and food systems, d) Challenges, opportunities, and obstacles for agroecology in Costa Rica. All participants provided informed consent—via surveys or interviews—authorizing academic use of their anonymized data.

Research Findings

This section presents some of the key findings related to the experiential dimension of those involved in the construction of agroecological initiatives in the country.

The Process of Change: Motivations and Factors Driving the Transformation

What motivated these individuals to change their previous trajectories as conventional agricultural producers or to embark on a path in agroecology? How did this transformation take place concretely within their specific ecological context? The diversity of responses is so vast that it is impossible to cover them all in this study. However, we can identify key aspects that provide an overarching perspective.

For a significant number of respondents, the change was driven by environmental and/or health-related factors. In some cases, traumatic experiences—such as pesticide poisoning—served as the catalyst for change. In other cases, the decision was more reflective, stemming from an acute awareness of the damage caused by conventional agriculture to both nature and human and animal health: “When conventional products stop working and you see how more and more pesticides are needed to produce, you start questioning what you are eating, and you begin to rethink everything” (Fincas_41, personal communication, August 20, 2023).

Environmental degradation, the “flood of poisons used in food production” (Fincas_4, personal communication, August 18,

2023), the need for coherence between one's beliefs and actions, and the urgency of addressing challenges such as food security, food sovereignty, and climate change all emerged as driving forces behind the transition to agroecology for many participants. Other responses reveal motivations of a more emotional and sensory nature: "Our farm was born from the desire to experience a deep connection with nature while developing a self-sustaining way of life for our family" (Fincas_87, personal communication, September 4, 2023). Similarly, another participant stated: "Love for nature and the awareness that, in these times, growing food is essential for survival" (Fincas_46, personal communication, August 21, 2023).

Several individuals indicated that their shift was motivated by a change in consciousness and a personal conviction that this was the necessary step to take in their lives—especially for those with long-standing experience in conventional agriculture. For many, this transition involved reestablishing a connection with the "natural agriculture" practiced by their grandparents before the Green Revolution (Prod_agro1, personal communication, April 15, 2024). In many cases, this conviction arose from firsthand observation of the positive results of organic or agroecological production on the farms of friends or acquaintances. Others reached this understanding through the realization that food production, forest conservation, and water source protection are not mutually exclusive. This shift often reflected an intergenerational sense of responsibility toward the planet and the recognition that sustainable agricultural practices are essential for future generations.

Another significant line of motivation is the growing awareness of soil degradation on farms caused by conventional agricultural and livestock practices. The idea of "detoxifying" the soil appears in several responses (Fincas_119, personal communication, November 3, 2023). Additionally, concerns related to food security, the quality and safety of food produced for sale and self-consumption, and the need to raise awareness about these issues among the population also emerged as motivations for transitioning to agroecological practices. The COVID-19 pandemic led some individuals to reconsider the relationship between the agri-food system and human health, prompting them to shift toward agroecology. Others were drawn to agroecology

due to their concerns about the protection of pollinating species, including bees, birds, and other insects (Fincas_91, personal communication, September 5, 2023).

Another set of motivations is oriented toward a community dimension. Some producers stated that they began their agroecological journey not only to develop their own farms but also to contribute to the surrounding communities through outreach activities such as workshops, talks, and training sessions for both visitors and neighboring farmers (Fincas_62, personal communication, August 27, 2023). Other farmers, concerned about the gradual disappearance of small-scale farming in their communities, saw agroecology as a potential way to revitalize farms that are being lost year after year. Establishing model farms or field schools motivated several producers to transition to agroecology to demonstrate that alternative production methods are viable (Fincas_65, personal communication, August 27, 2023). Some individuals turned to agroecology for more pragmatic reasons: earning income from selling pesticide-free products, escaping unemployment, or overcoming financial difficulties on their farms—often caused by the high cost of conventional agricultural inputs. Additionally, others began their agroecological journeys as part of family or couple-led projects, upon retirement, or after spending a lifetime working in academia, the public sector, or private enterprises (Fincas_55, personal communication, August 22, 2023).

Finally, there is a set of more “politicized” motivations, linked to viewing agroecology as a way to address today’s multiple crises (climatic, economic, war-related, and pandemic) and the need to break away from the current model dominated by large corporations (Fincas_1, personal communication, August 10, 2023). Some participants mentioned that their agroecological path was inspired by leading figures such as Ana Primavesi (Brazil), Jairo Restrepo (Colombia), Pacho Gangotena (Ecuador), and Nacho Simón (Mexico). These motivations link agroecology to the depth and richness of socio-environmental critical thinking in the region. Regarding motivations, it is also relevant to examine the commercialization and educational/organizational experiences studied. Table 2 provides a summary of these motivations.

Table 2
Summary of Motivations for Agroecological Transformation

Type of Experience	Motivations
Commercialization	- Connecting producers, entrepreneurs, and customers directly - Offering fresh and pesticide-free products at reasonable prices - Ensuring fair prices for producers - Breaking away from the intermediary-based commercialization model - Contributing to the local economy - Including family-based, small-scale, agroecological, and artisanal agricultural systems - Functioning as a support platform for agroecological or organic initiatives - Creating a space for social fabric building - Raising awareness about the impact of the conventional model on agriculture, soils, and rural families
Educational/ Organizational	- Promoting agrobiodiversity - Advancing food sovereignty at national and community levels - Reconnecting new generations with the land through educational processes - Encouraging a way of working and relating to the land and communities that integrates technical-productive, cultural, environmental, and political aspects - Strengthening the interconnection between rural and urban areas - Providing an alternative to the Green Revolution model - Contributing to the formation of a political, social, academic, and above all cultural movement in favor of agroecology - Connecting dispersed agroecological initiatives across the national territory to build collective strength

Note. Own elaboration, 2025.

Beyond motivations, it is essential to explore the factors that made these transitions possible—that is, how the shift to agroecology was implemented in terms of productive strategies, adaptive practices, and social or institutional support that allowed individuals to adopt agroecological practices on their farms or plots. A key aspect that emerges is that the transition was not abrupt but rather a gradual process involving progressive diversification of crops and management practices.

For example, some traditional livestock farms were transformed into integrated agroecological farms, agroforestry systems, or silvopastoral farms, while others remained livestock-based but shifted to a regenerative approach. Concrete practices implemented by producers over time included: introducing new crop varieties and polycultures, encouraging pollinators, building infrastructures such as greenhouses, worm composting systems, composting units, biodigesters, and seedbeds, integrating crops and livestock to generate fertilizers within the farm. These practices were often supported by organic agriculture and permaculture approaches, aided at times by NGOs and public institutions, though support was not widespread. What is important to note is that these changes took time and were introduced gradually, with their success largely depending on individual or family efforts and the positive results obtained, which reinforced the decision to transition toward agroecology (Fincas_132, personal communication, November 25, 2023).

Some producers benefited from technical support from organizations or public institutions. For instance, some gained recognition through the Ecological Blue Flag program, awarded by Costa Rica's Ministry of Agriculture and Livestock (MAG) and other public institutions, or obtained certification in Good Agricultural Practices (BPA), also granted by MAG. In some cases, this support laid the groundwork for greater sustainability, gradually eliminating agrochemical use and implementing agroecological principles. Some farms chose to obtain organic certification, though some later abandoned it due to costs and technical challenges (Fincas_60, personal communication, August 25, 2023). For others, collective certification proved more effective than individual efforts (Prod_agro1, personal communication, April 15, 2024). Meanwhile, other farms joined Payment for Environmental Services (PES) programs, integrating productive and conservation areas (Fincas_65, personal communication,

August 29, 2023). Still, some distance themselves from organic certification, viewing agroecology as a more comprehensive approach for socioecological transformation (Educ_org12, personal communication, August 31, 2023).

Besides being a gradual process, the transition to agroecology has involved extensive personal research, group training, and the exchange of knowledge. Several interviewees reported using the internet to seek relevant information on their own, attending talks, workshops, and training sessions, or receiving technical education from state institutions like the National Center Specializing in Organic Agriculture (CNEAO) at the National Learning Institute (INA). In some cases, individuals have received technical support from universities such as the National University (UNA), the University of Costa Rica (UCR), and the State Distance University (UNED), building networks that provide critical support in the absence of better-structured agroecological extension services and technical assistance at the public policy level. Some with more experience in agroecology even shared that they had participated in Farmer-to-Farmer training programs.

Another key aspect of the agroecological transition has been collective organization processes, such as creating and managing organic/agroecological markets, organizing producer and consumer networks, and mobilizing rural women in various parts of the country (Esp_agro3, personal communication, April 8, 2024), as well as reclaiming Indigenous lands where agroecological initiatives are being developed (Fincas_16, personal communication, August 18, 2023). Community organization efforts also stand out, including partnerships with municipal public policies aimed at promoting food security, agroecological education, and sustainable production. One example is the municipality of Santa Ana, in San José, which supports an alternative farmers' market along with technical assistance and educational services for producers and the broader community (Esp_agro4, personal communication, May 7, 2024; Esp_agro5, personal communication, May 7, 2024).

All the above suggests that the transition to agroecology in Costa Rica has been a process that goes beyond merely replacing conventional inputs with organic alternatives, representing a deep reconfiguration in farm management based on observation,

experimentation, and continuous learning. This process has largely involved a renewal of knowledge and the need to unlearn conventional practices. Producers have actively sought information, participated in training spaces, and built support networks to face the challenges of this path. Furthermore, collective organization has been key in consolidating these processes, with initiatives such as participatory certification, the creation of alternative markets, and advocacy in local public policies. Therefore, agroecology emerges not only as a way of producing that transforms farms but also as a contribution to a broader reconfiguration of social, economic, and ecological relations, challenging the hegemonic agro-industrial logic.

The Meaning of Agroecology for Those Involved in Its Construction

What does agroecology mean to you? While this question may seem simple, the responses reveal a remarkable diversity of perspectives. A comprehensive exposition of each response exceeds the scope of this discussion. Nevertheless, we have systematically structured the findings according to key thematic dimensions and their corresponding analytical categories.

Table 3

Thematic Axes of Responses on the Meaning of Agroecology

Dimension	Description
Productive and Ecological	- Agroecology as a sustainable food production system that regenerates soil, biodiversity, and ecosystems. Focus on practices such as organic farming, agroforestry, and water conservation.
Social and Community-Based	- Agroecology as a means to strengthen social ties, promote local economies, and foster collective organization among producers and consumers. Emphasis on solidarity, fair trade, and participatory networks.
Epistemological and Educational	- Agroecology as a knowledge system that integrates traditional, scientific, and experiential wisdom. Importance of farmer-to-farmer knowledge exchange, participatory learning, and agroecological education.

Ethical and Political	- Agroecology as a movement that challenges the dominant agro-industrial model, advocating for food sovereignty, environmental justice, and human rights. Connection to struggles against extractivism and land dispossession.
Holistic and Systemic	- Agroecology as a worldview that recognizes the interdependence between humans, nature, and territories. A comprehensive approach that integrates ecological, cultural, social, and economic dimensions.

Note. Own elaboration, 2025.

Building on the above, we will now present some reflections that allow us to delve deeper into the perspectives shared by respondents. These dimensions are interconnected and should not be seen as a fragmentation of the discussion but rather as a way to organize the topics for presentation and analysis.

Productive and Ecological Dimension

In this first dimension, agroecology understands agriculture as an ecosystem; productivity and ecology are not opposing forces but complementary ones. One response that encapsulates this idea states: “Agroecology is an association of crops and practices that link productive activity with the surrounding environment, where everything has an ecological function and is interconnected” (Fincas_54, personal communication, August 22, 2023). This statement, similar to many other responses, summarizes one of the fundamental principles of agroecology. Instead of perceiving agriculture as an isolated process or an activity separate from nature, agroecology sees it as an integral part of natural systems. By considering agriculture as an ecosystem, agroecology acknowledges the complex interactions between crops, animals, soil, water, climate, and other environmental elements.

In this approach, agricultural systems are designed to mimic the processes and patterns observed in natural ecosystems, rather than relying heavily on external inputs such as synthetic pesticides, chemical fertilizers, and heavy machinery. This ecological perspective promotes agricultural practices that not only protect natural resources and biodiversity but also enhance the resilience of farming systems against challenges such as climate change, crop diseases, and water scarcity (Fincas_120, personal communication, November 6, 2023).

Care, sustainability, harmony, awareness, and balance are seen as intrinsic qualities that must be incorporated into production systems, in direct opposition to anything that destroys, exploits, or reduces biodiversity. The idea of being a “friend of nature” emerges as a leitmotif in many responses, expressing complex content in a simple way. Undoubtedly, this connects to discussions on epistemo-aesthesis and environmental affectivity, as all responses point to an affective proximity to nature. The production of food is framed as a way to break with agrarian capitalism, which sees nature as an exploitable resource rather than a source of life. This is clearly expressed in another response: “This approach seeks to create resilient and balanced agricultural systems, promoting a harmonious coexistence between food production, environmental conservation, and the well-being of farming communities” (Fincas_40, personal communication, August 20, 2023). Thus, agroecology is envisioned as a way of inhabiting nature through respect and reciprocity, in contrast to the extractivist logic. More than just a productive model, it is an ethics of care that seeks to regenerate life in all its forms, integrating productivity with other equally significant dimensions.

Social and Community-Based Dimension

The second dimension relates to the social and community aspects of agroecology, which go beyond merely technical or productive aspects and involve a broader reflection on the socio-ecological dimension. For the survey respondents, agroecology is an approach whose main goal is to “create community” (Fincas_45, personal communication, August 21, 2023). The actions taken, whether at the farm level or in educational or marketing spaces, aim to establish the necessary connections to advance a broader agroecological agenda. Many expressed that they aim to “set an example” to inspire other producers and inform/educate those who visit their farms, so that surrounding communities can adopt “the agroecological vision and practice” (Fincas_21, personal communication, August 19, 2023), and contribute to the “respect and defense of the knowledge and way of life of peasant and Indigenous communities as a pillar of agroecological development” (Fincas_19, personal communication, August 19, 2023).

For others, food production through agroecology involves the implementation of holistic approaches in agriculture, based on ecological principles to promote biodiversity, optimize the use

of natural resources, and minimize the use of agrochemicals and synthetic fertilizers. This approach fosters practices that strengthen soil health and surrounding ecosystems. All of this ultimately contributes to “resilient and balanced agricultural systems that promote harmonious coexistence between food production, environmental conservation, and, fundamentally, the well-being of farming communities” (Fincas_40, personal communication, August 20, 2023), including through the creation of jobs and productive linkages.

For these individuals, agroecology is defined as a production model that goes beyond self-sufficiency and individual food security, establishing itself as a key pillar in community building. This approach highlights its central role in fostering spaces for learning and collaboration, where knowledge is shared on clean production, soil and biodiversity conservation, bio-input development, and other practices. These actions not only enhance sustainable production but also strengthen support networks and cooperation among farmers, consumers, and various social actors.

The exchange of knowledge emerges as a key component in the community-based agroecological vision. In this context, agroecology becomes a tool for social transformation, aiming for learning to occur horizontally and in dialogue with the traditional knowledge of urban residents, peasants, and Indigenous peoples. The intergenerational transmission of sustainable agricultural practices and the recognition of local knowledge are considered essential for the consolidation of resilient agri-food systems (Fincas_62, personal communication, August 27, 2023).

Another key aspect is the role of agroecology in territorial development and social cohesion. Various documented experiences highlight that agroecological initiatives have generated employment, strengthened the local economy, and provided development alternatives for rural communities. However, community building in this context faces challenges, such as the lack of state investment and skepticism stemming from past unfulfilled promises. The key has been to work based on the real needs of the population, avoiding external impositions and fostering tangible actions like local markets, community gatherings, and knowledge exchange spaces. Experience shows that when initiatives do not require large investments or depend on external actors who might withdraw their support

unexpectedly, communities are more willing to engage and take ownership of the processes (Esp_agro3, personal communication, April 8, 2024).

In some contexts, the participation of women has been particularly significant, highlighting the urgent need for spaces where they can share experiences and build support networks. Similarly, activities involving children have had a major impact, allowing them to learn through play and direct observation of their environment. These processes strengthen the sense of belonging and look at the long-term sustainability of agroecological initiatives (Esp_agro3, personal communication, April 8, 2024; Esp_agro6, personal communication, May 13, 2024). Agroecology stands out as a dynamic social construct, collectively shaped through dialogue between communities and diverse sectors. The collaboration of producers, traders, researchers, and consumers in shared learning processes reinforces its identity as a model of production and life rooted in reciprocity, respect for nature, and solidarity (Fincas_101, personal communication, September 12, 2023). This approach highlights the value of the deep, complementary knowledge that rural families and communities hold regarding what works in their territories. It also emphasizes the ingenuity and adaptability of farmers and small-scale food producers, who innovate through on-farm experimentation, exchange, and mutual learning. Thus, agroecology calls for rethinking conventional approaches to rural extension and research, which often undervalue community-based knowledge and prioritize a purely technical perspective on knowledge transmission.

Agroecology is presented as a viable path toward food autonomy, community development, and social justice, establishing itself as an alternative to conventional agricultural models and contributing to the resilience of the communities where these initiatives are implemented, both rural and urban. As noted by a representative of a local organization supporting agroecological initiatives in Puntarenas, the common and collective are prioritized for building ideas and actions, considering and respecting the history and memory of each group or community as a foundation for facing challenges and achieving successes for the benefit of people and their ecological contexts (Educ_org11, personal communication, 08/30/2023).

Epistemological and Educational Dimension

Agroecology is knowledge-intensive (Wijeratna, 2018), not only in terms of technical knowledge but also in terms of *being in the world*—that is, it encompasses an *epistemo-aesthesis*, in the sense that knowledge is acquired, shared, and transmitted not just intellectually but through environmental affectivity (Giraldo & Toro, 2020). As one interviewee put it, it is not just about producing food but about “building soil—not just its mineral components, but also harvesting an ecosystem of knowledges that allow us to keep constructing a habitat” (Prod_agro3, personal communication, March 11, 2024).

Building on this, it can be highlighted that the identified agroecological experiences play a significant role as spaces for the generation and exchange of technical, scientific, as well as vernacular and ancestral knowledge. Indeed, these farms are often open, experimental, and transdisciplinary spaces; in some cases, this is their hallmark, promoting participatory and interactive learning, exchange networks, and collaboration with students and academic actors interested in agroecology (Acad_agro3, personal communication, February 23, 2024).

Many individuals emphasize that their work consists of learning by doing, applying theoretical knowledge to practice, and valuing the knowledge that arises from the everyday realities of the field and the lives of producers, in line with the principles of popular education, such as participation, awareness-raising, and grassroots organization (Educ_org11, personal communication, August 30, 2023). In many cases, the importance of working in a playful and transdisciplinary way is emphasized, as well as empowering people to be able to confront the “dominant, capitalist, industrial, and globalized” agrifood system (Educ_org19, personal communication, September 5, 2023; Educ_org33, personal communication, April 11, 2024; Educ_org33, personal communication, April 11, 2024).

For others, the connection between the educational and the political is essential, as the hegemonic system can adapt and co-opt proposals like agroecology, depoliticizing them and presenting them as superficial changes that do not address the deep inequalities, violences, and extractivisms at their core.

Thus, it is argued that agroecology is a response that emerges from the people and communities, with solutions that have always been present, such as vernacular knowledge capable of supporting a different way of producing, marketing, and relating to one another, in contrast to what we have been told it should be (Esp_agro9, personal communication, May 13, 2024).

In this sense, although the concept of agroecology may not be present among farmers and rural producers, many of their practices are already aligned with agroecological principles due to their campesino roots. In these cases, it is essential to validate local knowledge and practices and ensure that training processes complement and guide key topics arising from dialogue, rather than imposing technical concepts that surpass the categories of campesino knowledge. Even when pesticides or other agricultural chemicals are used, promoting hands-on learning and presenting evidence of the benefits of agroecology makes it easier to “convince,” as people can observe for themselves that these practices are effective and adaptable to their farms. In these cases, the focus must be on “campesino agroecology” rather than an academic or “scientific” approach imposed from the outside, and it must be connected to local practice (Esp_agro9, personal communication, May 13, 2024).

To close this section, we can affirm that agroecological education at various levels and spaces is crucial for transforming food systems and reconnecting people with their food. In Costa Rica, where much of the agricultural production is destined for export and pesticide use is alarming, it is urgent to raise awareness about the importance of consuming local and sustainable products. The disconnection between consumers and food production has allowed the proliferation of diets based on processed products, favored by free trade agreements the country has signed with countries like the United States and Mexico in recent decades (Thow & Hawkes, 2009).

In response to this reality, the nascent Costa Rican agroecological movement promotes a different view of food systems, based on the knowledge of food sovereignty, agrobiodiversity, and the importance of protecting soils and ecosystems. It is essential to focus educational efforts not only on producers but also on consumers, providing them with tools to make informed decisions about their food. However, as we will see later, there remain

many obstacles and challenges for agroecology in Costa Rica to reach a larger scale and, instead of just being an “alternative,” become the backbone of our food system.

Ethical and Political Dimension

Agroecology should be understood not only as a production strategy but also as a tool for social transformation. In this regard, it addresses crucial issues such as access to land and productive resources, the defense of Indigenous territories, and the protection and use of native seeds—key elements in restoring the country’s capacity to produce its own food, reducing chronic dependence on global markets, and enhancing resilience against climate change threats (Fincas_30, personal communication, August 19, 2023; Fincas_94, personal communication, September 6, 2023; Fincas_101, personal communication; Fincas_117, personal communication, September 12, 2023).

For example, the COVID-19 pandemic highlighted how the power of large corporations persists, partly because consumers continue to purchase their products, such as pesticides, fertilizers, seeds, or processed foods. This package of products has colonized not only the agricultural economy but also the culture and mentality of society. In this context, agroecology emerges as a fundamental basis for regenerating physical, social, and cultural spaces, enabling the counteraction of the power held by these corporations and the economic interests operating within the country, as well as the capitalists profiting from the import and deregulated sale of toxic products (Fincas_59, personal communication, August 24, 2023).

Agroecology highlights the value of peasant labor and advocates for fair compensation. It is inconsistent to aim to stop the exploitation of land, soil, and biodiversity while continuing to exploit rural workers. In this regard, the eradication of labor exploitation means not only freeing farmers from corporate control but also ending their exploitation by consumers. In our society, we have normalized the availability of agricultural products at low prices without questioning whether farmers receive fair compensation or if the profits are concentrated in the intermediaries and companies that sell inputs and pesticides (Fincas_13, personal communication, August 18, 2023; Fincas_66, personal communication, August 29, 2023).

The trajectory of some individuals within agroecology highlights how the personal becomes a political dimension, gradually transforming as it intertwines with everyday experiences. An example of this is the case of one of the interviewees, who approached agroecology from a context of unemployment, seeking both a livelihood and a theoretical alternative to their personal concerns. Initially, agroecology and organic farming appeared to be concrete options for generating employment and income. Ethically, this approach seemed aligned with their values, while politically, they perceived these practices as opposing the dominant idea of capitalist development and excessive technologization, which further strengthened their political commitment to agroecology (Prod_agro2, personal communication, March 11, 2024).

Another important aspect concerns the criticism of the absence of public policies promoting campesino-based agroecology, despite the existence of a law supporting organic farming in the country (Law No. 8591). Public institutions, such as the Ministry of Agriculture and Livestock (MAG), have never prioritized enforcing this law. Instead, the Ministry has experienced ongoing budget cuts, particularly in areas related to organic agriculture, and there is a complete lack of technical assistance for organic production. The institution's role is limited to monitoring and penalizing producers who fail to meet certain requirements, without offering support, incentives, or guidance to address the significant gaps in these areas that farms cannot manage on their own (Acad_agro3, personal communication, February 23, 2024; Acad_agro2, personal communication, March 4, 2024; Prod_agro2, personal communication, March 11, 2024).

The consolidation and scaling of agroecology require institutional support that goes beyond relying on individual initiatives, even though these may be valuable and commendable. To achieve this, it is essential to develop a political program capable of transforming both educational and governmental institutions by integrating agroecology into university curricula and establishing regulatory and financial frameworks that promote its advancement. This involves, among other measures, the creation of specific programs in public universities to teach agronomy from an agroecological perspective, thus overcoming the current scenario where agroecology holds a marginal or even nonexistent position; the opening of financing lines for organic agriculture; and the restructuring of institutions such as the Ministry of

Agriculture and Livestock (MAG) to avoid conflicts of interest with agribusiness and prevent the latter from co-opting the meaning of organic production and influencing sectoral policies, as is currently the case in Costa Rica (Prod_agro2, personal communication, March 11, 2024).

Agroecology is conceived as an ethical and political approach that goes beyond production techniques, integrating itself into broader struggles for social justice, food sovereignty, and land access. This perspective politicizes food production by challenging purely technical or romanticized views and positioning agroecology as a practice aimed at structurally transforming the agri-food system. Moreover, in response to the advance of agribusiness and its appropriation of discourses originally linked to sustainability, emphasis is placed on the need to strengthen peasant organization, promote public policies that recognize the value of agroecology, and create educational spaces that combine traditional knowledge with innovative techniques adapted to local realities. In this regard, the consolidation of agroecology in Costa Rica depends on the ability of social and academic movements to influence political decision-making and prevent this approach from being diluted into proposals that perpetuate the dependence and exploitation characteristic of agribusiness. Thus, agroecology must remain a tool for resistance and transformation, upholding the right of communities to define their own production systems within a framework of social and environmental justice.

Holistic and Systemic Dimension

Reflection on agroecology invites us to explore dimensions linked to the existential questions that arise in the face of the current crisis and the need to build paths of personal and collective transformation. Beyond recipes and discourses, many participants emphasize the importance of living in rural areas or staying close to productive territories to gain a firsthand understanding of the effects of monocultures and extractivist conventional agriculture, which reduces humans to exploitable labor. In this sense, agroecology aims to establish a deeper connection with the productive and ecological environment, recognizing humans as part of a natural ecosystem (Prod_agro2, personal communication, March 11, 2024; Prod_agro3, personal communication, March 11, 2024).

Many of the respondents speak about agroecology in similar terms: as a way of life that “allows reconnection with the land and access to basic subsistence resources while also working on soil regeneration, groundwater recharge, biodiversity recovery, and other ecosystem services” (Fincas_125, personal communication, November 17, 2023); a way of life based on sharing with others while generating economic resources for the family. Although it faces many financial, institutional, and cultural obstacles, it is vital for the country to confront the effects of current crises, including the climate crisis (Fincas_6, personal communication, August 18, 2023; Fincas_61, personal communication, August 26, 2023).

In a society addicted to fossil fuels, plastic, digital technologies, and accelerated consumption, agroecology proposes an integral transformation that extends beyond agricultural practices. It is not just about producing healthy food or conserving biodiversity but about reconfiguring everyday life by intertwining the ecological, cultural, and productive spheres. This integration is reflected in the physical and symbolic proximity between the garden, the kitchen, and the home, allowing care, contemplation, and regeneration to become part of daily life (Prod_agro2, March 11, 2024; Prod_agro3, March 11, 2024). This approach fosters the emergence of a new agroecological culture, where food production coexists with artistic, educational, and community practices. Agroecology thus positions itself as a transformative way of inhabiting the territory, capable of redesigning the agro-food system while reshaping lifestyles. In urban contexts, it could drive significant changes by encouraging the creation of community gardens, promoting local markets, and strengthening connections with rural producers, thereby fostering healthier eating habits, reducing waste, and raising awareness about sustainability.

Vision of Agroecology and Agri-Food Systems

Our reflection on food systems is based on Carolan’s (2022) understanding that they are not just value chains with actors like producers, distributors, retailers, and consumers, as the neoliberal view suggests, which prioritizes efficiency, competitiveness, and profit maximization. This perspective is insufficient to capture the complexity of the social, ecological, and cultural processes that shape them. Food systems are also spaces of dispute, where traditional and scientific knowledge, power dynamics,

relationships with the land, and forms of resistance to agroindustry are intertwined. They are not merely circuits of production and consumption, but networks of meanings, practices, and values that shape our relationship with food and the territories where it is produced. Agroecology challenges the hegemonic view of food systems as simple supply chains and proposes understanding them as living networks of interdependence, where not only prices and market access are negotiated, but also autonomy, social justice, and ecological sustainability.

In this sense, when discussing food systems, we must consider their complexity and diversity. One key line of thought is to view agroecology as the foundation for building resilient and sustainable food systems, the future we must build from the present. Only an agroecological approach can provide the necessary tools to reduce the damage caused by conventional agriculture, in a sustainable way, ensuring the ability to produce food in the near future given the global climate crisis (Fincas_30, personal communication, August 19, 2023; Fincas_33, personal communication, August 19, 2023; Fincas_40, personal communication, August 20, 2023).

In the case of Costa Rica, it is noted that the country faces serious issues of poverty, exclusion, environmental degradation, violence, and political instability, which negatively affect people's lives and opportunities. The current system does not distribute wealth or food equitably. It is urgent to build an alternative to the dominant way of life, based on a food production model that respects common goods and promotes just social relations throughout the agro-food chain. This change involves transforming agricultural practices as well as the social relations underlying the hegemonic model. It is key to promote an agroecology that empowers local actors, strengthens their bottom-up organization, and values their ancestral knowledge as a civilizational response to current crises. To achieve this, peasants, Indigenous people, marginalized urban communities, and committed intellectuals must unite to collectively build a new way of life, integrating agroecological principles in productive, social, cultural, economic, environmental, and political spheres, guiding the creation of a welfare alternative that the current system denies to the majority (Educ_org19, personal communication, September 5, 2023).

This involves regenerating the physical, social, and cultural space of food production, degraded by decades of export monoculture,

intensive agrochemical use, and poor agricultural practices. Recovering soils, recognizing their intrinsic value and importance for our food, goes hand in hand with actions such as reconnecting people with their food, promoting Costa Rican popular cuisine, urban agriculture, and art as vehicles for transforming our view of the world of food and its socioecological network (Fincas_59, personal communication, August 24, 2023; Fincas_64, personal communication, August 27, 2023; Fincas_87, personal communication, September 4, 2023).

While it is crucial to provide fresh, nutritious, and pesticide-free food produced agroecologically, the entire responsibility cannot be delegated to peasant families or producers, who are already doing what they can with little or no technical support. Research showed that only 38% of farms received technical assistance from state institutions or entities such as NGOs or public universities to develop their agroecological units. This implies assuming risks and investments that, given the size of the farms (49.7% are under three hectares, 17% have between 3 and 6 hectares, 9.2% have between 6 and 9 hectares, and 24.2% exceed 10 hectares), cannot be scaled regionally or nationally without a clear public policy that fosters stronger interconnections between farms, markets, advisory services, and research. This strategy must include the active participation of those, from the bottom up, who are building agroecology as a social movement (Acad_agro1, personal communication, February 26, 2024; Esp_agro4, personal communication, May 7, 2024).

In summary, the consolidation of agroecology as a viable alternative requires not only the effort of those who cultivate the land, but also a structural transformation that challenges the commercialization of agriculture and ensures public policies that support its expansion. The struggle for food sovereignty, the rescue of peasant and Indigenous knowledge, and the construction of solidarity markets cannot rest solely on local initiatives; broader articulation is needed to confront the power dynamics that perpetuate inequality in access to resources and control of production.

Obstacles, Opportunities, and Challenges

Agroecology as a proposal for transformation is not without obstacles, opportunities, challenges, and contradictions,

resulting from the process of its construction and its opposition to dominant worldviews and power relations. In this sense, the research also offers relevant insights to understand how the key players in the agroecological transition in the country perceive it. Considering all of the above, it is not surprising that many people involved in agroecological production highlight the lack of public policies supporting agroecology, despite the existence of an organic production promotion law since 2007. This perception is widespread among participants, who emphasize the total absence of promotion from the Ministry of Agriculture and Livestock (MAG), with its role limited to organic certification and oversight, though with fewer resources and personnel (Acad_agro2, personal communication, March 4, 2024; Acad_agro3, personal communication, February 23, 2024; Fincas_81, personal communication, September 1, 2023; Fincas_83, personal communication, September 3, 2023).

The lack of public technical assistance and rural extension services is partially compensated by the farms and educational experiences themselves. However, they face limitations in addressing this challenge, as production is demanding and there is often insufficient time for training and knowledge exchange, especially given the economic and commercial pressures that farms must attend to in order to maintain short- and medium-term financial stability, including difficulties in hiring external labor and the demands of the crops, not to mention marketing challenges (Prod_agro2, personal communication, March 11, 2024).

For some, it's not just that the state does not promote agroecology, but it could be seen as an enemy of it, by blocking all forms of alternative production and favoring agribusiness, the increasing importation of food, and ignoring the massive application of pesticides in national agriculture, which goes unchecked and unregulated (See Castro & Werner [2024]; Fincas_84, personal communication, September 4, 2023).

Other issues include sectoral institutional fragmentation, with institutions doing little and failing to coordinate their actions (Fincas_100, personal communication, September 9, 2023), market access difficulties, limited access to courses or training, the low societal appreciation for agroecological products, the crisis in the agricultural sector and rural communities, many of

which are affected by the agro-export model and now organized crime, the government's open market policies, and the high cost of certifications, among the most mentioned (Fincas_26, personal communication, August 19, 2023; Fincas_56, personal communication, August 22, 2023; Fincas_84, personal communication, September 4, 2023; Fincas_100, personal communication, September 9, 2023; Fincas_104, personal communication, September 17, 2023).

Those coordinating marketing experiences also emphasize the lack of state support for agroecological initiatives based on peasant and/or family agriculture, both in production and market access. This has led to commercialization becoming increasingly concentrated in a few supermarket chains, wholesale markets, and conventional farmer markets. On the other hand, they highlight the lack of national interest in agroecological or organic products, partly due to ignorance about the health harms of consuming highly pesticide-laden products, partly due to consumption habits that value imported and processed goods more, and partly because organic or agroecological products are perceived as more expensive than conventional ones.

All of this creates barriers to expanding access to agroecological products, with local markets being key to building trust between producers and the local population (Comerc_9, personal communication, October 13, 2023; Comerc_12, personal communication, October 26, 2023). There is also a recognized lack of an updated and effective national policy on food security, with the country facing almost complete loss of food sovereignty, which prevents it from having a comprehensive vision of the human right to food and integrating it into an agroecological approach (Acad_agro1, personal communication, February 26, 2024; Esp_agro4, personal communication, May 7, 2024).

Those responsible for educational or organizational experiences state that one of the main challenges agroecology faces is the lack of financial stability and access to funds for sustainable production (Educ_Org 11, personal communication, August 30, 2023). Agroforestry, for example, requires long-term investments for producers to transition from conventional monoculture, demanding financial support that is currently limited (Educ_Org 17, personal communication, September 5, 2023). Additionally, there is constant pressure from a globalized market that favors

high-productivity, high-profit models and occupies large portions of agricultural land, displacing peasant farmers and limiting their ability to focus on agroecological production for local markets (Educ_Org 18, personal communication, September 5, 2023). Indeed, in structural terms, land access is another determining factor, as acquiring land for productive or family projects is becoming more expensive, and bureaucratic obstacles make it even harder for agroecological or organic producers to access resources (Educ_Org 24, personal communication, October 16, 2023; Prod_agro2, personal communication, March 11, 2023).

Beyond economic challenges, it is noted that dynamics of inequality and the lack of political will have been recurring obstacles in the development of agroecological systems (Educ_Org 22, personal communication, September 22, 2023). The absence of government incentives to abandon the agroindustrial model, combined with (de)regulations favoring large conventional producers, creates a gap that hampers the commercialization of agroecological food, as it requires costly certifications while allowing conventional producers to operate without comparable regulations (Educ_Org 24, personal communication, October 16, 2023).

This is compounded by the battle against large seed corporations and monocultures, as well as the political-business alliances that reinforce an extractivist and tourist model at the expense of local agroecological production. Inequality is also reflected in the lack of recognition of the roles of women, youth, and Indigenous Peoples in agroecology, as well as in the existence of misogyny, ageism, and racism that limit their access to resources and leadership in the sector (Educ_Org 26, personal communication, November 7, 2023; Educ_Org 11, personal communication, August 30, 2023). Furthermore, the limited integration between farmers and the fight against an unequal and unfair market exacerbates the conditions of those seeking sustainable alternatives through agroecology (Educ_Org 34, personal communication, November 27, 2023).

Conclusions

The agroecology movement in Costa Rica is still relatively recent, and as we delve into its study, we observe an ongoing construction process. The set of issues presented in this chapter offers a broad and complex panorama of this process, engaging in dialogue with the perspectives of those committed to its implementation in both

rural and urban areas. Although “natural agriculture,” as some call it, was not entirely eradicated by the Green Revolution, and organic agriculture emerged in the country as early as the 1980s, agroecology as a concept has gained significant momentum only in recent years, as its practice has spread across Latin America and the world.

Today, numerous local initiatives throughout the country draw inspiration from agroecological principles to design sustainable production systems. This is particularly relevant in a nation that has experienced an intensification of monoculture exports and conventional agriculture over the past four decades. However, agroecology is not just a technical alternative for food production; it is a living process of social, political, and ecological transformation. Throughout this study, we have observed how diverse trajectories converge in agroecology, not only as an economic or productive necessity but also as a profound reconfiguration of people’s relationships with the land, food, and communities. The experiences collected reveal that agroecology is neither a single nor a homogeneous model, but rather a mosaic of initiatives, interwoven with the personal, historical, cultural, and territorial contexts of those who practice it.

However, this transformation faces enormous challenges. From the pressure of the globalized market, which prioritizes volume and profit over life and sustainability, to the lack of public policies supporting its scaling-up, agroecology continues to fight an unequal battle against a food system dominated by monocultures, agrochemicals, and large distribution chains. Even so, the persistence of those who have chosen this path demonstrates that viable alternatives exist for producing food without destroying the environment, strengthening food sovereignty, and rebuilding local economies based on fair trade and mutual support. Agroecology in Costa Rica is an evolving field, and at this historical moment, it should be understood as such—without idealizing the process but also recognizing its emerging potential.

There are different meanings of agroecology for different actors. For some, it represents an opportunity to develop an ecologically responsible business, aligned with new food preferences among certain segments of the population. For others, it is a technical process of input substitution, with varying levels of awareness regarding socio-environmental issues. However, for most

participants in this study, agroecology is a more complex process, involving a socio-technical, ethical, and political transformation that seeks a new way of inhabiting the land and fostering community-driven change, as discussed throughout this chapter. These different interpretations coexist today; sometimes they are contradictory, and at other times complementary, yet they all form part of this current phase in which agroecology is taking shape as a transformative force within Costa Rica's food system.

In this sense, documented experiences not only account for what has been achieved, but also invite us to continue broadening horizons, strengthening networks, and deepening the search for a transformative agri-food system. Agroecology holds profound potential, as it represents an ethical, epistemic-aesthetic, political, cultural, and biological reconnection with our existence in the world. The experiences recorded in this study demonstrate possible pathways, but their true impact will depend on collective capacity to build alliances and grassroots networks while strategically influencing public policy. Only by doing so can agroecology move beyond a collection of isolated experiences to become a territorial strategy with real influence on food sovereignty, community well-being, and ecological resilience. Through this articulation, it will be possible to challenge hegemonic production models and advance toward food systems that enhance community autonomy, regenerate soils, protect biodiversity, and safeguard Costa Rica's rich biocultural heritage.

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Chapter 4

Feast or Famine? Examining food (in)security and livelihood resilience during COVID-19 in Costa Rica

Jessica A. Breitfeller, Eileen Joseph, and Jan Breitling

Introduction

The COVID-19 pandemic profoundly impacted both the tourism and conservation sectors. International travel restrictions jeopardized the livelihoods of individuals and communities throughout the tourism value chain. The loss of tourist revenues caused cascading socio-environmental effects within tourism-dependent communities worldwide, threatening local food security. One country that has been affected by these processes is Costa Rica, which has long been considered a global leader in biodiversity conservation and nature-based tourism. In 2019, the country welcomed over 3.1 million foreign visitors—an estimated 80% of whom participated in nature-based tourism activities (ICT, 2020). However, steep declines in international tourist arrivals over the first eighteen months of the COVID-19 pandemic significantly impacted ecotourism operators and local communities throughout the country, revealing the economic vulnerability of communities relying on nature-based tourism for their livelihoods and food security (Shah, 2020; Schönberg, 2021). Such was the case in Monteverde and the Osa Peninsula.

Monteverde is often referred to as a poster child for nature-based tourism (Koens et al, 2009; Findlay, 2010). Famous for its threatened tropical montane cloud forests and high levels of biodiversity and endemism, the region is home to three major protected areas—the Monteverde Cloud Forest Preserve, Bosque Eterno de Los Niños, and the Santa Elena Reserve (Koens et al., 2009). Before Costa Rica's tourism boom, most Monteverde residents relied upon dairy farming and agricultural production (Martín, 2004; Burlingame, 2018). Today, tourism is the main economic activity of Monteverde (Little et al., 2024).

Similarly, the Osa Peninsula is world-renowned for its biodiversity. Located in the remote Southern Pacific region of the country, the

Osa Peninsula hosts 2.5% of the world's known terrestrial species of fauna and flora, protected in part by Corcovado and the Golfo Dulce National Forest Reserve (Friedlander et al., 2022). Before the onset of ecotourism, small-scale agriculture, cattle ranching, gold mining, and logging were among the economic mainstays throughout the peninsula (Hunt et al., 2015; Fletcher, 2013). In recent years, ecotourism has come to represent 60-80% of the regional economy (Gutierrez et al., 2019).

Monteverde and Osa residents have undergone major socio-economic shifts over the past thirty years, abandoning land-based and agricultural livelihoods in favor of more lucrative ecotourism opportunities. However, the sudden loss of tourism revenue due to pandemic-imposed travel restrictions and health precautions left many unemployed without income and struggling to put food on their tables.

Within this context, this chapter employs a sustainable livelihoods resilience approach to examine how the COVID-19 pandemic affected these ecotourism-dependent communities and to uncover the types of livelihood capital they used to cope and adapt to these changes, particularly as they pertain to food (in) security. Sustainable livelihoods resilience refers to the ability of households and communities to sustain and improve their livelihood opportunities in the face of changes and challenges in the social, political, economic, or physical environment (Nyamwanza, 2012; Tanner et al., 2015). To do so, it draws upon qualitative data and observation collected during the first two-and-a-half years of the pandemic. It begins by examining how ecotourism has come to be viewed as a sustainable livelihood diversification strategy and is thus directly linked to food security. It then introduces the sustainable livelihoods approach before presenting the conceptual framework applied in this research. From there, it describes the local-level experiences, livelihood assets, and innovative adaptive strategies of the Monteverde and Osa Peninsula communities. Livelihood assets concerning food security are then discussed, and the implications of the crisis on conservation are further assessed. The chapter concludes by offering potential planning and policy solutions and avenues for further research on the synergies between livelihood diversification, food security, and resilience.

Conceptual Framework: Connecting Ecotourism, Sustainable Livelihoods, and Food (In)security

Ecotourism as a Sustainable Livelihood Strategy

Ecotourism is a form of nature-based tourism that focuses on conservation, provides local benefits, and promotes environmental education (Honey, 2008). It is envisaged as an alternative to mass tourism and a sustainable livelihood strategy that can help diversify local economies and increase rural community resilience (Mohammed & Kanton, 2022; Kunjuran, 2022; Tao & Wall, 2009). Nevertheless, some have questioned whether ecotourism truly is a sustainable livelihood strategy, pointing to the issue of overreliance (Job et al., 2020; Pham, 2020; Pocock et al., 2024). This debate is explored in further detail below.

It is important to emphasize that no singular definition of a sustainable livelihood strategy exists. However, at its most basic, a livelihood strategy consists of “the activities employed to generate the means of household survival” (Shen et al., 2008, p. 21). Livelihood strategies encompass material and social assets such as capabilities, knowledge, values, and aspirations (Chen et al., 2020). According to Chambers and Conway (1992), livelihood strategies are sustainable when they can “cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation” while also maintaining the natural resource base (p. 6).

Livelihood resilience refers to the ability of households and communities to sustain and improve their livelihood opportunities in the face of changes and challenges in the social, political, economic, or physical environment (Nyamwanza, 2012; Tanner et al., 2015). Livelihood portfolios, therefore, are resilient when they can cope with, adapt to, and ultimately learn and recover from shocks and disturbances. One way of ensuring greater livelihood resilience is through diversification. Ellis (1998) defines livelihood diversification as “the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and to improve their standard of living” (p. 4). In other words, rural households and communities ensure greater resilience by drawing from multiple means to support themselves. Such means may include subsistence farming, fishing, hunting, and participation in the cash economy

as wage labor in multiple sectors, including ecotourism (Tao & Wall, 2009).

Livelihood diversification is also a critical approach to improving food insecurity. The Food and Agriculture Organization (FAO) defines food insecurity as a circumstance when an individual, household, or community lacks “physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO, 1996, p. 28). Alternative livelihood strategies such as ecotourism can provide income for purchasing foodstuffs and supporting local agriculture and distribution. At the same time, ecotourism can help raise awareness of sustainable agriculture practices and aid in maintaining the local environment for food production, which together can ensure greater food security in the long term. Conversely, it is important to note that increased reliance on ecotourism may also inversely impact local food security by diverting time, labor, and knowledge away from local food and agricultural production (Cowherd, 2012). In other words, overreliance on tourism as a main source of income can, as we demonstrate in this chapter, decrease the livelihood sustainability and resilience of local individuals, households, or communities.

The Sustainable Livelihoods Approach

One way of assessing livelihood resilience and food security is via the Sustainable Livelihood (SL) approach. The SL approach emerged in the 1980s as an integrated, people-centered development framework intended to address rural poverty by focusing on vulnerability through the lens of livelihood capital (Shen et al., 2008; King et al., 2021). A growing number of studies have attempted to assess how ecotourism might constrain or enhance livelihood outcomes, diversification, and community resilience (Mohammed & Kanton, 2022; Kunjuraman, 2022; Ávila-Foucat et al., 2021). More recently, scholars have explored these concepts within the context of the COVID-19 pandemic (see, for example, King et al., 2021; Ntounis et al., 2022; Adams et al., 2021).

The SL framework centers around five types of capital assets: natural, financial, human, social, and physical capital. Natural capital (N) encompasses environmental assets and natural resources such as land, water, and biodiversity. Financial capital (F) refers to the monetary resources available to individual

community members, including savings, subsidies, credit, and income. Human capital (H) is inclusive of skills and knowledge, while social capital (S) refers to the networks, connections, and relationships one maintains. These could include familial ties or associations with specific actors, organizations, or institutions. Physical capital includes assets such as infrastructure, tools, and technology (Harilal & Tichaawa, 2018). However, rather than focusing on these physical assets alone, the authors follow Shen and colleagues (2008) in adopting institutional assets (I) as the fifth form of capital closely related to social capital. Shen et al. (2008) define institutional capital as “providing for people’s access to tourism markets, tourism benefits sharing, access and participation in the policy-making process, and the extent that people’s willingness to be involved is reflected in political decisions to achieve better livelihood outcomes” (p. 27).

An individual’s or community’s access to certain assets—whether abundant or limited—is shaped by policies, institutions, livelihood strategies, and outcomes (Scoones, 1998). These factors, in turn, influence the vulnerability and capacity of an individual or community to adapt to shocks (Allison & Ellis, 2001).

More recent SL scholarship has also begun to consider how agency, both individual and collective, contributes to livelihood outcomes and resilience (Chen et al., 2020; King et al., 2021). Individual and collective forms of agency are indicators of access to capital, the health and influence of social structures (e.g., institutions), and the likelihood of system transformation (Chen et al., 2020). Therefore, individual and collective forms of agency determine factors of community resilience.

For this project, two SL frameworks were used: the sustainable livelihoods in tourism (SLT) framework put forth by Shen et al. (2008) and Chen et al.’s (2020) agency-based livelihood resilience model. Following King et al. (2021), we frame COVID-19 as “a ‘rupture’ affecting all components of the model simultaneously” (p. 3). Thus, we were interested in the linkages between the different model components of livelihood capital and agency and how these affect livelihood outcomes and interact to support or hinder food security and overall resilience.

Methodology

Case Study Sites

Costa Rica was selected as the primary site for this study due to its reputation as an international leader in environmental conservation and ecotourism. In particular, Monteverde and the Osa Peninsula were chosen as specific case studies because they are two of the country's most visited and distinguished ecotourism destinations as well as areas of international importance in biodiversity conservation. Monteverde and the Osa Peninsula have a long history of ecotourism and conservation and were highly impacted by the loss of tourism during the pandemic. At the same time, each site's distinct geographic and demographic factors offer a compelling case for comparative analysis.

Monteverde

Monteverde is northwest of the capital of San José, located along the continental divide in the *Cordillera de Tilarán* mountain range on the Pacific slope of Costa Rica. The area boasts astonishing levels of biodiversity: an estimated 50% of the nation's and 2.5% of the world's biodiversity is found within Monteverde (Monteverde Cloud Forest Biological Preserve, 2022).

Before tourism, Monteverde residents relied upon agriculture and cattle farming (Martín, 2004). In the 1950s, U.S. Quaker pacifists and Korean War conscientious objectors sought refuge in the area (Chornook & Guindon, 2008). Initially, the Quaker immigrants raised dairy cattle, and many residents continued to engage in subsistence farming (Cowherd, 2012). In the 1970s, the Quakers along with U.S. scientists founded the Monteverde Cloud Forest Biological Reserve, which marked the introduction of the environmental ethic that has become a core part of Monteverde's tourism identity.

Over the past 30 years, tourism has become increasingly crucial to the area's income generation and food security as tourists have flocked to experience the area's unique ecology. In that time, tourism grew from less than a hundred visitors annually in the 1970s, to tens of thousands in the 1990s, to nearly a quarter of a million by 2019 (Burlingame, 2018; Shah, 2020). Originally envisaged as an alternative to farming, nature-based ecotourism is now the mainstay of the local economy, with at least 85% of

Monteverde's population directly or indirectly supported by the "monocrop" of tourism (Burlingame, 2018, p. 4).

The Osa Peninsula

The Osa Peninsula, located in the Southern Pacific region of Costa Rica is home to approximately 2.5% of global biodiversity in only 1,200 square kilometers (Friedlander et al., 2022). It is also home to the largest wetland ecosystem and mangrove forests in Central America and the last remaining tract of lowland rainforest in Pacific Mesoamerica (Friedlander et al., 2022).

Like Monteverde, Osa Peninsula residents depended on small-scale agriculture and cattle ranching before the arrival of tourism, as well as logging, hunting, gold panning, and, more recently, oil palm plantations. Several other economic activities, like banana and timber plantations, failed to improve human development and overall wellbeing; they were abandoned at different times during the latter half of the last century (Román & Angulo, 2013). Due to these practices, deforestation, forest fragmentation, and habitat degradation were rampant during the 1970s and 1980s (Zambrano et al., 2010; Sanchez-Azofeifa et al., 2002). This slowly began to shift with the introduction of new policies and regulations, such as the 7575 Forestry Law, which made deforestation illegal throughout the country and established the national Payments for Environmental Services (PES) program. The PES program is a state-run conservation initiative to financially compensate private forest owners for the services produced by their forests (Fletcher and Breitling, 2012). Changing legislation and increased infrastructure development throughout the 1990s prompted agricultural abandonment and the appearance of private conservation areas (Algeet-Abarquero et al., 2015). By the mid-2000s, several communities created eco or agrotourism associations, which laid the foundation for a still-growing nature-based tourism sector on the peninsula (Hidalgo-Chaverri, 2019).

Methodological Approach

This chapter utilizes a sustainable livelihoods resilience approach (Chen et al., 2020; King et al., 2021; Shen et al., 2008) to analyze how the COVID-19 pandemic impacted local livelihoods and food security. It draws upon qualitative research conducted during several site visits to Monteverde and the Osa Peninsula between

March 2020 and August 2022. One of the authors spent three months in Monteverde during the year 2021 and two and a half months in 2022. One of the authors visited the Osa Peninsula two times a year between 2020 and 2022, staying one week during each visit.

Prior to the beginning of the study, ethics approval was obtained from the United Nations Mandated University for Peace's Ethics Committee in San José, Costa Rica. The research team used a suite of methods, including in-depth semi-structured interviews with a broad range of stakeholders such as farmers, members of civil society (not employed by or owning a tourism business) conservation officials, local conservation and tourism employees, guides, and business owners; participant observation in tourism and conservation activities; and a brief livelihood assets survey. Semi-structured interviews consisted of open-ended questions regarding perceptions of ecotourism before and during the pandemic, coping strategies, conservation impacts, and potential benefits. Upon their verbal consent, interviews were carried out with 48 participants and conducted in either Spanish or English, depending on the participant's preferences.

Table 1

Research Study Participants by Stakeholder Type and Location

Osa Peninsula	Monteverde	Type of stakeholder
6	7	Civil society members
8	8	Business owners & employees
6	1	Government officials & employees
4	8	Farmers
24	24	TOTAL

The livelihood assets surveys were exploratory and included both closed and open-ended questions regarding individual and community assets available to participants during the height of travel restrictions. Survey responses were then used to guide follow-up interviews with participants; these interviews explicitly focused on food security. Participant observation involved participation in several ecotourism excursions, agricultural and business operational tours, and national park and reserve visits. Primary data collection was supplemented by reviewing

community development strategies, COVID relief plans, and international and local news media.

Through triangulation, the research team uncovered the linkages between the qualitative data, livelihood asset survey results, and public documents. Field notes from semi-structured interviews and participatory observations were transcribed, translated, and then coded to identify emergent themes. This data was then compared across both case study sites to glean insight into community and livelihood vulnerabilities and reveal innovative coping strategies.

Results: Local Level Pandemic Experiences

Despite being two of Costa Rica's most eminent ecotourism destinations, Monteverde and the Osa Peninsula experienced somewhat different scenarios during the pandemic due to varying accessibility of local livelihood assets. Each destination's experiences are further detailed below.

Monteverde

When the COVID-19 lockdown began, the immediate problem for the residents of Monteverde was food security. The loss of income due to tourism layoffs was compounded by inadequate savings and accumulated debt. This, coupled with a loss of inherited agricultural knowledge, a lack of resources to grow food, and supply chain disruptions aggravated local food insecurity, making it difficult for certain demographics to continue to feed their families.

The pandemic appeared to have the greatest impact on the Monteverde middle class. The reasons for this were twofold. First, compared to other socio-economic demographics, this group had limited access to land and inherited agricultural knowledge to grow food. Younger generations left their farms for jobs in ecotourism and related service industries as these jobs were thought to be more lucrative and provided higher social status (Allen & Padgett Vásquez, 2017). Due to these migratory trends, middle-class residents lost access to spaces to grow food and became distanced from the knowledge of producing food. Second, without ecotourism revenues, this demographic lacked sufficient financial means to purchase food and other basic staples.

Disruptions in agricultural supply chains and markets further increased food insecurity in Monteverde. Local farmers lost their buyers and were unable to sell their products as restaurants and hotels were no longer catering to tourists. Disruptions occurred not only due to a lack of tourist demand but also because markets failed to connect producers with those in need. Community-based organizations stepped in to fill this gap, developing an inventory of local food producers and using a combination of institutional savings and donations to buy produce at or below cost before distributing it to those lacking access to food.

Beyond connecting those suffering from food insecurity to local farmers, the community of Monteverde employed a variety of different coping strategies. At the beginning of the pandemic, a community commission conducted a survey to identify the most pressing issues and who was in the greatest need of support. The survey results were used to inform federal aid distribution and identified less apparent problems, such as the need for more space and knowledge to grow food. Many of the participants the research team spoke with attributed Monteverde's initial successful response to the survey. To supplement federal aid, the community also promoted self-sufficiency through new gardening initiatives, developed alternative economies based on bartering, creating a local currency, and a small-jobs program.

In an effort to address the issue of self-sufficiency, community organizations purchased seeds and plants and provided communal gardening space to community members to enable them to grow their food. These organizations also facilitated the establishment of a seed network to allow individuals to buy, sell, or trade seeds. Local institutions also contracted farmers to share their knowledge through webinars produced by a local news network and disseminated via social media. In addition, a WhatsApp group chat was created between farmers and novice gardeners so that questions could be crowdsourced and experiences shared.

In 2021, the old bull ring in town was repurposed into a community garden. Compost was sourced from local farms, composting toilets, and by-products from the local cheese factory to rejuvenate the compacted and degraded soil. Community members volunteered their time and efforts to tend to the produce, which they gave to students' families from the Cerro Plano Elementary School. The community garden also became the site of a new farmer's

market, El Mercado Verde, which occurred every two weeks and allowed smaller producers to sell sustainable, organically produced products directly to consumers.

Monteverde residents also drew upon principles from the circular and sharing economies like bartering, cooperation, and buying locally to survive. For example, community organizations provided small jobs to locals in exchange for certificates for a local grocery store to purchase foodstuffs and other necessities such as internet coverage. Another project developed amid the pandemic was a local currency known as VERDES. The VERDES system operated through an online platform and allowed participants to access an online marketplace to buy and exchange goods and services. Some brick-and-mortar businesses also participated in the program. VERDES could be earned by volunteering in the community, practicing specific sustainable actions such as composting, or participating in gardening classes (Mesquita, 2021). As of April 2021, there were over 2,000 people enrolled, with the equivalent of USD 35,000 in circulation (Wilkins, 2021).

The Osa Peninsula

When the pandemic hit in early 2020, many individuals and communities on the Osa Peninsula quickly felt the impacts of the travel restrictions and the complete absence of tourists, national or international. Farmers or landowners who used to work and still had the land could produce their food or keep selling their produce. For them, the land was a built-in safeguard against food insecurity; there was enough to eat throughout the pandemic. For those whose earnings depended primarily on tourism, the lack of income increased food insecurity directly and indirectly. Several interviewees mentioned cases where individuals or entire families had no income and lacked access to the most basic food items during the first months of 2020. This left them to rely on family and friends until April 2020, when the government launched a nationwide public financial aid and rescue package, the *Bono Proteger* or Protection Bonus. This program aimed to protect the most vulnerable and those suffering from extreme poverty.

The lack of income and increasing food insecurity in the area resulted in various coping mechanisms or adaptation strategies, which were site-specific and often determined by individual realities. For instance, in the communities of Guadalupe, near La Palma in the center of the peninsula, some community members

reported being short on food and needing help from others to get by. Some families organized to assist those in need. Respondents living in other locations on the peninsula reported that at various times, people provided food and other necessities, such as soap and hygiene products, to other families when needed. Similarly, the Rancho Quemado and Los Angeles communities near Drake Bay worked collectively to plant “community crops,” mostly rice and corn, to assist the most vulnerable. In some areas, individual community members, farmers, and families turned to gold panning, a pre-tourism practice that is now illegal throughout the country but still occurs as a clandestine livelihood activity, particularly in times of need. The researchers spoke with two individuals who worked as guides and obtained temporary jobs in other sectors. These individuals reported that some of their tour guide colleagues opted to withdraw from the tourism sector and return home, sometimes to other areas of the country. They often depended on their families or broader social networks for several months.

When asked if residents of the peninsula still knew how to grow food, respondents indicated that, indeed, on the Osa, most people can produce or know someone who maintains knowledge of agricultural production since many individuals have family members who have been farmers all their lives. One interviewee stated that when food insecurity became more dire, this knowledge was shared with the communities and individuals in need. Several respondents mentioned how they were taught to establish small vegetable gardens, regenerative agriculture techniques, and or how to produce basic food crops such as plantain, beans, and corn. Additionally, some of the conservation NGOs in the region, such as the Corcovado Foundation, were actively involved in these processes, providing training, equipment, materials, and seeds (The Tico Times, 2022). One quote from an ecotourism lodge owner summarizes what several interviewees expressed:

Food security is fundamental, for many years we stopped cultivating, despite [being] a farming family. The money flowed thanks to tourism, and we had left agriculture aside. [During the pandemic,] we had to go back to farming and return to subsistence agriculture and sell the surplus.

In some instances, equipment and even machinery were shared by communities. A few respondents mentioned that certain tourism

projects and agricultural cooperatives in the region donated heavy machinery to prepare the land for sowing and planting. Nevertheless, even when the knowledge and access to machinery existed, for some, it made sense to look for alternatives, such as temporarily moving away, finding other jobs, or panning for gold and then purchasing food instead of producing it.

Most respondents quickly returned to their original livelihood activities when the pandemic subsided. Tourism has picked up very rapidly, and most appear to be trying to move back into the pre-pandemic “normal.” Others pointed out that they knew people who continued producing primary crops and vegetables, and a few even appeared to have increased their production. Some landowners, particularly those involved in tourism, seemed much more aware of the need to diversify and establish the “old” model of integrated farming systems to count on having access to basic food items. According to one of our interviewees, this acceptance stems from the awareness that staple crops and foodstuffs can and should be produced on their land even after the pandemic. Interestingly, this lesson of diversification has previously been learned by many Costa Rican farming communities dependent on a single crop (e.g., coffee, cattle, etc.) and was one of the main reasons some of these communities pursued ecotourism in the first place (Avila Foucaut et al., 2021).

In other cases, people considered gold panning, even after the pandemic, much more profitable and manageable, making it unnecessary to produce their food, as they could easily sell the gold and buy food from neighbors or in the supermarket. Strikingly, one respondent also asserted that conservation and agriculture do not go hand in hand, implying that artisanal gold panning was better for conservation. This person stated that should there be another crisis in the future, people should simply go back to gold panning, as “this is what we know best.” Such responses, however, were outside the norm.

Regarding lessons learned in terms of food security and livelihoods, some respondents stated that people needed to be prepared to produce basic food items and know how to store seeds in case of another crisis. A few mentioned that people needed to find a new love for agriculture and food production, and that there was a need for NGOs and state organizations to increase environmental and agricultural education programs to help cultivate this passion

and raise awareness and capacity to produce. The following quote from a local lodge owner sums up what many people interviewed described:

We have experienced how fragile this type of economic activity is since it depends largely on foreign visitors, so we must look for production alternatives that allow us to provide food security for our families.

Discussion

COVID Food Insecurity: Connecting Livelihood Assets and Adaptation Strategies

Guided by the SLT framework and the agency-based livelihood resilience model, this study aimed to explore the livelihood assets and adaptation strategies residents deployed and to identify those that may have made them more resilient. A specific set of livelihood assets, such as access to land, secondary income, savings, and agricultural knowledge, contributed to individuals' ability to cope with the crisis and aided communities in grappling with increased food insecurity. These assets, however, varied between each locale (see Table 2). These findings are discussed in further detail below. The following table presents the types of livelihood assets by region as they came forward through the different research methods applied, as described in the methodology.

Table 2

*Livelihood Assets Related to Monteverde and the Osa Peninsula
Food Security, 2020-2022*

Type of Livelihood Assets	Monteverde	Osa Peninsula
Economic Capital	· Government subsidies and aid · Alternative economic arrangements (e.g., small-jobs program, VERDES exchange system, etc.) · International donations	· Government subsidies and aid · Greater savings and lower debt · Part-time salaries · Secondary income from odd jobs
Natural Capital	· Agricultural means of production, including land, seeds, and seedlings, provided by local organizations	· Greater access to land · Higher availability of other natural resources (i.e., gold, flora and fauna)
Human Capital	· Minimal agricultural knowledge base held by a select few	· Higher degree and maintenance of agricultural knowledge due to increased access to family land and continued farming practices
Social Capital	· Greater social cohesion at the community-level · Community collaboration and collective action	· Greater reliance on familial relations · Larger focus on family-to-family collaboration rather than collective community-level organization
Institutional	· Collaborative network of community-based organizations · Proximate institutional arrangements	· Dispersed individual organizations

The research results demonstrate that an increasing dependency upon nature-based ecotourism in Monteverde and the Osa Peninsula has undermined historical food production and subsistence practices (i.e., farming, fishing, and gardening) and left communities increasingly vulnerable vis-à-vis external shocks and crises such as the COVID-19 pandemic. Families that had access to land, like those in Osa, were more likely to maintain a working agricultural knowledge base and therefore were able to relatively quickly return to subsistence farming to support themselves and feed their families during the height of the crisis. In Monteverde, fewer community members had access to agricultural land; hence, they relied on their social and institutional connections to gain access to community gardening spaces, agricultural knowledge, and seeds for planting.

Geography and local institutions were critical in shaping and facilitating adaptation strategies. Monteverde maintained greater social and institutional capital as a smaller, more tight-knit community than in the Osa. Here, local institutions were physically proximate; this allowed organizations in Monteverde to pool resources more efficiently and collaborate to establish food banks, develop community and home garden initiatives, and institute VERDES as an alternative currency. In Osa, institutional intervention was far more limited due to geographical remoteness and the dispersed nature of the communities on the peninsula. Therefore, communities depended more on family and other close personal relationships for assistance during the height of the crisis. Many research participants reported returning to cultivating family lands, while others turned to illegal alternatives, including artisanal gold mining and poaching inside and around Corcovado National Park. These differences are reflective of the collective agency of the communities. Collective agency, or the “capacity for a community to organize themselves toward a common goal of resilience” (Otsuki et al., 2018, p. 152), is linked to institutional and social capital access. The lack of access to social and institutional capital and Osa’s distance from tourism markets impeded its collective agency. Conversely, Monteverde’s centralized planning and greater access to social and institutional capital contributed to their collective agency. The different forms of collective agency can explain, in part, the ability of each community to respond and adapt to the COVID-19 pandemic.

Access to natural assets, including land, seeds, and plants, as well as human capital (i.e., agricultural knowledge), played an important role in offsetting food insecurity in Monteverde and the Osa Peninsula. However, the historical process of transitioning from land-based livelihoods to a dependence on ecotourism diminished access to these assets. Communities thus secured them through specific place-based social relations (institutional and familial). Social and institutional capital can act as backstops when other forms of capital, such as natural and financial, are limited or unavailable to the broader collective. As noted in the following sections, this has policy implications for risk reduction and improving resilience in the face of future shocks and disturbances.

Implications and Convocations for Conservation

Conservation efforts coupled with an overreliance on ecotourism can constrain community livelihood opportunities, making them less resilient to external shocks and, therefore, more vulnerable to food insecurity. Traditional land use and livelihood activities such as farming and fishing have declined—or, in the case of hunting, been abandoned—due to increasing reliance on ecotourism and conservation mandates. These results substantiate previous findings that indicate that loss of farmland and farm-based livelihoods tends to occur around nature-based tourism sites and national parks, resulting in a tradeoff and a potential overdependency on ecotourism for income and food supply (Mohammed & Osumanu, 2022).

Historically, the goals of conservation and food security have been at odds. However, now more than ever, there is a need to strike a balance and find greater synergy between the two. Emerging research explores how protected areas might be incorporated as part of the solution to local food security through the utilization of rights-based approaches to conservation that allow for the limited consumption of wild foods and the sustainable harvesting of certain natural products to be sold on local markets as a means of creating alternative livelihoods (Jouzi et al., 2022). Additionally, greater investment in buffer zones and the provision of incentives for sustainable management and agriculture practices in these areas may also contribute to the dual goal of increasing conservation and local food security (Samal & Dash, 2022). This can provide a safety net for local community members during times of crisis

and can lead to improved livelihood and conservation outcomes (Jouzi et al., 2022; Naughton-Treves & Holland, 2019).

Conclusion

The Monteverde and Osa cases provide a comparative snapshot of the issues surrounding ecotourism dependency and potential issues of food (in)security and conservation. Together, they demonstrate two principal lessons that have implications beyond Costa Rica. First, in ecotourism-dependent communities, access to specific livelihood assets can help ensure greater food security, particularly during times of crisis. Such assets include both individual and collective access to natural capital such as land, seeds, and plants; human capital including an understanding of traditional agricultural knowledge and practices; and finally, social and institutional capital, which together allow communities to organize and to “resolve collective problems more easily” and effectively (Wiesinger, 2007, p. 10). Availability of these assets varies from one ecotourism destination to another, and even from one particular family or person to another and thus must be evaluated on an individual or case-by-case basis during tourism planning and development as well as emergent shocks and crises.

Second, ecotourism and conservation can undermine historical land use, food production, and subsistence practices, which may spur greater food insecurity when not approached holistically. This is because while ecotourism, at times, can be viewed as a livelihood diversification strategy, an overreliance on ecotourism in the name of resilience may prompt greater vulnerability as there is no real diversification but rather a substitution of one livelihood strategy (farming) by another (ecotourism). Studies have shown that such overemphasis on tourism may inhibit self-sustainable food production (Himmelgreen et al., 2006; Burke, 2021) and cause communities to become reliant on foreign capital (Cowherd, 2012). In this sense, ecotourism may exacerbate the vulnerabilities in the food system.

Collectively, these findings point to the need to broaden livelihood opportunities. Just as nature-based and ecotourism once were envisaged as a livelihood diversification strategy, counteracting dependence on one single crop, today, these types of tourism have become the new “monocrop,” decreasing the resilience of rural community members (Burlingame, 2018, p. 4). Ecotourism alone does not ensure livelihood diversification, nor does ecotourism

adequately safeguard against food insecurity (Mohammed & Osumanu, 2022). This is particularly true in ecotourism hotspots such as Monteverde and the Osa Peninsula, where a significant portion of the population derives their livelihood from nature-based tourism and adjacent activities. With this in mind, other diversification strategies to consider moving forward include the introduction of agrotourism, targeted reintroduction of smallholder farming, and assistance securing supply chains. Such livelihood diversification should be regarded as a way to increase livelihood resilience and food security and as a potential means of increasing conservation sustainability.

In light of these results, the authors contend that tourism recovery plans and future policies must commit to safeguarding against short-term food insecurity while increasing food self-sufficiency in the long run. In doing so, they must explicitly address the externalities and risks that nature-based tourism and conservation pose to rural, environmentally endowed communities. More specifically, planners and policymakers should aim to facilitate greater livelihood diversification in ecotourism destinations by bringing local voices to the fore to direct recovery efforts and disaster and crisis planning moving forward. Building capacity and strengthening local institutional relationships among different sectors, e.g., state agencies, agricultural cooperatives, businesses, development and conservation NGOs, transportation companies, and other types of institutions, are also crucial in guaranteeing that tourism and conservation are more resilient in the future. Combining conservation and food security goals within these areas of eco- and nature-based tourism can aid in ensuring more shock-resistant communities. Here, it is necessary to emphasize that there is no one-size-fits-all approach to the interconnected issues of livelihood resilience, food security, ecotourism, and conservation. Targeted, place-based interventions are needed based on community size, geography, demographics, and dynamics.

Finally, we offer a few points of departure for future research to help guide tourism interventions, policies, and planning. First and foremost, there is a need to study previous shocks and ruptures within the domestic and international (eco)tourism context. The coronavirus is not the first time Costa Rica has faced such challenges, nor will it be the last. Previous shocks, such as the coffee crash of the 1990s, the 2008 global recession,

the Zika outbreak, and the natural disaster caused by Hurricane Nate in 2017, all impinged upon foreign tourist revenues and caused a ripple effect across national conservation and protected areas. Examining how ecotourism destinations in Costa Rica and beyond responded to such perturbations can help identify effective responses and strategies that allowed communities to overcome the coronavirus pandemic.

Further research is needed to determine if and how current adaptive strategies can be expounded upon in preparation for subsequent crises. Lessons from such scholarship can be extrapolated and applied in climate adaptation planning to help inform ongoing adaptation strategies. Scholars may also consider working with communities to carry out in-depth asset mapping through SWOT analyses and other frameworks to determine communities' strengths, weaknesses, opportunities, and threats and help inform targeted interventions focusing on capacity building and asset cultivation. Additional geographic analyses that examine how topography, land, physical distance, and remoteness impact community resilience should also be considered. Community-to-community cooperation should be facilitated to share lessons learned among communities and community members of different localities within individual countries and internationally. Together, the above policy recommendations and future research can help contribute to responsible recovery and ensure greater resilience for livelihoods and food security in the long run.

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Chapter 5

Just food at just prices: A case study of a Costa Rican agroecological farmer-to-customer food delivery service

Mary Little

Introduction

The global food system faces challenges related to environmental degradation, social inequality and social instability (UNEP, 2021). Agricultural systems, which account for 23 percent of the world's greenhouse gas emissions, increase temperatures, rainfall variability, and cases of extreme weather (Moerder et al., 2020). In 2017, the relative contribution of agriculture to regional total CO₂ emissions from all human activities was 57% in Latin America, which includes emissions from tilling, raising livestock, agrochemical application, and transportation. CO₂ emissions are much higher in Latin America than in Europe (13%) and North America (9%), indicating substantial opportunities for improvement in this sector (FAO, 2020). The United Nations Food and Agriculture Organization (FAO) has focused on agriculture's enormous potential to contribute to biodiversity conservation and economic stability (FAO, 2014). Agroecology, also known as ecological or regenerative farming, draws on natural processes like biological nitrogen fixation, biodiversity and recycling, rather than chemicals, which reduces biodiversity and contributes to climate change (Garcia-Oliveira et al., 2022).

The FAO supports increased agroecological production as it promotes a social dimension that closely links farmers and consumers in the food value chain (FAO, 2020a). The UN Special Rapporteur on human rights and the environment stated that the “rights-based approach ... is an essential catalyst for transformation from unsustainable food systems to a future where everyone enjoys healthy and sustainable food, workers are treated fairly and degraded ecosystems are restored” (UNEP, Andersen, 2022). Recognition of the need for a responsible food system, particularly as the impact of climate change increases, raises the question: what changes to the food systems will

transform agriculture to allow farmers and consumers to assert our rights to a healthy environment?

The benefits of agroecological production include improved soil health, ecological biodiversity, enhanced food security, and strong social equality. Additionally, D'Amico et al. (2024) highlight how the reduction or elimination of intermediaries between producers and consumers provides layered benefits including increased adaptation to consumer behavior patterns, and a higher quality of healthier foods. In response, alternative food systems are gaining prominence for their potential as a more ecologically sound way to feed people while supporting local farmers. Local agroecological efforts can take various forms, including farmers' markets, on-farm sales, box delivery schemes, and direct selling to local schools, hospitals, or elderly houses (Charatsari et al., 2020). This study focuses on food supply chain systems, which are defined by Charatsari et al. as "networks through which foods are distributed from their producers to end-consumers" (2023, p. 2).

Costa Rica is relatively new to direct farm-to-customer sales but increased drastically during COVID-19. Enraizadas was established in San Luis, Costa Rica in 2018 with the mission to provide products that are free of agrochemicals produced by local farmers from open-pollinated seeds and provide customers with healthy and nutritious food (Adrianna Campos, Personal Comm., 2023). This study focuses on these agroecological values central to Enraizadas to evaluate whether the local food delivery business meets their stated goals. Principles of food commoning are combined with the triple layered business model to assess the potential to connect producers and to generate mutual economic, ecological, and social benefits. Interview and survey data reveal both the challenges and advantages associated with establishing a regional food delivery system. Additionally, this research illustrates how adapting agroecological producers' strategies to align with their values has helped to maximize benefits while effectively addressing challenges. Farmers who adopt sustainable agricultural practices can potentially achieve greater economic returns while simultaneously reducing waste and emissions. This presents significant advantages not only for the farmers themselves but also for consumers, who have long been disconnected from both the agricultural process and the

land that sustains them.

This case study aims to enhance our understanding of 1) the environmental, economic, and social value generated for producers and customers by this SFSC operation, and 2) the challenges encountered by farmers and the business in their efforts to deliver healthy, locally sourced food at prices that are fair for both farmers and consumers. This paper contributes to the literature on food commons by exploring the diversity and particularity of “actually existing” commoning actions (Eizenberg, 2012). Grounded in a case study in San Luis de Grecia, Costa Rica, a country with a strong conventional agricultural export market but few agroecological producers, the article analyzes the values and practices guiding a food commoning initiative. It explores how coordinating production and distribution of food can contribute to a more economically, ecologically, and socially just commons-based food system in the Global South.

Conceptual Framework and Literature Review

Food Commoning and Triple Layered Business Model

Food systems are now widely recognized to need fundamental transformation (Webb et al., 2017). Scholars and activists have proposed to move beyond an understanding of food as a commodity, instead reconceptualizing it as a commons. Food commoning refers to the practice of collectively managing and governing food resources and systems in a way that emphasizes shared ownership, sustainability, and equitable access. Carceller-Sauras and Theesfeld discuss “food commons” as an alternative framework for addressing food security and justice, incorporating principles of food sovereignty and community participation (2021). Shiva emphasizes the importance of the concrete action of saving and sharing as a form of reclaiming food sovereignty and commoning practices in the face of corporate control over seeds and agriculture (2016).

Linebaugh (2008) proposes to consider the commons as a verb instead of a noun: it is the act of commoning which invokes the common nature of a resource, including productive agricultural land. A growing body of scholars ([Escobar, 2015](#); [Federici, 2012](#); [García-López et al., 2020](#); [Linebaugh, 2008](#); [Singh, 2017](#)) conceptualize the commons as a complex set of social, ecological and political practices rather than a territorial construct. In

response to the negative ecological and social consequences of privatization, researchers and activists are envisioning different forms of exchange, production, and living together as a commoning strategy (Nightingale, 2019).

Food chains can deliver products but can also transfer knowledge and values. Shortening food supply chains has been proposed to increase food system sustainability and resilience (Chiffolleau & Dourian, 2020; Michel-Villarreal et al., 2021). Short Food Supply Chains (SFSC) reduce "...the distance between agriculture and final consumption, directly re-connecting farmers to consumers..." (Charatsari et al., 2020). SFSC have been well studied regarding their sustainability. In comparison to long chains, SFSC they have been reported to 1) reduce economic uncertainty for farmers since they are not subject to the market volatility of longer supply chains, 2) contribute to the local economy, 3), support more inclusive and equitable participation in the food system, and 4) better preserve agrobiodiversity (Chiffolleau & Dourian, 2020). This work focuses on SFSC's potential contribution to local economies (Kiss et al., 2020) and social sustainability (Wang et al., 2022), the increased interest of consumers in such food distribution schemes (Cruz et al., 2021), and their capacity to strengthen the connection between farmers and buyers (Giampietri et al., 2018).

This paper examines how local food supply chains contribute to a commoning mentality by creating producer/consumer connections and valuing their regenerative agricultural practices. Buying food from the local food shed links people to the impacts of food production. Paying prices set by farmers gives voice to the true cost of production. Additionally, buying regionally supports the local economy and strengthens community bonds. This case study is situated in the literature on SFSC resilience as an active commoning strategy. SFSC initiatives increased to meet local food needs during COVID-19 but have remained understudied especially in the context of COVID-19 (Chiffolleau & Dourian 2020; Michel-Villarreal et al. 2021). This work focuses on analyzing smallholder farmer responses and adaptations following the impacts of the COVID-19 pandemic.

Though there is increased interest in SFSC, the dimensions of the value produced haven't been fully examined. This study links the commoning theory with Triple Layered Business Model Canvas, developed by Joyce and Paquin (2016) to portray how creating economic, environmental, and social value can contribute to

forms of exchange as a commoning strategy. Canvases depict the business strategies used by organizations to understand the pros and cons of different business models. They also facilitate the analysis of the critical success factors, which makes the triple business canvas useful for this assessment.

Figure 1

Benefits of Farmer-to-Customer Short Food Supply Chain Through the Triple Layered Business Model Canvas Lens



The core benefits of SFSC are high quality, sustainably produced food that, in turn, promote economic and ecological health. The economic layer of the canvas assessment hinges on production and transportation costs. These focus on costs of agricultural inputs, time spent at markets and away from the farm, and unsold products that count as a loss. Since SFSC operations rely on the connection between farmers and customers, the development of relationships and a deeper understanding of production can enhance economic value. Trust-building is rooted in the mutual belief that farmers are requesting a fair price for their products and that customers are willing to pay such a price. This concept, emphasized by the SFSC co-founders and farmers, is illustrated in Figure 1.

The environmental layer includes all ecological impacts of production. For the farmer, the type of seeds and fertilizer used plus machinery and practices influence the environmental

impacts. Outside the farm, transportation from the farm to markets, washing and packaging of products, when required, all contribute to the environmental footprint. SFSC can have a positive impact on environmental aspects of farming because of the ability to better plan production processes and the reduction of food miles (Malak-Rawlikowska et al., 2019). Not only are long, international routes often reduced to a few kilometers, consumer travel is eliminated.

Costa Rica produces a variety of fruits and vegetables for national consumption, making SFSC a logical option for sourcing food locally. All 28 farmers selling produce on the Enraizadas platform are located in the central regions of the San Jose, Alajuela, and Cartago provinces, which is home to almost half of the national population. The temperate climate and rich volcanic soils have made this region the center of Costa Rican coffee and vegetable production (Brenes-Peralta, 2021). The intensive use of agrochemicals to boost yields has led to environmental challenges, including contamination of soil, water, and air. This pollution impacts human health and ecosystems, particularly in areas like Cartago, where unsustainable farming practices have degraded water quality (IAEA, 2015). Agroecological practices and collective organic certifications are on the rise to address human and environmental health issues. Organic certification is not mandatory for participation in Enraizadas, as the associated costs can be prohibitive. Instead, Enraizadas employs a thorough vetting process to ensure that producers are not using agrochemical fertilizers. This process includes evaluating their farming practices and providing guidance to enhance agroecological methods when necessary.

The central value of SFSC operations is offering high-quality products that local farmers cultivate and sell directly to clients. Much more than other food supply chain approaches, short chains depend on the development of strong relationships with consumers and the level of farmers' knowledge (Charatsari et al., 2020). The social canvas incorporates the trust and connection that builds agricultural knowledge between farmers and cultivates a sense of community. Buying directly from farmers can create a culture of belonging which promotes social support. The households that purchase food from Enraizadas can contact farmers for information about production methods, products or to make specific requests, creating deeper bonds. Business canvas

have been criticized for overemphasizing economic value. The triple canvas model acknowledges that while economic success is important, many farmers prioritize values that do not compromise the environment or the community. Focusing on the connections between the triple values indicates the interconnectedness of all three layers. Enraizadas emphasizes the fundamental principles that farming practices support ecological, social, and economic systems over time.

Methodology

Information for this research was collected through semi-structured interviews with the founders of Enraizadas between September 1-5, 2023. Interview themes included: 1) creation and growth of the business, 2) core values that inform the business, and 3) economics, social and environmental benefits and challenges. All farmers selling products on the Enraizadas platform were also invited to participate in an online questionnaire. The invitation to participate was sent on August 2, 2023, and closed on August 17, 2023. Questionnaire topics included time and products on the platform, reasons for selling on the platform, benefits and challenges of participating in Enraizadas. Online questionnaires were selected to ensure that researchers could reach more producers and allow farmers to participate in the study at their convenience without interfering with their livelihoods.

Descriptive statistics were used to analyze the farmers' responses. *In vivo* qualitative coding was used to better understand farmers' experiences (Saldana, 2011). To ensure consistency, two academic assistants acted as independent coders to reconcile discrepancies and refine the coding scheme (Saldana, 2021). Cofounder interviews were analyzed using the key categories from the Triple Canvas Model. This study was approved by the School for Field Studies Ethics Committee.

Results

Farmer input came from surveys conducted with 19 of the 28 farmers selling through the Enraizadas platform as of September 2023. Farmers sell diverse products on the platform from vegetables, dairy products, jams, and butters, to shampoo and cleaning products. Seventy-five percent of this sample have been selling with Enraizadas for a year or more. Small-scale farmers contributing to Enraizadas typically manage farms with a

workforce of 2 to 11 individuals. Forty-four percent of the farmers were contacted by Enraizadas to sell with them. Another 31% had the platform recommended to them by a participating farmer, indicating satisfaction with the relationship. The surveys covered topics related to products, sales, and the benefits and challenges of selling on the Enraizadas platform.

The farmer questionnaire began with a free association task, inviting farmers to provide a word they most closely associated with “Enraizadas.” The responses were subsequently analyzed and categorized into thematic groups.

Table 1

Words Participating Farmers Associate with Enraizadas

Theme	Participant Response
Principles/Motivation	Effort, respect, responsibility
Product descriptors	Delicious, freshness, healthy, local, organic
Production methods	Environmentally friendly, organic, sustainable
Outcomes	Healthy products, social connections, support, wellness

Terms like “effort” and “responsibility” highlight the personal commitment of farmers, while support” and “social connection” point to how this model can build relationships between farmers and consumers. Terms like “health,” “wellness,” and “healthy products” emphasize the program’s focus on providing nutritious food. “Organic,” “freshness,” “sustainable,” and “environmentally friendly” underscore the emphasis on regenerative practices. Farmers also included descriptors like “delicious,” “local,” and “freshness” which touch on sensory and cultural aspects of food. This reinforces the project’s aim to deliver locally-sourced products that taste better than mass produced, conventional produce.

Farmers’ Reasons for Joining Enraizadas

One of the main complications agroecological farmers face is fair prices at market. A participant explained they decided to sell with Enraizadas to ease worry and work related to finding outlets

for their produce. “The happiness of planting and knowing the product will find its way to the customer gives me a lot of peace to do my work as a farmer.” Another farmer gave a similar reason for joining so that Enraizadas could “provide the logistics to deliver our products from the farm to our clients,” and another farmer pointed to the limited options for organic farmers, “I do sell at a farmers’ market but wanted to try another avenue that sells to people who know they want to buy agrochemical-free foods.”

Benefits of Selling with Enraizadas

Farmers reported very high satisfaction with the fair pricing strategy, with 89% of the farmers reporting that they have a positive view of the right to set their own prices. One farmer explained, “What I sell depends on what I decide to produce. It goes all the way to deciding what price to sell at.” Allowing farmers to independently determine pricing when selling to distributors is a transformative approach that ensures they receive fair compensation for the risks incurred during production. This is made possible by eliminating intermediaries. One farmer summarized the main benefit of selling to Enraizadas as “being part of direct business between farm families and consumers.”

Another benefit of this short food chain is what five farmers referred to as a “lower/reduced product waste.” “They tell us the quantity of product that has sold so we can harvest it and no more.” Another farmer provided an example of this food waste. “They’ll (Enraizadas) say we need 5 kilos of cherry tomatoes. So I’ll have 5 kilos ready and I don’t have to prepare a lot that they don’t need. This is how it works.” Farmers can sell unneeded products at another venue while reducing resource loss from wasted food.

Farmers found the platform could connect them to clients that were interested in sustainable, local food that they may not otherwise have connected with. “They help us reach new clients.” “Enraizadas collects the products, separates them by order, and delivers them. We only produce chicken and eggs so people can buy our products plus everything they want all together, in one delivery.” Another farmer focused on the relations and trust that can be built through this SFSC. “I have gotten to know some of my clients. They can make special requests or ask questions through the platform. I have invited some to the farm and they have come to see how I do things.”

Challenges of Selling with Enraizadas

Some challenges identified by farmers were systemic and aimed at government policy that creates barriers for small, agroecological producers. “Why is the government supporting a large, centralized produce market in San Jose? We are left trying to compete against outside vendors that bought at bulk prices.” “There isn’t any help from the government to transition to sustainable farming, which makes it difficult. Enraizadas is a support network, in a way.”

Customer perceptions and preferences can also clash with the realities of eating local, seasonal food:

Some customers want products like tomatoes all year, but they are hard to grow during some seasons. We have also seen that people are accustomed to the hard, hybrid tomatoes at the supermarket. Local varieties can be softer and smaller, but the customer can complain.

Another issue was customers’ lack of familiarity with some products:

I try to grow more than just staples like lettuce, onions, and tomatoes, but many people don’t know how to cook with other vegetables and herbs. I think we are losing connection with some of the traditional ingredients and all the greens that our grandmothers cooked with.

Discussion

Fewer Costa Ricans are visiting farmers’ markets, which have traditionally been the primary way people purchase fresh food directly from local farmers. Following COVID-19, people reported less access to organic food as well (Sylvester, 2021). Others are frequently disappointed to find that some vendors are not producers but merchants that purchase food for the lowest possible price at the largest agricultural market then resell at local markets, which diminishes the economic benefits to the farmers. Some consumers question the health impacts when they find that most vendors are selling products grown with agrochemicals. One of Enraizadas’ co-founders who farms using agroecological methods provided a farmers’ perspective on markets. She found that her options for selling produce presented challenges. The middlemen that sell to grocers offered her so little that it often didn’t cover

actual production costs. Selling directly to customers at farmers' markets, where farmers can set their own prices, required investing many hours of valuable work time on sales. Enraizadas seeks to offer a third option that addresses the needs of both farmers and consumers while promoting sustainable production.

Enraizadas addresses these concerns by acting as the coordinating intermediary in the direct farmer-to-consumer model, thereby facilitating a connection between agroecological producers and consumers. Enraizadas operates a digital platform for customers to select and purchase food items. Following this, the agroecological producers harvest the exact quantities ordered by the customers. Enraizadas then collects the harvested food from farmers, prepares the orders, and distributes them directly to clients' homes. Using a digital platform allows customers to see what items are available in real time and reduces waste since farmers know exactly how much to harvest.

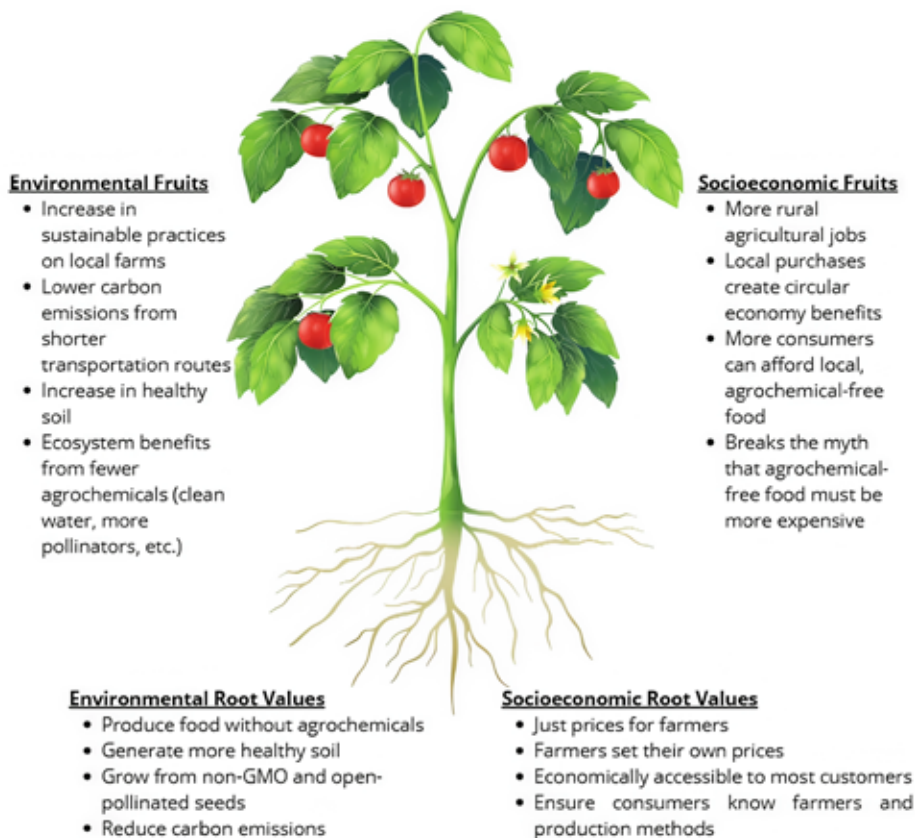
Enraizadas was established to actively pursue its vision of an improved food system rather than hoping that an improved food system would materialize (Van De Sande, 2013). This vision is rooted in ensuring a stable livelihood for sustainable producers. Under Enraizadas' SFSC pricing model, farmers set their own prices to ensure they can cover production costs. Enraizadas also emphasizes that just pricing includes a responsibility of fair prices to customers and requires a commitment that farmers do not raise prices excessively at the shoulder of growing seasons or due to an unexpected limited supply of a product on the markets. Farmers report very high satisfaction with the fair pricing strategy, with 89% of the farmers reporting that they have a positive view of the right to set their own prices. Enraizadas has also conducted four of their own customer satisfaction surveys over the last three years. All four surveys show that 80% or more of the customers find the prices to be fair.

Interviews with the co-founders of Enraizadas revealed core values that underlay their business and guide decision-making. These include working *with* the environment to regeneratively produce food, connecting with farmers and customers so they can understand and support one another, and ensure fair prices for both producers and consumers. Their motives for creating a farmer-to-consumer delivery business revolved around enabling farmers and consumers to learn and live these principles

through producing and purchasing local food. Figure 2 provides a representation of these businesses as root values that are embodied as fruits. For clarity, I have divided their root principles and fruitful outcomes into socioeconomic and environmental categories, though the environmental and socioeconomic components are always intertwined.

Figure 2

Enraizadas' Farm-to-Consumer Food Delivery Business' Root Values Manifest as Fruitful Outcomes



The environmental root values outlined by Enraizadas co-founders in interviews emphasize a holistic approach to sustainable agriculture that prioritizes the health of ecosystems and communities. By advocating for food production without agrochemicals, the initiative's reported aims are to enhance soil organic matter, promote biodiversity by using open-pollinated seeds rather than genetically modified organisms (GMOs), and significantly reduce carbon emissions associated with both production and transportation. Most farmers participating in this model reported notable positive environmental outcomes (fruits), including a marked increase in sustainable practices driven by training, and consumer interest in environmentally-sound production methods. These practices have led to reduced emissions from transportation to markets and minimized reliance on external farm inputs. The shift towards organic farming has also resulted in healthier soils due to increased composting and soil-saving strategies, while fostering improved environmental health through balanced agricultural systems that natural pest control methods and mitigate concerns over agrochemical water contamination. This strategy not only enhances agricultural productivity but also contributes to the resilience of local ecosystems.

The integration of socioeconomic values into producer outcomes is crucial for a complete evaluation of the benefits and challenges of sustainable agricultural systems. By ensuring fair prices that reflect the true costs of inputs, labor, and knowledge, farmers can regain control over their pricing strategies, moving away from reliance on middlemen who often dictate terms unfavorable to them. The Enraizadas website fosters a direct relationship with consumers that enhances economic accessibility of food products through efficient delivery systems. The transparency in the food supply chain is bolstered by initiatives such as farm open houses and video communications that enable consumers to connect with producers, generating trust and awareness about the origins of their food. The socioeconomic outcomes for farmers include increased job opportunities in rural areas that stimulate local economies. Putting more money in farmers' pockets supports a circular economic model.

Enraizadas reported client comments on the platform that reveal culturally rooted challenges that could delay uptake of this service. During interviews with the cofounders, they identified a perception

among Enraizadas clients that sustainably produced food, often shorthanded as *organic*, costs more than conventionally produced food. This is seen as a significant challenge that prevents some Costa Ricans from even visiting their web page. There is cultural self-segregation with roots in the green revolution practices and postcolonial extractive agricultural practices. Enraizadas has made significant efforts to share the Costa Rican producers' stories of regenerative agriculture to promote education about agriculture that replenishes the land. These videos project the message that Costa Ricans are part of the solution through personal and ecological care. Sharing this story of equitable access among different sectors of the Costa Rican population promotes the commoning concept of shared responsibilities and shared advantages. As more consumers gain access to locally produced, agrochemical-free food, the myth that organic products must be expensive is dispelled, opening the market to a broader customer base and promoting healthier eating habits across diverse socioeconomic groups.

Applying the Triple Layered Business Model to these findings reveals significant economic benefits, including improved production and harvesting planning, the ability to set fair prices, and reduced costs from travelling to local markets. Environmental advantages align with these economic gains, such as the production of on-farm inputs like organic fertilizers and pesticides, which lower costs while promoting sustainability. Farmers experience dual benefits from reduced transportation needs, leading to savings on fuel and decreased emissions. Socially, farmers highly value their participation in Enraizadas due to enhanced connections within a network of producers and knowledge sharing. This collaboration fosters trust with customers, as they can actively engage with client feedback and promote their products with videos to share sustainable production practices and products.

SFSCs not only provide food but are also value-creating systems that operate parallel to mainstream food distribution channels (Connolly et al., 2022). Enraizadas' direct food delivery system is an example of added value for both farmers and clients. It facilitates the achievement of environmental goals by connecting farmers who adopt environmentally friendly practices with clients who want to support regenerative farming and limit carbon emissions for the transportation of products (Bui et al., 2021). Moreover, this food delivery system serves the social and ethical goals of

reducing unemployment in rural areas (Falguieres et al., 2015) and enhancing food security in the communities by supporting small local farmers that struggle to sell their products at a fair price to large scale middlemen (Schmutz et al., 2018).

Value also emerges through relational processes (Marsden et al., 2000) such as trust building through fair trade at fair prices. These relationships support a sense of ownership, equitable access, and shared responsibility for local food systems. Enraizadas' direct farmer-to-customer food distribution system aligns with what Vivero-Pol identifies as the food commoning principle of a marketable product contingent on fair trade and sustainable production (2018). The end-goal of a food commons system should not be profit maximization but rather increasing good access in ways that are fair to producers and consumers, build community, and shorten the distance from field to table (Vivero-Pol, 2013). The founders of Enraizadas' stated purpose of providing just food at just prices aligns with the principles of fairness paired with the ecological benefits of reduced transportation distance, known as food miles. An analysis of the interviews with Enraizadas' founders and the farmers demonstrates that Enraizadas' SFSC values align with the food commoning goals to increase access to food in ways that are fair to producers and consumers while building community.

Though the potential benefits are multilayered, serious challenges related to both client preference and operations must be addressed for this SFSC model to succeed in Costa Rica. One issue is the perception that sustainable food services cater to a predominantly elite or foreign demographic, which can alienate local Costa Ricans. This is compounded by a cultural tradition of visiting local markets rather than relying on home delivery. While some individuals appreciate the convenience of delivery, others struggle with the cultural shift, finding it difficult to adapt to a system that doesn't allow them to hand select their own produce.

Additionally, the requirement for customers to be present to accept the food delivery can be inconvenient. Establishing alternative designated pickup locations could alleviate this issue for those that cannot be at home at delivery times. The intricate nature of a food delivery system itself presents challenges for scalability, making it difficult for the business to expand effectively while ensuring efficiency and customer satisfaction. These factors

collectively illustrate some of the hurdles that must be navigated to foster a more inclusive and efficient food delivery ecosystem in Costa Rica. As more consumers gain access to sustainably produced, fairly priced food, the myth that organic products must be expensive is dispelled, opening the market to a broader customer base and promoting healthier eating habits across diverse socioeconomic groups.

Conclusions

The relationships created between producers and consumers by Enraizadas are pivotal in building resilient communities through sustainable agricultural practices. As we move forward, it is essential to recognize that initiatives like Enraizadas are not just about food delivery; they represent a broader movement towards reclaiming our food systems, empowering local economies, and ensuring that consumer food choices contribute to a more equitable and resilient future. As a testament to their resilience, Enraizadas successfully navigated the logistical challenges posed by a surge in orders during the COVID-19 pandemic. This period marked a significant shift in consumer behavior, as many individuals began prioritizing healthier food options and fostering stronger community ties. The pandemic has awakened a collective consciousness regarding the risks associated with relying on agroindustrial processes for food production, often sourced from distant regions. In this context, a growing number of consumers have embraced food delivery services that offer fair prices, sustainably produced goods, and support for local farmers. This shift not only reflects a desire for quality but also an increasing commitment to environmental values and social justice. Enraizadas is an example of creating a digital commons that promotes local production and exchange in Costa Rica. This commoning strategy brings people closer to the land and the farmers that produce their food to collaborate in creating triple layers of just exchange. The satisfaction farmers expressed about collaborating with Enraizadas underscores that this SFSC business not only meets market demands, but is actively contributing to a vision of food systems that balance environmental integrity, economic viability, and social equity.

Acknowledgements

I would like to express my deep gratitude to the founders and farmers of Enraizadas for their invaluable contributions to understanding food justice and agroecological practices. Their commitment to local, sustainable agriculture by supporting small-scale producers and fostering community solutions has been key to this research. Their dedication and patience with my many questions is much appreciated and will hopefully inspire other sustainable distribution projects. I would like to thank the Center for Ecological Resilience for supporting my work by funding my many trips to Finca San Luis in Grecia, Costa Rica.

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Chapter 6

Institutions supporting local producers: Implications for knowledge sharing in rural communities

Fern Perkins and Allison Cantor

Introduction

The Monteverde Zone (MVZ) in rural north central Costa Rica has a long agricultural history, starting with the early settlers who moved to the region in the early 20th century (Vargas Leitón, 2024; Vivanco, 2007). The rapid socio-economic and political changes in the late 1980s, sparked by tourism, have gained widespread attention in the academic literature, most notably for their impacts on local food systems and health (Cantor et al., 2013, 2021; Himmelgreen et al., 2006, 2014; Ruiz et al., 2014). The regional communities are recognized for their high degree of self-organization, partly due to the influence of the Quaker families that settled in the region in 1951 (Vivanco, 2007), bringing with them practices of self-governance and consensus-style decision-making, and larger-scale dairy farming (Davis, 2009). The legacy of independence and local support for the surrounding community is important, as the municipal administrative center for this rural region was, until recently, located in Puntarenas, 69.5 kilometers away on poorly maintained roads (Martín, 2004). In 2002, Monteverde became a special district, with its first local government. It wasn't until 2024 that it became an administratively independent *cantón* (i.e., “county”) (Vargas Leitón, G., 2024).

The conservation organizations and ecotourism in the MVZ are intertwined, and leadership by local institutions is well-documented (e.g. Burlingame, 2000; 2014; 2018). The economic benefits of ecotourism for conservation have been great, with local organizations administering all the protected areas in the MVZ. The primary source of income sustaining these organizations' conservation endeavors is tourism (Dahles & Keune, 2002), which makes them vulnerable to external factors affecting international travel. Despite food production being a service as important as

those provisioned by nature reserves, the relationship between local institutions and agricultural production has not been studied.

As this historically rural, agricultural region adapts to changes associated with development, it is important to reflect on the impacts of these changes, especially regarding food production and the sustainability of food systems, as the evidence suggests that food insecurity continues to be a concern for local communities (Ramírez & Echandi, 2024; Monterrosa et al., 2022). This scoping review aims to critically examine the dialectical relationship between institutional support and sustainable food production in the context of rapid socio-economic change, using the MVZ as a case study. This review addresses the following research questions:

- 1) *What is the history of the relationship between local institutions and food producers in the Monteverde Zone, and how has this shifted over time with the rise in tourism?*
- 2) *What are the lessons learned from this example that can be of value to other communities experiencing rapid socio-economic growth and development?*

Additionally, the review applies the United Nations Food and Agriculture Organization's (FAO) 10 elements of agroecology (FAO, 2018) as a lens through which to operationalize the lessons learned from this case study, contemplating the two main land uses in the MVZ.

Conceptual Framework and Literature Review

This review is organized around two conceptual frameworks that dovetail in the context of food production in Costa Rica. The political-economic lens is important to understand how large-scale economic forces have shaped the country's policy and institutional landscape as it relates to support for local food production. This framework has a long history of application to understand development in Latin America and draws on fundamental concepts such as globalization and neoliberalism (Boschi & Gaitán, 2009; Collier & Ong, 2005), development and inequality (Boschi & Gaitán, 2009), and cultural dimensions (Hale, 1997). This approach also explains how shifting state interests, such as priorities surrounding conservation and land

use, as well as the importance of tourism, shape food systems and impact their sustainability.

We also apply the 10 Elements of Agroecology, a framework developed in a collaborative, multi-stakeholder iterative process aimed at creating a flexible system redesign framework adaptable to diverse local contexts. The framework was initially shaped by key themes highlighted during the First International Symposium on Agroecology for Food Security and Nutrition. These themes—recycling, efficiency, diversity, resilience, and synergies—captured the ecological dimensions central to agroecology. However, regional consultations underscored the need to strengthen the social and political dimensions of agroecology. In response, five additional elements were incorporated: co-creation of knowledge; human and social values; culture and food traditions; responsible governance; and circular and solidarity economy. Through iterative refinement of the elements, their content, and an overarching narrative emphasizing their interconnectedness, the framework was finalized with input from international and FAO experts (FAO, 2018).

History of Agriculture in the Monteverde Zone

Between 1915 and 1920, five to eight families of mixed descent moved into the lower elevations of the MVZ (e.g. San Luis, 1330 meters above sea level), practicing subsistence farming (Vargas Leitón, E., 2024, Vargas Leitón, G., 2024). Early settlers moving into the MVZ from lower elevations believed the previously cleared land with domesticated crops was evidence of indigenous agriculture in the San Luis Valley (Griffith, et al. 2000), reflecting previous land-use practices. In 1951-1952, a dozen Quaker families emigrated from the United States and settled in what they named Monteverde (Guindon et al., 2001), bringing with them a European-influenced dairy-farming tradition. In 1953 they established the Monteverde Dairy Plant, legally constituted in 1954 as the corporation *Productores de Monteverde Sociedad Anónima* (APLM), specializing in cheese. Dairy farming in the area increased, with the dairy plant buying milk from up to 26 communities that make up the ‘milkshed’ (Griffith et al., 2000).

The early days of dairy farming were characterized by conversion of ecological capital to other forms of capital as forests were cleared for pasture (Stuckey, 1989). In the 1970s, input-intensive agricultural production dominated, facilitated

by CoopeSantaElena (Griffith et al., 2000) and the availability of credit and loans from CoopeCima (Guindon et al., 2001). The late 1970s brought an economic crisis, and the 1980s a steep devaluation of the Costa Rican *colón*. At the national level, the Ministry of Agriculture and Livestock (MAG) changed course to detechnify and discourage the use of external inputs that became cost-prohibitive, seeking to reduce production costs (Griffith et al., 2000; Vivanco, 2007). There was no related advising on regenerative practices to replace external inputs, and milk production fell. In cases when ecological capital was lost and other capital was not sufficiently reinvested into the system, many farmers accessed subsidies from national or local lending agencies (Stuckey, 1989). This ecological and economic debt combined with falling milk production resulting from reducing inputs and from new economic opportunities associated with tourism. Some farms were lost from the food system due to the inability to repay loans, while others saw a more lucrative land-use opportunity with the economic transition to tourism (J. Stuckey, personal communication, November 12, 2024; Vivanco, 2007). Upland coffee production was stimulated by an economic diversification strategy in the face of the late 1970s economic crisis, although most farms still focused on dairy. CoopeSantaElena provided important support to coffee producers during this time (Griffith et al., 2000).

With tourism came opportunities for farms to diversify income through offering tours, direct sales, lodging, and other services. Production and consumption patterns reflected the influence of factors external to MVZ, including economic policy. By 2014, most of the food consumed in Monteverde was produced elsewhere (Stuckey et al., 2014).

Institutional Structures in Costa Rica

This review refers primarily to three types of legal entities in Costa Rica. A *sociedad anónima* (corporation) is dedicated to commercial activities and made up of shareholders, with voting power tied to shares held (SCIJ, 2016). An *asociación* (association) is made up of members not represented by capital, each with one equal voice and vote (SCIJ, 2010). *Cooperativas* (cooperatives) are a special type of association in which economic benefit and responsibility are distributed according to members' participation in the cooperative's common activity (SCIJ, 2024).

Some examples from the review include the APLM, which expanded its services to provide technical assistance and farm supplies to local producers (Stuckey et al., 2014); APLM; the Santa Elena Cooperative (CoopeSantaElena) (Griffith et al., 2000); and the *Asociación para el Movimiento de Agricultura Orgánica del Pacífico Central* (MAO-PAC), which is an organic agriculture organization in the mid-Pacific region of Costa Rica that supports local producers (Bader et al., 2019). At the national level, relevant institutions include the MAG, the National Subterranean Water, Irrigation, and Drainage Service (SENARA), and the National Union of Small Agricultural Producers (UPANACIONAL).

Methodology

Study Context

Located in the Tilarán Mountain Range, the MVZ is known worldwide as being home to a tropical montane cloud forest ecosystem (Jarvis & Mulligan, 2010). This region is home to impressive biodiversity. For this reason, the MVZ has attracted researchers, students, and tourists from all over the world. According to the latest census data, the district of Monteverde had a population of approximately 5,386 people (INEC, 2022). However, this does not account for people in neighboring communities who utilize services in Monteverde or the floating population, including tourists and service industry workers. Some have estimated that around 250,000 tourists visit the region each year. Within the context of Costa Rica and considering national-level support for producers, the scoping review focused on the MVZ, corresponding to the *milkshed*—the region comprising communities from which producers provided milk to the Monteverde Dairy Plant (Productores de Monteverde S.A.) starting in 1954 (Griffith et al., 2000).

As noted previously, and elsewhere, the rapid development since the late 1980s has led many families and individuals to abandon food production in favor of other economic strategies, directly or indirectly tied to ecotourism and conservation. Agriculture and ecology/conservation have figured heavily in economic development, land-use, and research in the MVZ, making the elements of agroecology an appropriate framework for the current analysis.

Data Collection

This chapter draws on a systematic scoping review of the literature (Munn et al., 2018). The authors used Boolean search term operators to search for literature from 1986 (the initial period of rapid tourism growth) to present (2024) from the following sources:

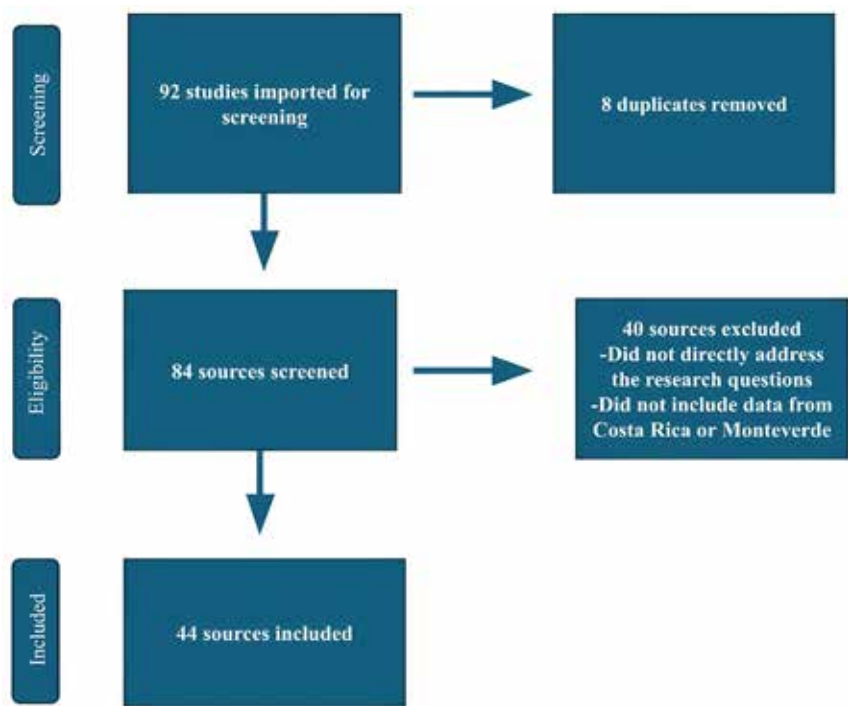
- Google Scholar
- Web of Science
- The New Mexico State University (NMSU) library's integrated search platform, which aggregates multiple databases
- The Monteverde Institute's digital collections hosted by the University of South Florida
- ScieLo
- Redalyc

Search terms included “farm,” “institution,” “Monteverde,” and “support.” Searching with the term “farm” yielded additional, locally relevant sources from the Monteverde Institute's digital collections. Additionally, we searched in ScieLo and Redalyc using the terms “agricult*,” “apoyo,” “organización” or “institución,” and “Monteverde” or “Costa Rica.” Additionally, internal documents from local institutions providing support to farmers were included. In order to verify some of this information, key stakeholders were consulted. These stakeholders included a coffee farmer, three dairy farmers, a former Dairy Plant manager who also worked with CoopeSantaElena, a Finca La Bella coffee producer, an extension agent of the Monteverde MAG office, a National Distance Education University (UNED) professor, and the coordinator of a local municipal commission, previously involved in agrobiodiversity research and extension.

We identified 92 sources (see PRISMA chart, Figure 1). After the initial review of documents, eight duplicates were removed, and 40 were excluded based on the exclusion criteria (i.e., they did not contain information directly related to the research questions, or information on Costa Rica or Monteverde). Overall, 44 sources were included in the review. This included peer-reviewed articles (n=15), grey literature (n=20), book chapters (n=4), editorial reviews (n=1), legal documents (n=1), and theses and dissertations (n=3). As qualitative research is an iterative process, we updated

the stakeholder map and codebook as new information became available throughout the review process.

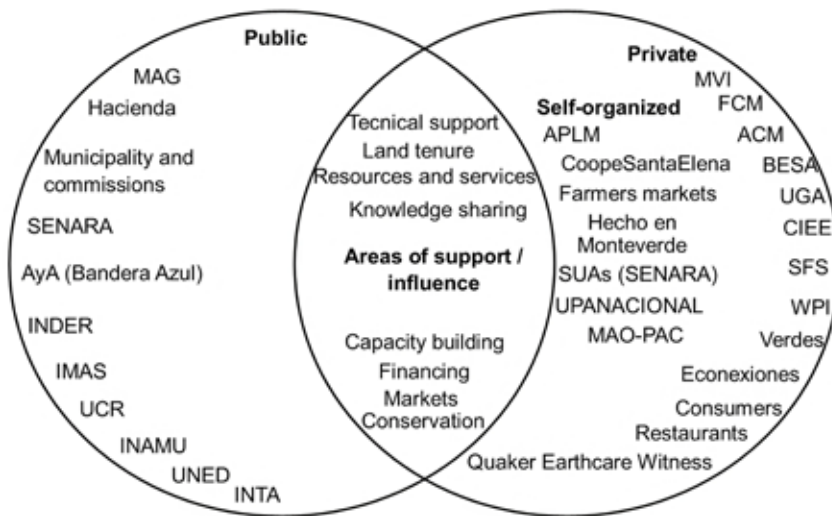
Figure 1
PRISMA Chart of Scoping Literature Review



A stakeholder mapping was also conducted by the co-authors and considered areas of support to local farmers by public institutions, local non-governmental organizations and businesses, and self-organized groups (see Figure 2).

Figure 2

Stakeholder Map of Institutions Supporting Local Producers in the Monteverde Zone



Data Analysis

Analysis was conducted using MAXQDA mixed methods analysis software (MAXQDA, 2024). As the scoping review was exploratory in nature, a dual approach consisting of deductive and inductive reasoning was applied (Saldaña, 2011). A codebook was created using key themes that were identified during the stakeholder mapping exercise (deductive). The finalization of the codebook was an iterative process, as this was further refined using a grounded theory approach (inductive) (Charmaz & Belgrave, 2002).

Research Ethics

Ethical approval was not necessary for this review, as it drew on publicly available sources. Documents from local organizations that are not considered “public” were granted approval for use by the organizations’ administrative authorities. Although the authors consulted with key community stakeholders to verify information, stakeholders were only asked to fact check information regarding the institutional support that food producers have received or currently receive. They were not asked their opinions, attitudes or beliefs regarding any of the review

topics. This is not considered human subjects research and is therefore exempt from ethical review and approval.

Findings and Discussion

1) What is the history of the relationship between local institutions and food producers in the Monteverde Zone, and how has this shifted over time with the rise in tourism?

Institutional Support

The policy context in Costa Rica has historically set the stage for institutional support of food producers, as there has been a strong emphasis on promoting family farming, enhancing rural development, and aligning agricultural policies with broader sustainability and social welfare objectives (MAG, 2020; Rivera et al., 2017). The Costa Rican government has officially recognized and declared the “Decade of Family Farming,” with the aim of promoting new and better differentiated public policies in favor of family farming (MAG, 2020). However, there has also been a lack of robust sustainable environmental policies, leading to the high use of agrochemicals (Brenes Alfaro, 2021; Little et al., 2024). This has resulted in institutional contradictions, as some public institutions provide support to food producers in the context of these underlying government policies. For example, in San Carlos, MAG, the State Phytosanitary Service, and the University of Costa Rica (UCR) Environmental Contamination Research Center supported pineapple producers to promote good practices around agrochemical use (Brenes Alfaro, 2021). However, it was/is the lack of environmental policies related to agriculture, combined with the influence of free-trade agreements and other neoliberal capitalist approaches, that permitted and encouraged the use of these agrochemicals to support industrial agro-exports.

For small-scale producers, the government has played a significant role in establishing and strengthening cooperatives, providing financial assistance, and promoting social development. However, the support has been uneven, with some inconsistencies and limitations in the provision of extension services and technical assistance for sustainable agriculture. Despite the clear identification of challenges in this analysis (see below), there is a lack of national institutional support noted in the scoping review documents. This is curious because, at the national level, there is a political and legal precedence for supporting food producers.

Overall, the institutional support for producers in the MVZ has come from a combination of government agencies, universities, non-governmental organizations, and self-organized farmer associations and cooperatives, which have provided technical assistance, resources and services, financing and access to funding, opportunities for collaboration, capacity building, and knowledge-sharing (see Figure 2). There has also been demonstrated local institutional support for food producers to address some of these issues, including from the MVI (Burlingame, 2019; Little et al., 2024), the Monteverde Commission for Resilience to Climate Change (CORCLIMA, n.d.a,b,d), the Monteverde Municipality, the University of Georgia San Luis campus (UGA), and the Council on International Educational Exchange (CIEE). This varied support has aimed to address the particular challenges faced by food producers in the MVZ, many of which have been identified since the early 2000s (Stalland, 2006; Atnip et al., 2013). Challenges include environmental issues (e.g., soil fertility, pests and animals, climate change) (Stalland, 2006; Bader et al., 2019; Stuckey et al., 2014), access to resources (e.g., financial resources, high costs of organic certification; Bader et al., 2019; Atnip et al., 2013), intergenerational shifts (e.g., aging farming population, lack of intergenerational knowledge transfer; Ramírez & Echandi, 2024), market barriers (e.g., competition from imported produce, difficulties accessing markets, market dynamics), and government support (Bader et al., 2019).

Technical Support

The tropics have low soil fertility, and existing organic matter and nutrients are rapidly depleted, affecting crop productivity. After depleting this ecological capital (Stuckey, 1989; Stalland, 2006), farmers in the MVZ have historically relied on expensive chemical fertilizers, which have negative environmental impacts. Animal invasions are also common (Bader et al., 2019). For farmers in the MVZ this includes insect infestations, such as leaf cutter ants, spittle bugs, as well as vertebrate invasions, like recurring problems with armadillos. Climate change impacts are also increasing (Griffith et al., 2000; Stuckey et al., 2014) for dairy farmers and other producers. Fluctuations in rainfall and drier conditions affect pasture growth and water availability. In drier years, higher elevation clouds reduce the beneficial effect of dry season mist, while increased dry, windy conditions in the rainy season have a negative impact on pasture growth (Stuckey

et al., 2014).

The MAG provides some technical support, including monitoring compliance with international trade standards, issuing required certifications, providing technical assistance to farmer organizations, and helping farmer organizations access government funds for special projects (Stuckey et al., 2014). In the 1980s, the MAG encouraged farmers to reduce inputs such as fertilizers, resulting in decreased milk production (Griffith et al., 2000). In recent years, the MAG has provided support for regenerative livestock farming under the Nationally Appropriate Mitigation Actions umbrella (NAMA; G. Cruz Céspedes, personal communication, October 28, 2024; G. López Miranda, personal communication, December 10, 2024; J. Stuckey, personal communication, November 12, 2024). The MAG also offers technical assistance and training to farmers on topics like crop diversification through programs like the 4H Clubs (G. López Miranda, personal communication, December 10, 2024; Ramírez & Echandi, 2023; Van Dusen, personal communication, December 5, 2024). Further, the MAG and SENARA (via Sociedades de Usuarios del Agua, SUAs, Societies of Water Users) promote agricultural irrigation schemes in the MVZ (Stuckey et al., 2014). *Programa Bandera Azul Ecológica* (Ecological Blue Flag Program) of the Costa Rican Sewer and Aqueduct Institute (AyA) has encouraged farmers to keep good records, which has facilitated the transition to regenerative practices and impact monitoring (G. Cruz Céspedes, personal communication, October 28, 2024).

The National Institute of Innovation and Transfer in Agricultural Technology (INTA) and UCR have also supported farmers by providing technical advice and training, including on crop diversification (Ramírez & Echandi, 2024). To address a lack of previous support, some producers have sought assistance from government institutions like the National Learning Institute (INA), UNED, and the Mixed Institute of Social Assistance (IMAS), participating in vocational training programs and even taking courses in administration, marketing (G. Castro Reyes, personal communication, October 28, 2024; M. Torres Ortega, personal communication, December 10, 2024), and organic cultivation.

Land Tenure

Converting land to agricultural production was a way to legally claim land in Costa Rica (Nygren, 1995) prior to the 1996 Forestry Law (Vivanco, 2007); in this way, the national government encouraged agricultural production in rural areas for many years. Land tenure monopolization by one family in the San Luis valley left other farming families with marginal land or no land and working for the family that owned about half the valley. In 1992, *Finca La Bella*, a farming initiative, was established. Land was purchased and donated by Quaker Earthcare Witness and, based on lessons learned in the similar *Buen Amigo* experience, the land was divided into parcels to be farmed individually by member families, and a nature reserve. Multiple local NGOs, churches, and the MAG were represented on an oversight committee. CoopeSantaElena held title to the land until it closed, when title was transferred to MVI and eventually to the parcel owners (Sojo Nájera, n.d.; G. Lobo Navarro, personal communication, December 4, 2024).

Resources and services

Farmers in the MVZ lack access to other resources such as communal tools, high quality seeds, and organic compost, which prevents them from diversifying their products (Bader et al., 2019). The lack of money, time, and labor are also major barriers for farmers who wish to adopt more environmentally friendly practices (Atnip et al., 2013). Many farmers are interested in organic certification, but it is cost-prohibitive. Group organic certification is a cheaper alternative, but still poses a challenge (Bader et al., 2019). Other governmental organizations provide support to food producers, such as the Institute for Rural Development (INDER), which is tasked with leading the development of rural communities in Costa Rica. INDER supports a wide range of rural projects. For example, in 2021, INDER supported an artisan baker in the MVZ, by investing in her business (INDER, 2019). The National Women's Institute (INAMU) *Fomujeres* program provided equipment to a local woman coffee producer, with follow-up from the MAG (H. Porras González, personal communication, December 17, 2024).

The conservation movement in Monteverde has interacted with local producers in programs such as *Bosques en Fincas* (Forests in farms; Arévalo & Masters, 2024) and other reforestation efforts

by the Monteverde Conservation League (ACM), the Costa Rican Conservation Foundation, UGA, CIEE, and MVI (Brown, 2022; Burlingame, 2000, 2018). While these programs aim to provide benefits to farmers, such as water conservation, soil improvement, erosion control, source of wood for posts and windbreaks, their impetus has been environmental conservation. Biodigesters have been installed on farms with support of local institutions such as Bosqueterno SA (BESA), providing both climate change mitigation benefits of converting methane to carbon dioxide, and economic savings to farmers using methane stoves (Burlingame, 2018).

Consults with local farmers revealed support from national and local institutions in the form of services to farming families. The CoopeSantaElena provided a variety of services, supplies, and marketing support to coffee farmers primarily (Griffith et al., 2000; J. Stuckey, personal communication, November 12, 2024; J. Vargas Leitón, personal communication, December 3, 2024). Soil fertility testing has been provided by MAG in the past, and more recently, soil carbon and tree growth monitoring by MAG as part of the NAMA strategy have supported regenerative dairy producers (G. Cruz Céspedes, personal communication, October 28, 2024).

Knowledge Sharing

Local institutional support for sustaining agriculture includes knowledge sharing to address the knowledge gap that has been widening in recent years, both in the MVZ and in Costa Rica. While MVI has considered the interests of the community to be at the core of its mission since its inception in 1986, MVI's role in promoting sustainable food systems did not begin until the 2000s (Peña Leiva, n.d.). Researchers from the University of South Florida (USF) identified links between increased tourism and high rates of food insecurity in the region (Himmelgreen et al., 2006). Subsequently, USF was awarded various National Science Foundation (NSF) Grants to engage in research and bring students to participate in a community health field program, which explored topics related to food insecurity and food production (NSF, n.d.).

In response to economic and food insecurities resulting from the COVID-19 pandemic, MVI facilitated various types of support for local production and consumption. The Huertas Monteverde

WhatsApp chat group acted as an interface between community members and expert local food producers (MVI 2021, 2022), promoting the transfer of knowledge on family gardens. This chat was so successful that although it was created for two months in 2020, it was still active in 2024, albeit without a facilitator or formal support from MVI. The questions and answers from the facilitated period were compiled into a manual. This post-pandemic farmer-to-farmer training program, *Aprovechando Nuestra Finca*, encouraged sound planning and efficient use of resources (MVI 2023).

Further, academic tourism (MVI, UGA, CIEE, SFS, WPI) in the MVZ has produced research on various aspects of agroecology, including recommendations to farmers regarding management of soils, pests, and pathogens, although much of this research is not readily accessible to farmers (see Monteverde Institute tropical ecology and conservation digital collection, https://digitalcommons.usf.edu/tropical_ecology/).

Shifting Political-Economic Contexts

At a national level, it is possible to track shifting policy trends with the rise in tourism. While Costa Rica has been known globally for promoting sustainability and conservation, the shift towards these economic pillars was heavily influenced by and coincided with shifting macro-economic forces, including the rise in international tourism and neoliberal economic policies. For example, the revised forestry law in 1996 prohibited deforestation on lands with secondary regrowth and instituted a new financial mechanism to incentivize private land conservation: the national program known as Payments for Environmental Services (PES; Brockett & Gottfried, 2002), shifting the historic land tenure incentive for deforestation and agricultural production. This was a marked policy shift which historically favored the economic pillars of coffee and bananas (Allen, 2015). Examples such as this one show that the context of food production in Costa Rica, especially in relationship with conservation and land use, has shifted in response to changes in macro-economic interests of the country. However, the country still recognized the economic importance of national policies that favored large-scale agricultural producers. Trade liberalization, such as the Central American Free Trade Agreement, and agricultural export incentives in the late 1990s and early 2000s became the priorities of the national policy

landscape. This was to the detriment of small-scale food producers (Franceschi Barraza, 2014).

After the shift to tourism in the late 1980s, there was a related large-scale political-economic shift in the MVZ. This, coupled with neoliberal trade policies, has caused the MVZ to become heavily reliant on imported produce, both from other countries and other regions of Costa Rica. This creates competition against local farmers and negatively impacts the local economy. Farmers in the MVZ face challenges with inserting their products into markets due to factors like low production volumes, lack of competitiveness, and limited information and infrastructure (Bader et al., 2019).

The national fiscal reform of 2018 included a value-added tax (IVA) and the requirement of electronic receipts (*factura electrónica*), tied to accounting, tributary, and insurance requirements. This created greater administrative demands on anyone selling goods or services, and increased cost for directly accessing formal markets. In the MVZ, the lack of electronic receipts is a challenge for some potential buyers to support local producers (S. Torres Leitón, personal communication, October 24, 2024).

The Small and Medium Agricultural Producers (PYMPAS) program of MAG offers reduced IVA tax rates on farm supplies, a corporate tax exemption, reduced land tax rates, emissions inspection exemption for farm vehicles, a reduced fee for wells, and worker social security discounts (MAG, n.d.).

Rising land prices mean the payback for land purchase from agricultural production would be very long, meaning that land converted to other uses is unlikely to be replaced by agriculture. However, some new landowners do include agriculture production as part of their activities (Stuckey et al., 2014).

Additionally, the MVZ is experiencing a general aging of the farming population, which poses challenges for the long-term sustainability of agriculture in the area (Ramírez & Echandi, 2024). The limited participation of young people and children in the management of home gardens and farming, as evidenced in the stories of Buen Amigo and Finca La Bella (Sojo Nájera, n.d.), presents challenges in the transmission of traditional agricultural knowledge and threatens the preservation of local knowledge. Overall, the younger generation is less interested in farming as

a career, as the tourism industry is seen as more attractive and less labor-intensive. This threatens the future of agriculture in the MVZ (Bader et al., 2019).

Market Access and Positioning

Local demand for local products was historically satisfied through barter exchanges between farming families, when external markets were difficult to access (Guindon et al., 2001). Some institutions such as the San Luis Ecolodge and the University of Georgia San Luis campus prioritized and quantified purchasing from local producers (UGACR, n.d.). Some restaurants currently offer a farm-to-table menu with their own or local products (e.g. Belmar, Valle Escondido).

Academic institutions, such as MVI, the School for Field Studies (SFS), and Worcester Polytechnic Institute (WPI), have facilitated research on market aspects of local production sustainability (Bader et al., 2019; Cantor et al., 2008; Helmy et al., 2006). A list of local food producers was created and shared with the community in 2020 (CORCLIMA, n.d.a; MVI, 2021). Updated versions of this list included detailed information about each food producer, as well their ties with different community initiatives, including *Verdes*, *Econexiones*, and *Hecho en Monteverde*. *Verdes* was a social, complementary, digital currency designed for Monteverde during the COVID-19 pandemic (CORCLIMA, n.d.c). It was a mechanism through which the community could barter local products and services; it is inactive since the market space was lost (I. González Chen, personal communication, December 13, 2024). *Econexiones* was a platform created by local community members in response to the pandemic, to connect producers and consumers, with a focus on products from the Bellbird Biological Corridor (R. Garro Morales, personal communication, November 27, 2024; Little et al. 2024). *Hecho en Monteverde* (Made in Monteverde) is a consortium of local entrepreneurs that promotes authentic and educational experiences, with consideration for local nature and culture, and hand-in-hand with conservation and community sustainability efforts. It is backed by a quality seal and denomination of origin (Hecho en Monteverde, n.d.). To respond to the need for capacity building around entrepreneurship, a component of lack of market competitiveness of local farmers, the Monteverde Community Fund (MCF) recently facilitated the *Emprende Rural* entrepreneurship training with the UNED (G. Castro Reyes, personal communication, October 28, 2024).

During the COVID-19 pandemic, MVI purchased local produce and dairy products from farmers who had lost their primary market when tourism halted, to supplement standard food assistance packages of non-perishable items to those who had lost their income for the same reason. It sold subsidized seed potatoes to local farmers, and produced two online video series, *Desde Nuestras Raíces* and *Monteverde Trasciende*, to promote the use of local ingredients and support entrepreneurs, respectively (MVI 2022).

Discussion

The scoping review showed that although there has been institutional support for small-scale food producers in the MVZ, they continue to face challenges in the context of political-economic development associated with tourism, despite favorable policies at the national level. In a broader context, dietary delocalization and shifting food systems problematize small-scale agriculture in Latin America (Popkin & Reardon, 2018), and Costa Rica is no exception. In other settings, researchers have identified solutions that highlight the importance of institutional support on small-scale food producers, such as documenting a positive relationship between institutional support (regulatory, normative, and cognitive institutions) and business performance (Osei & Zhuang, 2024) and demonstrating the positive impact of Farm to Institution programs on the economic realities of producers (Harris et al., 2012). Institutional support for small-scale food producers should be strengthened in the MVZ. Applying the 10 elements of agroecology to better understand lacunas in the available data will ensure that the recommendations from this review can be operationalized into concrete actions for future work and bring together many of the elements discussed in this chapter.

In the MVZ, there has been institutional support for increasing biological diversity on local farms, both wild and domesticated. There has also been support for economic diversification on farms, including agrotourism, value-added processing, and direct marketing. Diversity is key to food security and nutrition, as well as conservation and protecting natural resources.

Monteverde has historically been praised for its approach to ecotourism (Baez, 2002). There have also been critics of ecotourism who question the real impacts on local communities through

the commodification of nature and the greenwashing associated with the tourism industry (Honey, 1999). Despite the challenges that small-scale food producers in the MVZ face, this research shows that synergies do exist between tourism and agricultural production, and within the diverse biological elements of farms in the MVZ. Recently, ProNativas and MVI are working with MAG to promote pollinator gardens, encouraging synergies afforded by this ecological service. Efficient use of resources has been supported through the Aprovechando Nuestra Finca program, and NAMA and regenerative farming support from MAG.

In the MVZ, recycling of resources on farms has included biodigesters (Burlingame, 2018) and a recent municipal composting initiative converting restaurant food refuse into fertilizer (Tico Times, 2024) could enhance this element. Co-creation and especially sharing of knowledge have been supported based on our findings, either by outsiders (researchers and students, or academic tourists) conducting research and making recommendations for local producers, or through facilitation of farmer-to-farmer knowledge sharing. During COVID-19 this was a prominent aspect of the renewed community interest in food production (Cantor, 2021), as evidenced by the continuation of the Huertas Chat. MVI has supported other aspects of knowledge sharing through the Desde Nuestras Raíces program, which also supports the continuation of culture and food traditions through local cooks sharing recipes with local ingredients (MVI 2021). Aprovechando Nuestra Finca, the Huertas Chat, and Desde Nuestras Raíces promote sharing of local knowledge, supplemented by other ways of knowing, to address local agroecological and food system challenges, representing a *Diálogo de Saberes* (Leff, 2004).

Human and social values were reflected in the ownership structure of the Dairy Plant, with its policy of a limited percentage of shares held by any one member (J. Vargas Leitón, personal communication, December 3, 2024), surveys of local needs supporting the establishment of the farmers market (Helmy et al., 2006), and in land tenure support (Sojo Nájera, n.d.). Resilience in moments of crisis has been supported by local institutions, exemplified by the purchase of local produce with funds raised by MVI and MCF in the COVID-19 pandemic. Personal communications of farmer experiences suggest enhanced resilience in the face of extreme events is a benefit of

regenerative dairy farming practices (G. Cruz Céspedes, personal communication, October 28, 2024; Rodríguez Díaz, 2024).

While responsible governance characterized the history of the Dairy Plant, at a national level this element needs improvement to align environmental and economic policy with farmers and food security in mind.

While there are examples of support for circular and solidarity economy in the agricultural production sector in the MVZ, especially during the pandemic with produce purchase from local farmers, stability of local markets has been a challenge (as evidenced by lack of continuity in Verdes, Econexiones, and farmers markets).

Future work should situate this relationship within the 10 elements of agroecology, focusing on the following:

1. While co-creation and sharing of knowledge has been a part of the relationship between institutions and food producers in the MVZ, there is room for improvement in this element. Is knowledge generated and shared by institutions accessed and used by farmers? How can institutions incorporate follow-up into the research they conduct or facilitate?
2. Local institutions have supported the elements of culture and food traditions, and social and solidarity economy, and restaurants could further enhance these elements by highlighting local food. Synergies between ecotourism and conservation provide an example of the feedback loop that could be encouraged between place-based tourism and local food production. Creation and promotion of a local denomination of origin seal would allow restaurants to verifiably participate in the creation of a place-based gastro-economy. If this were aligned with the ICT *Tu-MoDeLo* guidelines, they could simultaneously advance toward their Tourism Sustainability Certification when relevant.
3. Responsible governance by public institutions should implement land-use zoning and tax structures should encourage maintaining agricultural production as part of the MVZ landscape, as well as ensure affordable housing to combat gentrification. UPANACIONAL could act as an advocate at the national level.

4. Local and national institutions should seek to enhance food security and food system resilience in the absence of tourism and in the face of political and economic factors beyond local control.
5. Identification or creation of an institution to emit electronic receipts for farmers could expand their local commercial markets. This could be achieved through the MCF (R. Arévalo Rojas, personal communication, October 4, 2024).
6. To centralize efforts toward food sovereignty and support for producers, a commission should be created to align public and private entities' efforts toward local food security and articulate with other commissions. A sustainable food system municipal commission could provide more continuity than the associations, corporations, and cooperatives that have disappeared from the MVZ food system.

Conclusions

Based on the findings of this review, we conclude that future research is warranted to document the relationship between institutions (national and local) and food producers, with a focus on sustainability of food systems in the context of rapid social and political economic development. Research directly with producers to understand their current needs should be conducted to inform institutional support efforts. Specifically, future work should outline the available support and create a pathfinder, including mechanisms through which to operationalize future suggestions. This should also include a feasibility component, action plan, and impact evaluation, which considers available resources, including institutional support at the local and national levels. The household survey will be repeated in 2025 and should include questions regarding food security, local production, and connection between producers and consumers.

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Chapter 7

Community-Supported Agriculture on Costa Rica's Osa Peninsula: Diverse Economies and Regenerative Agroecology Networks

Tara Ruttenberg

Introduction

On March 19, 2020, Costa Rica closed its borders to foreign visitors, and like most countries around the world, implemented restrictive COVID-19 regulations across the country (González, 2020). Costa Rica's southwestern Osa Peninsula is a remote region increasingly dependent on tourism visitation to its Corcovado National Park and surrounding areas, known internationally for its rich biodiversity and access to pristine nature and wildlife. Local livelihoods of peninsula residents in related industries including agriculture, fishing, tour operations, conservation, and ecotourism were greatly affected by COVID-19 closures. Locals faced underemployment and unemployment virtually overnight, and markets for farmers' produce were severely impacted due to diminished tourist demand during the months of the pandemic, while residents' access to quality fresh food dwindled.

In Puerto Jimenez, the largest town on the peninsula, the Los Higuerones Cooperative, a local non-profit organization, responded quickly by creating Cajas Verdes, a community-supported agriculture initiative linking local farmers with Osa Peninsula residents through a weekly harvest box delivery program. Cajas Verdes was also designed as a mutual aid project, whereby consumers could opt to sponsor additional produce boxes for area locals affected by COVID closures, while also benefiting from weekly produce deliveries directly to their home at a time when most shops and restaurants were closed, supermarkets faced national delivery shortages, and domestic travel restrictions were in place. As post-pandemic life resumed, Cajas Verdes evolved into the Mercado Verde, a weekly small-scale farmers' market, where local farmers bring their produce, dairy products, and other homemade goods to sell to area residents and visitors, both local

and foreign. Since its inception, the Mercado Verde has become a gathering place for community events, endemic seed-sharing exchanges, agroecology trainings, and interactive workshops for kids and adults. Now five years later, the Mercado Verde market continues to link local farmers and producers with consumer demand centered around Puerto Jimenez and surrounding areas on the Osa Peninsula.

Figure 1

Promotional Brochure for the Mercado Verde



The Los Higuerones Cooperative also organizes regular community-supported farming projects through its Manos Cambiadas program, where local agriculturalists can solicit the

support of other farmers and community members on planting, pruning, and harvest days, as well as for the construction of small-scale infrastructure on their farms. This initiative has created a collective farming network bridging Indigenous Ngöbe Buglé, Costa Rican, and foreign resident communities living on the Osa Peninsula as a means of strengthening local agricultural production and cooperative farming practices. These cross-cultural interactions have helped strengthen food security for subsistence farming communities and support regenerative connections among farmers and consumers in both local and tourism-oriented markets. As a result of the Cajas Verdes, Mercado Verde, and Manos Cambiadas initiatives, many local farms have begun diversifying their production practices and yields, shifting toward agroecology methods, and transitioning to organic and regenerative farming in a region whose land use history has favored conventional cattle, banana and oil palm production for decades. Recently, Los Higuerones founding members created the ReGenerOsa Collective, a multi-sector consortium network of Osa Peninsula women entrepreneurs, non-profit leaders, agroecologists, government liaisons, conservationists, and social workers, as a platform for raising and distributing funds to support other women-led initiatives for social and environmental wellbeing on the peninsula. Through horizontal decision-making and a multi-capitals approach to regenerative living, the ReGenerOsa Collective links local, national, and international donors to grassroots community-based projects through multi-scale relationships, cooperative practices, and redistributive economic processes, strengthening what Hunt et al. (2020) refer to as both bridging and bonding capital on the Osa Peninsula.

The diverse economies conceptual lens is applied in this chapter to explore the rich multiplicity of co-constitutive economic practices and governance philosophies that comprise the socioecological fabric of Osa Peninsula communities. The main initiatives of the Los Higuerones Cooperative are discussed as exemplary models promoting agroecological processes through adaptive community-based strategies for regenerative agriculture in Costa Rica and beyond. Following a brief landscape history of the Osa Peninsula and a conceptual discussion of the diverse economies principles relevant to the local socioecological context, Los Higuerones' Cajas Verdes, Mercado Verde, Manos Cambiadas, and ReGenerOsa Collective initiatives will be described in relation to their roles

in promoting agroecology through post-capitalist processes of economic diversity, “commoning,” and communal governance in regenerative agriculture. This exploration emphasizes the ways in which emerging agroecology networks bridging multiple organizations and communities on the peninsula may strengthen diverse economic practices as viable alternatives to growth-based socioeconomic models otherwise dependent on corporate agroindustry. Conclusions from this discussion can support further research and practice in community-based approaches to regenerative agroecology and agrotourism in Costa Rica and elsewhere (Little & Blau, 2019).

Literature Review: Land Use Legacies, Conventional Farming and Agroecology on the Osa Peninsula

Recognized for its iconic role as an eco-laboratory, as opposed to an ecotopia (Boza et al., 1995; Fletcher et al., 2020), Costa Rica sits at the forefront of important debates in the fields of conservation, regenerative tourism, agroecology, sustainable development, and climate change. As a testing ground for policy programs like payments for ecosystem services (PES), reducing emissions from forest destruction and degradation (REDD+), renewable energy, and ecotourism for sustainable development, the country has long been acknowledged for its commitment to resource conservation and environmentalism (Honey, 2008; Fletcher, 2014; Hite, 2018; Walbott et al. 2019; Ramirez-Cover, 2020). Unfortunately, however, Costa Rica’s reliance on a conventional growth-based economic model is often at odds with environmental objectives. Local realities underscore the fundamental contradictions of Costa Rica’s governance model, which promotes agro-industrial exports (Galt, 2009; 2020), a reliance on foreign investment, and a high-volume approach to tourism (Ruttenberg and Brosius, 2020) as government revenue-generating strategies, often to the detriment of natural resources, biodiversity, and local and Indigenous communities increasingly affected by waste pollution, agrochemicals, gentrification, and tourism-oriented overdevelopment (see Fletcher et al., 2020). While ecotourism is lauded as a win-win strategy for poverty alleviation and environmental conservation in Costa Rica, large-scale tourism projects and associated amenity development regularly favor foreign ownership and unjust resource use, undermining ecotourism’s sustainability goals and resembling the more destructive and exclusionary practices of mass tourism

under neoliberal governance (Braun et al., 2015; Ruttenberg & Brosius, 2020).

The Osa Peninsula, located in the southern Pacific region of Costa Rica, is home to 2.5 percent of the Earth's biodiversity, a statistic commonly leveraged to attract ecotourism visitation and international investment in conservation and development. As a lush rural outpost and frontier landscape within a country whose national socioeconomic and environmental governance models depend on the growth-oriented tourism and agriculture industries, the Osa Peninsula faces heightened demand for tourism infrastructure development, corporate agroindustry, and speculative real estate markets, all of which threaten its otherwise iconic global reputation as a leader in biodiversity conservation. While currently confronting a range of anthropogenic threats to socioecological sustainability, the Osa Peninsula has long been recognized for its rich conservation and landscape histories, biological and ecological diversity, climate change adaptation strategies, Indigenous and rural mestizo cultures, and community-based approaches to tourism, farming, and socioeconomic development (Beggs & Moore, 2013; Amaya Rodriguez, 2023). Following the creation of Corcovado National Park in 1975 and its subsequent displacement of local and native communities, dozens of social and environmental organizations emerged to promote biodiversity conservation, ecotourism, and sustainable development across the peninsula (Boza, 1993; Brandon et al., 1998; Hunt et al., 2020). Flanked to the west by the Pacific Ocean, and to the east by the tropical fjord-like Golfo Dulce, the peninsula is also home to non-profit organizations promoting marine species and habitat conservation for resident and migratory populations, including keystone and apex species (Cortes, 2016; Friedlander et al., 2022). While Hunt et al. (2015, 2020) identified an impressive 137 community organizations in the Osa Peninsula region, they emphasize the need for greater community bonds among these organizations, as well as stronger supportive connections among local groups and regional, national and international entities, or what they call bonding and bridging capital, respectively.

Conventional farming practices on the Osa Peninsula and areas surrounding the Golfo Dulce have been historically characterized by agro-industrial monocropping given twentieth century legacies of the United Fruit Company's banana plantation model,

periods of forest production for paper and hardwoods through corporations including Osa Forestry Products and Ston Forestal, intensive cattle and rice farming, and the increasing expansion of corporate oil palm production (Hunt et al., 2020; Amaya Rodriguez, 2023). Today, land use on the peninsula is a mosaic of public and private conservation areas, private ecotourism and farming enterprises, corporate and cooperative agroindustry, as well as locally owned cattle pasturelands, agroecology initiatives, and smallholder farms and homesteads (Beggs & Moore, 2013; Hunt et al., 2020; Amaya Rodriguez, 2023). While conventional agricultural practices, pesticide use, and monocropping persist in the region, regenerative farming practices are growing in popularity among resident landholders and local farmers through seed-sharing initiatives, agroecology workshops, and cooperative farming activities, as well as an increasing prevalence of organic farming practices, intercropping, and rotational cattle farming (Carlos Bellanero, pers. comm., April 22, 2023).

However, significant socioecological issues remain given the region's reliance on export-oriented agricultural industries and tourism development characteristic of Costa Rica's growth-based economic model described above (Hunt et al., 2020). Particular anthropogenic threats to the social and ecosystemic integrity of the Osa Peninsula include: conventional agriculture, primarily cattle farming and palm oil production; a number of private and commercial marinas permitted for construction along the western shores of the Golfo Dulce; road and infrastructure development catering to increased tourist visitation to Corcovado National Park, Drake's Bay, and Cabo Matapalo; foreign-owned private landholdings and speculative real estate markets; and the proposed construction of both an international airport just north of the peninsula and a hydroelectric dam on Indigenous territory with serious downstream consequences for communities serviced by the Terraba-Sierpe watershed and Pacific mangrove species/habitats (Beggs & Moore, 2013; Umaña Quesada, 2013; Hite, 2018; Amaya Rodriguez, 2023).

As human and non-human nature confront these and other threats to socioecological wellbeing, local communities, rural farmers, and activist networks have begun organizing to strengthen alternatives to overdevelopment and secure local food sovereignty through citizen initiatives linked to local food economies, agroecology, and regenerative agrotourism endeavors.

These initiatives include the Los Higuerones Cooperative and affiliated Mercado Verde community-supported agriculture project, which links rural smallholder farmers to regional consumer markets; Manos Cambiadas, a farming collective that organizes community members to support farmwork on local smallholder farms; and the newly founded Encuentro de Mujeres Rurales, a rural women's collective organizing "for autonomy and food sovereignty" on the peninsula. Simultaneously, family- and community-based rural cultural tourism projects, including those in Rancho Quemado and Bijagual, center regenerative communal farming practices, agroecological approaches to tropical forest restoration, and traditional cultural experiences for visiting tourists. For example, Rancho Quemado's community-based agrotourism model experiments with more sustainable oil palm farming practices, including intercropping with organic cacao, vanilla, and other palm varieties, and visitors can tour the plantation and learn about their harvest and production processes. Similarly, the family-owned Peje Perro farm in Bijagual has transitioned to organic rice farming and regenerative agroecology practices for traditional crop cultivation and offers cultural farm tours and traditional farm-to-table fare at their restaurant on site. Understood as burgeoning networks of rural food production and regenerative agrotourism, these projects' shared focus on sustainable local agriculture, community-based approaches, regional autonomy and collectivity can be seen as representing an emerging landscape of communality and commoning unique to the peninsula. Exploring the region's regenerative agriculture and tourism networks through the diverse economies concepts described in the following section offers a useful lens for recognizing the community-based economic practices and communal governance approaches supporting rural livelihoods, agroecology, and food security on the Osa Peninsula.

Conceptual Framework: Diverse Economies, Communal Governance, and Commoning

The postcapitalist ontological approach of diverse economies provides a set of relevant conceptual frames for exploring the regenerative agroecology networks on the Osa Peninsula. This approach de-centers capitalist logics and social relations of production from seemingly fixed or monolithic notions of the economy (Gibson-Graham, 2005) through highlighting diverse modes of economic interaction. J.K. Gibson-Graham's (2005) diverse

economies framework maps capitalist, alternative capitalist, and non-capitalist modes of interaction across the economic practices of enterprise, exchange, labor, transactions, and property (Gibson-Graham et al., 2013), and promotes a community assets-based approach to development alternatives (building on existing skills, infrastructure, and institutions) as expressions of postcapitalist possibility (Gibson-Graham, 2005, 2006; Gibson-Graham et al., 2013; Kretzmann & McKnight, 1993, 2005). Community economies concepts and methods emphasize the importance of acknowledging existing skills, talents, and capacities of the community, and then mobilizing these assets toward community-building processes supportive of collective wellbeing (Gibson-Graham et al., 2013). As a basis for postcapitalist praxis in local contexts, the concept of *community economy* can be defined as “a set of economic practices that explicitly foregrounds community and environmental wellbeing.... as the purpose... of the economy,” as well as “sites of economic decision making, negotiation, and experimentation” that build upon “the progressive potential of community” (Community Economies Collective, 2019, p. 57). Here, community is understood as both an “always emergent process” and practice of co-dependence, mutuality, and “being in common” beyond a place-based commonality, but rather a space where “the potentials of community desires, ethics, and dispositions” guide economic dynamics in given contexts (Community Economies Collective, 2019, p. 58). The non-capitalocentric approach to community economies thus entails first recognizing existing local efforts to improve well-being and then moving to support and strengthen those existing efforts as localized, pluralistic grassroots movements and alternative development initiatives (Gibson-Graham, 2005; COMPAS, 2007).

Secondly, the diverse economies frame offers a unique conceptualization of the commons (Gibson-Graham et al., 2013, 2016), useful for identifying regenerative agroecology practices that support communal resource use, access, and governance for interdependent food sovereignty and broader community wellbeing. Here, commoning is understood as a relational process of reclaiming otherwise enclosed or occupied space (Gibson-Graham et al., 2013, 2016), and which attends to a “diversity of practices for commoning different types of property” (Gibson-Graham et al., 2016, p. 198). Bollier and Helfrich (2019, pp. 15-17) expand on this perspective to define the commons as both “living social systems through which people address their

shared problems in self-organized ways” and insurgent space for “freedom-in-connectedness... in which we can rediscover and remake ourselves as whole human.” This approach to the commons as a process of commoning offers a frame for exploring relational dynamics among the Osa Peninsula’s regenerative networks, where cooperative farm labor, community-based agrotourism initiatives, sharing of knowledge, inputs, and surplus, as well as collective financing arrangements might be seen as communal practices of commoning otherwise enclosed, individualized, or privatized spaces.

Finally, Fletcher’s (2019) adaptation of Foucault’s (2008) governmentality analytic to the diverse economies conceptual framework helps link community economic interactions and regenerative approaches to commoning across governance philosophies, principles, processes and practices that may be indicative of an emerging communal governmentality in Osa Peninsula agroecology. In his multiple governmentalities framework, Fletcher (2019) builds on Foucault’s (2008) fourfold governmentality categories (sovereign, truth, disciplinary, neoliberal) to include communal governmentality, described as a socialist/participatory “art of governance” philosophy based on: a) principles of socialization, communal production, commoning, and participatory decision-making; b) policies including common property regimes, worker-owned cooperatives, land reform, and gifting; and c) subjectivities nurtured through collective responsibility, conviviality, affective relations, and care. The application of Fletcher’s (2019) categorizations of communal governmentality to the exploration of regenerative agroecology initiatives on the Osa Peninsula helps identify existing governance practices that may help strengthen bridging and bonding capital (Hunt et al., 2020) among local communities and external supporters, while enacting practical alternatives to problematic growth-based models in agriculture and tourism.

Methodology

As detailed here below, my research with the Los Higuerones Cooperative’s four main community-based initiatives—Cajas Verdes, the Mercado Verde, Manos Cambiadas, and the ReGenerOsa Collective—involved varying levels of participant observation and immersive involvement over the course of nearly five years living, researching, and teaching on the Osa Peninsula.

Reminiscent of Stranger's (2011, p. 11) "unorthodox ethnography," my "participant-as-observer" role entailed researching everyday "adaptations, resistance and critique... to take account of the relationship between the observer and the observed, but also the relationship between the... worlds they belong to." Sato's (2004) treatment of "multiplex subjectivity" offers a useful methodological frame for conceiving of researcher positionality in decolonial feminist participatory fieldwork, whereby intersectional power dynamics are negotiated in the "mutual constitution of [our] positionalities," both in the local context, as well as within the "multiple discourses in which one is differentially positioned as a subject at any given time" in the complex processes of mutual, albeit unequal, knowledge production (Narayan, 1997; Foucault, 1980; Crenshaw, 1997, all as cited in Sato, 2004, p. 102). The following observations and analysis draw from the "multiplex subjectivity" (Sato, 2004) of my positionality as researcher and study abroad professor, foreign resident, and community member of the Osa Peninsula, as well as participant-observer in Los Higuerones and other community-based agroecology initiatives.

Discussion: Community-Supported Regenerative Agroecology on Costa Rica's Osa Peninsula

As a US citizen and foreign resident of Costa Rica since 2006, I moved to the southern tip of the peninsula in June 2020, at the height of COVID-19 pandemic protocols when international travel into the country was still limited and economic activity was restricted to the provision and procurement of essential goods and services. My research experience with the Los Higuerones Cooperative in the town of Puerto Jimenez began through participant observation as a member of their weekly Cajas Verdes' produce box delivery program, which sourced produce from local farmers, provided transportation for their products to the cooperative headquarters for packaging and distribution, and eventually made its way to my doorstep, nineteen kilometers south down the bumpy dirt road. While access to consumer products was very limited at the time, the Cajas Verdes produce box arrived each week filled with fresh greens, tropical fruit, root vegetables and seasonal staples like citrus, squash, lychees and plantains. I also enrolled in the Caja Verdes mutual aid solidarity program to sponsor a weekly box for local families affected by lack of livelihood access given the drought in tourism visitation, a primary industry on the peninsula.

Figure 2

Brochure for an Intercultural Seed Exchange Activity at Cooperativa Los Higuerones



As pandemic restrictions eased in the following months, I occasionally joined other resident volunteers at the cooperative to help sort and package produce for delivery and accompanied program staff on site visits to some of the local farms. And as the Cajas Verdes program transitioned to the Mercado Verde weekly farmers' market following the easing of COVID-19 restrictions, I began visiting regularly to source local and organic produce from area farmers, participate in community workshops and events, peruse the goodies at the giveaway and barter tables, and enjoy lunch cooked traditionally over a wood fire by women

members of the cooperative. In the years following the pandemic, the Mercado Verde quickly became a gathering place for farmers and creators, local Costa Rican and Indigenous Ngöbe Buglé families, cooperative members and foreign residents living in the area, and local non-profit leaders building community through collaborative skills-sharing activities, performances, and agroecology workshops. In affiliation with local agroecology nonprofit, Biriteca Acroecologica, these events often include seed-sharing expositions where local and Indigenous women farmers bring seeds to gift and exchange and spend time together sharing stories and explaining the corresponding planting practices supportive of successful harvests. These intercultural seed-sharing activities often convoke participation from members of local and Indigenous communities in other parts of Costa Rica, who bring their heirloom seeds and traditional knowledge to the peninsula, creating a cross-regional agroecology network of small-scale and subsistence farmers in the process. Most recently, the Mercado Verde began experimenting with the *verde*, a market-specific complementary currency they created to be used among market vendors to support one another and make financial flows and processes of exchange more visible across the market's broader community economy.

Los Higuerones' collaborative farming initiative, Manos Cambiadas, has been supporting local farmers in organic farming and agroecology on the peninsula for a number of years. Work days are organized according to demand on a rotating basis, with monthly, bimonthly or weekly farming days scheduled depending on seasonal farming needs, weather conditions, planting and harvest cycles, or infrastructure projects in process of construction. While I have not participated personally in any of the Manos Cambiadas collective farming days, I have facilitated university student groups visiting local regenerative farms on the Osa Peninsula that do participate in the program. One such farm, Peje Perro, has worked with Manos Cambiadas volunteers for its organic rice planting and harvesting processes, benefiting from the extra farm support given the labor-intensive practices associated with organic versus conventional rice production. As part of the Spring 2024 Wildlands Studies study abroad program that I teach annually in Conservation Ecology and Sustainable Development, students and I visited the Bellanero family's Peje Perro organic rice farm, participated in a tour of the land used for intercropping plantain and cassava, and tried our hands at

preparing harvested rice for the husking process. Through this practice, we experienced what Manos Cambiadas volunteer farmers might do when they work on farms like Peje Perro to support the farm labor needs of local regenerative farms through regular, organized, and rotating collective farming projects. This process included testing rice field soil samples for soil quality in the pre-planting phase, moving harvested rice from the storage facility, and removing debris from sacks of harvested rice to be husked by a small machine.

In 2022, I was invited to join the ReGenerOsa Collective in its initial days as part of the brainstorming committee for designing collaborative decision-making processes and exploring fundraising options to support local community initiatives and non-profit organizations. The ReGenerOsa Collective is comprised of local and foreign resident women activists, entrepreneurs, government liaisons, and non-profit leaders living on the peninsula and working in social and environmental fields. ReGenerOsa serves as an umbrella organization and funding mechanism for members' projects, as well as other social and environmental initiatives organized and implemented by women on the Osa Peninsula. When funds are available, project proposals are received and voted on by ReGenerOsa councilmembers to determine project priorities and allocate funding. Registered in the US as a 501c3 non-profit organization, the ReGenerOsa Collective can receive tax-deductible donations, and is considering initiating a platform for local and foreign-owned businesses in the area to donate a percentage of monthly sales to support peninsula initiatives.

The summarized participant-observations of Los Higuerones projects and activities shared here provide a basis for recognizing important elements of an emergent agroecology network on the Osa Peninsula. Exploring these initiatives through the diverse economies conceptual frames described in the previous section allows for acknowledging diverse expressions of community economic interaction challenging otherwise capitalocentric notions of growth-based agriculture and tourism economies. Additionally, diverse economies concepts offer a useful analytical frame for acknowledging existing community-based projects as enactments of agroecological commoning and communal governance for collective wellbeing among Osa communities. As such, the following analysis draws from the conceptual frames of community economies, commoning, and communal

governmentality to explore the community-based initiatives of the Los Higuerones Cooperative as potentially representative of an emerging regenerative agroecology network strengthening both bonding and bridging capital among Osa Peninsula communities.

Firstly, analyzing Los Higuerones' activities through the diverse economies analytic, a broad range of economic practices can be identified across the categories of labor, enterprise, transactions, property, and finance (Gibson-Graham, 2013). In the *labor* category, wage labor can be identified for some Mercado Verde employees; *alternative paid* labor is provided through work-trade employees of Los Higuerones who receive food and lodging in exchange for their work, self-employed farmers, paid agroecology non-profit leaders and employees, Los Higuerones cooperative members, and Mercado Verde vendors; and *unpaid labor* is represented through Manos Cambiados volunteer farmworkers and ReGenerOsa Collective members, as well as care-workers and family members of Los Higuerones Cooperative affiliates. In the *enterprise* category, *capitalist* enterprises include national agriculture corporations like Palma Tica and a number of private hotels like Lapa Rios and Hilton Botanika; *alternative capitalist* enterprises are represented by family-owned and operated regenerative farms, produce vendors and restaurants like Peje Perro and Rancho Quemado, the OSACOO oil palm cooperative, and the small businesses of self-employed Mercado Verde vendors; and *noncapitalist* enterprise includes the Cajas Verdes initiative and the donor- and member-funded Los Higuerones Cooperative. In the *transactions* category, *market* transactions include conventional agricultural product sales in domestic and international markets; *alternative market* transactions include vendor sales at the community-supported Mercado Verde, other local and regional sales of organic and regeneratively produced agroecological products from the peninsula, and trade and barter of local goods at the Mercado Verde; and *nonmarket* transactions include gifted products at the Mercado Verde, as well as seed-sharing and knowledge exchange through activities and workshops sponsored by the Los Higuerones Cooperative and other Osa-based organizations like Biriteca Agroecologica.

In the property category, *private* property includes private farms owned by local and foreign peninsula residents, national agriculture companies, and transnational agroindustry corporations; *alternative private* property includes the Los

Higuerones Cooperative installations in Puerto Jimenez, which are privately owned but collectively and cooperatively used, land used for community-based agrotourism in Rancho Quemado, as well as local farms in periodic processes of commoning through Manos Cambiadas cooperative farming initiatives; and *open access* property includes community farms and both material and intellectual agroecology property practices like seed- and farming knowledge-sharing. Finally, in the *finance* category, *mainstream market* finance can be identified through corporate agro-industry and conventional tourism investments in land, farming, and tourism operations; *alternative market* financing includes start-up funds for community-based agriculture and agrotourism businesses, private donations to the ReGenerOsa Collective and other local agroecology non-profits, and the Verde complementary currency used among vendors at the Mercado Verde; and non-market finance includes mutual aid support to local families through the Cajas Verdes program, as well as gifting and donations offered through the auspices of the ReGenerOsa Collective to local project initiatives on the Osa Peninsula.

Secondly, the concept of commoning as an expression of community economies in action, is a useful lens for analyzing the propensity of Los Higuerones' initiatives toward expanding the commons, both material and intellectual, to previously enclosed or otherwise privatized domains in Osa Peninsula agroecology. For example, the Cajas Verdes program created a mutual aid network linking community-supported agricultural produce to residents in pandemic-occasioned need, through gifted donations funded by other local and foreign residents. By covering the transport and distribution needs of farmers and creating a funding mechanism to provide both access to food for local people and livelihood support for small-scale farmers, the Cajas Verdes program can be seen to have "commoned" an otherwise private local food market by expanding access through mutual aid to those who were previously excluded. Another example is the Manos Cambiadas initiative commoning the farmworker labor market through a collective of volunteer farmers supporting other farmers beyond conventional capitalocentric notions of private property for agricultural production and paid wage labor in the farming sector. The type of community-based farming practiced through Manos Cambiadas is itself an expression of commoning, as access to farmland and surplus production is often distributed among cooperative members. The installations of the Los Higuerones

Cooperative often serve as a physical commons, where farmers and vendors come to market for the Mercado Verde, people gather for a range of economic interactions, and local non-profits host skill-sharing workshops and seed-sharing activities, which can also be seen as representative of commoning intellectual property such as traditional agroecological methods and vital inputs like gifted heirloom seeds. Finally, the ReGenerOsa Collective acts as a mechanism for financial commoning in support of peninsula initiatives by receiving and distributing donor funds through democratic processes of horizontal decision-making that provide access to a financial commons for selected projects. While this is not an exhaustive list, these examples demonstrate some of the many ways in which the Los Higuerones Cooperative's initiatives strengthen local community-based networks through commoning agroecological land, labor, markets, finance, physical and intellectual property, and even input materials like seeds.

The third and final diverse economies conceptual lens to be applied to this analysis is Fletcher's (2019) framing of communal governmentality, or what he presents as Foucault's (2008) fifth and lesser-known socialist/participatory art of governance philosophy. Fletcher (2019) identifies communal governance *principles, policies and subjectivities* representative of a broader communal governmentality *philosophy*, many of which can be seen in the Los Higuerones Cooperative's approach to agroecology on the Osa Peninsula. First, the governance *principles* of socialization, communal production, commoning and participatory decision-making can be identified predominantly in the Manos Cambiadas and ReGenerOsa Collective initiatives, where a commitment to communal farming production and participatory decision-making are fundamental tenets of each program, respectively, and in which instances of commoning are prevalent through Manos Cambiadas' collective and cooperative modes of labor organization and ReGenerOsa's financial redistribution practices, as described in the paragraph above. Second, the governance *policies* of common property regimes, worker-owned cooperatives, land reform, and gifting are represented through the Mercado Verde's cooperative governance model comprised of Osa Peninsula farmers, sharing and gifting of intellectual (skills/knowledge) and physical property (seeds) as commons, in addition to Manos Cambiadas' collective farming regime as a framework for common property and land reform. Finally, communal *subjectivities* nurtured through collective responsibility, conviviality, affective relations, and

care are reflected across the multiple Los Higuerones initiatives, including the mutual aid approach to the Cajas Verdes program as an expression of collective responsibility, the Mercado Verde's convivial atmosphere connecting otherwise disparate Osa communities through community-supported agroecology, as well as affective relations and care as core organizing values of the ReGenerOsa Collective. Through this lens, the Los Higuerones Cooperative, in its multiple projects, models, and founding values, can be seen as linking community economic interactions and regenerative approaches to commoning across governance philosophies, principles, processes and practices, together representative of an emerging communal governmentality in Osa Peninsula agroecology.

Conclusions

This chapter explored the four main initiatives of the Osa Peninsula's Los Higuerones Cooperative, including its Cajas Verdes weekly harvest box community-supported agriculture project; Mercado Verde farmer's market; Manos Cambiadas volunteer farming collective; and the ReGenerOsa Collective's platform for supporting women-led projects on the peninsula. These projects were analyzed through a community economies conceptual lens to identify diverse modes of economic interaction, including many alternative capitalist and non-capitalist practices, across the categories of labor, enterprise, transactions, property, and finance (Gibson-Graham, 2005, 2013). This analysis also explored how Los Higuerones' agroecology initiatives strengthen local community-based networks through commoning agroecological land, labor, markets, finance, physical and intellectual property, and material inputs like seeds. Finally, Fletcher's (2019) multiple governmentalities analytic provided a framework for recognizing communal governance practices, processes and subjectivities as representative of an emerging communal governmentality in Osa Peninsula agroecology. Though Hunt et al. (2020, p. 199) ascertain that "community organizations remain isolated from one another and are not collectively bridging to confront the development challenges facing their region," emerging agroecology networks bridging multiple organizations and communities on the peninsula, with increased access to regional and international support, may represent a shift toward enhanced bonding and bridging capital through diverse economic practices and communal governance models. Conclusions from this analysis can support

further research and practice in community-based approaches to regenerative agroecology and agrotourism as viable alternatives to growth-based socioeconomic models dependent on corporate agroindustry, in Costa Rica's "eco-laboratory" and elsewhere (Boza, 1995; Fletcher et al., 2020; Little & Blau, 2019).

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Chapter 8

Traditional ecological farming practices of the Indigenous Bribri People and the potential threat of REDD+ to the conservation of these practices

Britney Villhauer

Introduction

The need for sustainable development in lower- and middle-income countries in Latin America has arisen to our consciousness as destructive industrial food production systems threaten autonomy and food security in countries such as Costa Rica. My research in the Bribri territory of KéköLdi showcases how Indigenous Peoples are attempting to decolonize neocolonial conservation and environmental strategies through the prioritization of non-Western worldviews and active resistance in relation to food production within Indigenous territories. In this chapter, I will analyze Bribri decolonial proposals for environmental management through integration of traditional agroforestry practices and compare them with the proposed Indigenous Chapter for the National REDD+ Strategy in Costa Rica. The outcomes of this analysis will reveal a more robust climate change mitigation strategy, incorporating traditional Indigenous ecological knowledge around food production into a holistic forest conservation strategy beyond carbon markets.

Conceptual Framework and Literature Review

According to the Food and Agriculture Organization (FAO), the primary components of food security include physical access to a supply of food, consumption of food, affordability of food, and stability of access over time (2009). Reducing Emissions from Deforestation and Forest Degradation (REDD+) is a forest financing strategy being negotiated globally through the United Nations Framework Convention on Climate Change (UNFCCC). REDD+ has been highly criticized in the literature particularly for its potential negative impacts on Indigenous communities around the world regarding land grabbing and abuse of Indigenous rights (Boucher, 2015; Campbell, 2015; Evans et al., 2014; Goldtooth,

2014; Guzmán León, 2016; Marion Suiseeya, 2017; Sunderlin et al., 2017; White, 2014). Indigenous People's access to the forest where they have traditionally engaged in agroforestry methods, securing their own food security independent of industrialized global food systems, is being threatened by REDD+. The benefits of agroecological practices, in contrast to the carbon market approach to forest financing, present a strong case for decolonial transformation of this UNFCCC strategy.

The context of REDD+ in Costa Rica is exemplary for Indigenous populations all over the world and is being celebrated as a prototype for forest financing globally. However, the decolonial process around environmental management strategies has been contentious since the national Payments for Environmental Services (PES) strategy was proposed in Costa Rica in the 1990s. Additionally, the National REDD+ Strategy in Costa Rica has been undergoing an Indigenous Consultation process through the facilitation of Cultural Mediators in order to ensure that the strategy does not have a destructive initial impact, as the PES did (Herrera Ugalde & Sucre Romero, 2019). Through the Cultural Mediators Program, Indigenous representatives developed the Indigenous Chapter of the National Strategy, with five Special Indigenous Themes (SIT). These include: 1) Indigenous Payments for Environmental Services, 2) Healing and Legal Certainty of the Land, 3) Concept of Forest and Indigenous Cosmovision, 4) Protected Areas and Indigenous Territories, and 5) Participatory Monitoring and Evaluation (MINAE, 2017). The importance of SIT 1, Indigenous PES, will be explored in detail in this chapter to reveal how this approach can support traditional agroecological food production methods and food security.

Costa Rica is an important case study example of innovative social projects countering dominant industrial agricultural systems, as recent agricultural policy has brought Costa Rica to embrace destructive environmental practices. According to FAO, 36% of the land in Costa Rica is dedicated to agriculture, while Costa Rica supports 5% of the planet's biodiversity ("Scaling up Climate Ambition..." n.d.). Simultaneously, there are eight Indigenous groups in Costa Rica (Bruncas, Bribris, Cabécares, Chorotegas, Huetares, Malekus, Ngäbe, and Teribes) and 24 Indigenous territories (Rojas, 2004). Though territories are legally outlined by the Indigenous Law of 1977 (Ley Indígena 6172), land tenure is still a major issue four decades later, with

43% of the territorial lands in the hands of non-Indigenous People (Mesa Nacional Indígena de Costa Rica, 2009). I engaged in research in one of the Bribri territories, the KéköLdi territory in the southern Caribbean, to explore how Indigenous Traditional Ecological Knowledge (TEK) is responding to the industrialized, market-based forest financing strategy REDD+ and industrial food production.

Methodology

This research was carried out in the Bribri Indigenous Territory of KéköLdi. With non-Indigenous People making up 70.3% of the population (INEC, 2011), KéköLdi experiences the highest infiltration of modern, non-Indigenous influence of any Indigenous territory in Costa Rica. This greatly impacts the values, norms, and practices of the community, also placing unique demands upon the REDD+ negotiations.

The sociocultural reality in KéköLdi further demonstrates systemic neocolonial oppression. Half of the population in KéköLdi lives with one or more unmet basic necessities (INEC, 2011). Of the Indigenous People working in agriculture in KéköLdi, 80% have an elementary education or less, with 100% of the women Indigenous agricultural workers with elementary education or less.

In my research I utilized the customary research methodologies culturally appropriate for Indigenous populations, as standardized in the literature (Kovach, 2009; Tuhiwai Smith, 2012). These methods include conversation, storytelling, and participation.

Conversation is an alternative Indigenous research methodology in place of structured interviews. Plains Cree/Saulteaux Indigenous scholar Margaret Kovach teaches that unlike structured interviews which control and standardize the narrative, “an open-structured conversational method shows respect for the participant’s story and allows research participants greater control over what they wish to share with respect to the research question” (2009, p. 124). I conversed with members of the KéköLdi community, as well as other Bribri from the Talamanca territory and Bribri living outside of the territories. The majority of these interactions were not audio-recorded, but on all occasions, I took extensive field notes immediately following our conversations. I relied on both my field notes as well as transcribed audio recordings for

the coding and analysis process to glean an overall message emanating from the participants.

In addition, I relied on storytelling with 13 Indigenous elders from nine different clans to share ancestral Bribri cosmological stories. Validating Indigenous insight through the prioritization of their oral histories as foundational understandings in analyzing the research context prioritizes the marginalized voice, the story of “those who have suffered the most,” even though the history has not been maintained in a written record, and it authorizes these “Indigenous insights lost to traditional history” as acceptable understandings of history (Kincheloe & Steinberg, 2008, p. 147).

Participation is essential in Indigenous methodologies. It can be used to record components of the research context that are important especially for analyzing the information gathered (Kovach, 2009; Tuhiwai Smith, 2012). Because Indigenous people live in unique, specific manners that are foreign to typical Western researchers, social implications, cause-effect dynamics, and interpretation are untranslatable without understanding the context. During my stay in the territory, I lived in the home of Indigenous elders, participated in community ceremony events, attended Bribri language/cosmovision classes with local children and agricultural workshops with development agencies, amongst other events.

I utilized a consent script with research participants, though the conversation of consent was ongoing and revisited consistently throughout my research, and my Indigenous research partners maintained primary control of research methods and data analysis for ethical purposes with Indigenous populations. Interviews along with field notes from informal conversations within the territory were transcribed. In order to analyze this data, I partnered with Indigenous elders and traditional knowledge holders in multiple rounds of qualitative coding. This analysis revealed a dominant decolonial narrative regarding the impact of REDD+ on traditional agroforestry practices and Indigenous autonomy in food production systems.

Findings and Discussion

Perhaps most significantly, this analysis revealed that if REDD+ were to frame the importance of forest conservation as financial support for Indigenous People to return to traditional

agroforestry practices in the territory, rather than offsetting the contamination of industrialized nations, the Bribri would be more likely to consider participating in REDD+. Traditional cultural practices of interacting with the forest for food harvesting, water sources, and spiritual engagements could be strengthened if these traditional practices were manifested within the REDD+ strategy in Indigenous territories. Early in the negotiations of the REDD+ strategy in Indigenous territories in Costa Rica, the Bribri People and others expressed disapproval of the ways the REDD+ strategy limited their access to the forest and threatened their food sovereignty. In the following sections I will review the critiques of REDD+ as a policy compensating for global polluters, usurping Indigenous land, and blocking access to subsistence harvesting in protected forest and then detail how the Indigenous PES strategy and the revitalization of traditional agroforestry methods may aid in decolonizing the REDD+ strategy.

Climate change is caused predominantly by big polluters in the industrialized global society, and therefore Indigenous People do not feel that they need to pay the price and make the sacrifices to compensate for others' pollution, nor would they be capable of a large enough mitigation to do so. Bribri elder Juanita Sánchez told me that Costa Rica is very small, and the little impact that this small Indigenous Bribri population will have by protecting the forest in the territory is insignificant on a global scale to mitigate climate change. She said that other countries in Central America and around the world needed to change their destructive practices. In a conversation with Cultural Mediator Keyswar Mayorga, he also told me that the people who need to be incentivized to change are the big banana companies and the cattle owners, not the Indigenous People who are already caring for the forest. Duaro Mayorga told me how much the landscape has changed in recent decades with the invasion of foreigners into lands traditionally protected and conserved by Indigenous People. In a later conversation, he told me that the part of the territory that had been usurped along the beach had been completely developed for hotels and tourism. This is supported by findings of the UN, decrying the impunity of Costa Rica towards its Indigenous populations (Brenes Mora, 2024; Mora Diaz, 2024).

In a similar sentiment, the usurpation of Indigenous lands remains one of the greatest concerns both globally, as well as in the Bribri Territory of KéköLdi, as many fear that policies such as REDD+

will constrict land use and stymie their ability to practice their customs and traditional agroforestry practices. Angela Reyes expressed concern that policies like REDD+ were continuing to steal land away from the Indigenous People and were not allowing them to live their lives and their customs in the forest. She said that it is important to keep teaching Indigenous values to the young kids and to maintain the agroforestry practices, rather than allowing State policies like REDD+ prohibit them and take away their land. Ana Balma also discussed the problems of land being sold to non-Indigenous People and the challenge of the National Commission of Indigenous Issues (CONAI) to establish the territorial bounds with the passing of Indigenous law 6172 in 1977. She told me that the Bribri did not have land titles but rather relied on the fact that their family have been on the land for generations, that non-Indigenous People would respect that the forest is theirs. However, she said they saw many non-Indigenous People come in with tractors and chainsaws to cut down the forest. This is a legal issue, as Indigenous territory is not privately owned and cannot be sold. This is one way violent land disputes have originated in the territory.

Finally, the REDD+ strategy, by imposing Western conservation practices of designating forest as being off-limits to human impact, prohibits the Bribri people from maintaining the cultural rights and traditional food production practices of agroforestry. Ana told me of how she used to work the land and cultivate rice, beans, corn, and several other products that would support her and her family's needs, but that today there is not enough land to cultivate their own food and that they now depend on packaged products from the store. Duaro corroborated this sentiment, indicating that Indigenous culture is dying away in his generation, and that young people today no longer are interested in speaking Bribri or learning the cosmovision or cultivating the land. He said that their ancestral subsistence practices are no longer enough to survive today. His mother, Gloria Mayorga, agreed. She told me about how the young people in the territory today no longer want to work the land; they find more sense in selling the land to get money to be able to buy food rather than planting and cultivating in the territory.

The narratives outlined above indicate the importance of REDD+ decolonization through the Indigenous PES strategy. Juanita told me of how the PES was originally implemented

in a culturally inappropriate way in the territory, paying individuals for land that was protected, when Indigenous People do not historically own land individually but share everything communally in the forest. She explained the decolonial process with the PES strategy of switching from paying individuals for protected land to paying the territory's Development Association for land held communally in the territory, but how it was also a tumultuous change, as the Indigenous People were accustomed to the culturally inappropriate PES originally. Money made by KéköLdi's Indigenous Development Association through the national forest financing strategy PES was originally used to buy back lands that had been usurped, however, only about 70% of the land was recovered when the non-Indigenous People started to resist. However, the effectiveness of the Development Association to resolve these issues is dubious, as complaints filed to the State have gone unheard and the Association itself has been seen as complicit with the State, leading to what was described as a "coup" in 2009.

Through the Indigenous Consultation process prior to the implementation of a National REDD+ Strategy, important changes were proposed by Indigenous People in Costa Rica to decolonize the National REDD+ Strategy. As protected land within Indigenous territories in Costa Rica has proven to be a violation of Bribri human rights to food and culture (Sylvester et al., 2016), Indigenous People in Costa Rica knew from the start that the REDD+ strategy must be implemented differently within the territories. As described above, the national PES strategy had already gone through a decolonial process, which serves as an example for REDD+ (Villhauer & Sylvester, 2021). An important transformation in the Indigenous PES (as opposed to the national PES) is the allowance of subsistence foraging/wild food harvesting in the protected forest, which is an extremely important component of Indigenous societies in Costa Rica (Fuentes Rodríguez, 2014). The cultural value of medicinal plants, vines for basket weaving, firewood, and other small-scale harvesting is protected in the Indigenous PES (Baker, 2014; Kothari et al., 2012; Miller, 2006; Morales Pita, 2015). As we see the example of the PES that was decolonized so that Indigenous People could continue their traditional practices, similarly, REDD+ must be decolonized to follow the Indigenous PES model.

Duaro explained to me the entire decolonial process with the PES program. He said that originally the PES strategy was presented to them by the State, and they could only vote if they wanted to participate or not in the financing strategy. They were not consulted on the culturally appropriate way to implement a results-based payment strategy. But after the PES was implemented in the territories, he described the Indigenous activation to insist on appropriate changes, including having access to medicinal plants and construction materials within the protected forest as well as a communal payment system. This new policy is known as the Indigenous PES. Now, with REDD+, Duaro says that they are insisting that the strategy be decolonized from the very beginning, so as not to create problems in the territory.

I observed the division and categorization of land within the KéköLdi territory as I walked through the forest regularly with many research participants. Gloria taught me that the leaves used to construct the thatched roofs (*Geonoma congesta*) only grow in primary forest that would be enrolled in PES. Duaro also later explained to me in a recorded conversation that about 1,000 hectares of land in KéköLdi are protected by PES, but even in this land the Indigenous People are permitted to harvest leaves for construction of roofs and medicinal plants, for example. The resources on communally held land (also under PES protection) may be sustainably harvested by any community members and do not belong to any individual. When I was walking through the forest with Juanita, she demonstrated to me the different categories and designations of the land. She would point out to me how to identify land that was not registered under PES and was being utilized as agroforestry by individual Indigenous People. She also pointed out virgin forest that does not belong to anyone but to the community, and for which the Bribri are receiving compensation for protecting through PES. The agroforestry farms are only small patches of forest dispersed within PES protected forest and therefore provide the connectivity between protected forests. This was explained to me by Juanita and Gloria separately as I continually revisited the theme in my conversations. They explained to me that crops are rotated in a polyculture manner amongst other forest trees. While subsistence farming was not initially allowed in forest protected by PES, it is also easy to see that the agroforestry supports wildlife habitat and connects protected areas so that species can travel between them (Sylvester & García Segura, 2016).

Additionally, the practice of living harmoniously with the forest and harvesting at a subsistence level (rather than clear cutting for monoculture agriculture) almost necessarily accompanies the Indigenous PES. Individual families are more likely to subsistence harvest rather than buy packaged food from the store because they do not benefit economically from the money gained through the PES. Cultural Mediator Keyswar stated that this approach to living in harmony with nature frees the Bribri from the system, as they consume what they produce and noting that they cannot eat the paper money. In fact, he said it is not the Bribri who need to be taught this value, but the large banana companies who clear-cut large sections of forest. Enrolling land in Indigenous territories in REDD+ or PES could contribute to the resurgence of this cultural value, if the Bribri are allowed to continue to harvest at a subsistence level, through agroforestry methods.

The Indigenous PES is an apt example of the Cultural Mediator Program being used as a decolonial tool. The decolonial process undergone by the PES policy (preceding the REDD+ consultation), instigated and led by the Bribri, was not a strategy led by the government itself but through Indigenous resistance. The inclusion of Indigenous PES in REDD+ demonstrates that the Indigenous People want their autonomous decisions respected by the government. Utilizing Indigenous PES in REDD+ has the potential of supporting important Bribri values of community, returning to ancestral agricultural practices, and caring for the forest holistically, but it is not guaranteed to produce these outcomes and the Indigenous People must remain attentive to their observations in the territory as these policies are implemented. Just as the Bribri took control of PES in 2009 when they observed negative impacts in their community, they should be prepared to intervene in defense of the territory if unexpected and unwanted outcomes are observed.

Besides the Indigenous PES model, another important decolonial transformation needed in the REDD+ strategy is allowing the Indigenous People to engage in the forest in traditional agroecological methods. The closeness of the traditional Bribri lifestyle with nature is not only something I heard about in my conversations in the territory but was something I was able to observe and participate in during my time in the territory. I accompanied trips deep into the forest to care for the bananas and other fruit trees in the agroforestry plots, as well as to perform

healing ceremonies for the land. When I accompanied Gloria and Ana to the field to harvest banana rhizomes to be transplanted, I witnessed other members of the community in Gloria's plot, helping to clear the land to let more sun in. Gloria explained to me that these community members come by regularly to help with the manual labor, and they also carry home harvested goods from time to time. This is land that belongs to Gloria and her family, but she shares with other members of the community, and they work to till the land together.

In a 2018 workshop, *Human and Productive Empowerment of the Indigenous People and Afro-descendants of Costa Rica*, a Bribri woman, Angela, said working together as a community is an important Indigenous agricultural strategy. This is in stark contrast to the concepts of traceability and managing plagues that were being taught by the non-Indigenous professionals leading the workshop. Another experience where I participated in traditional Indigenous agricultural methods was a workshop put on at the Indigenous farm Loroco (Finca Integral Didáctica Agroecológica Loroco) within the community of Volio. This workshop was led by Indigenous women. Working in agroforestry methods is not mechanized, but contrastingly brings people closer to nature, with active participation as a community and closeness to the dirt, the organic materials, the water, the plants, and eventually the harvest. The Indigenous People benefit directly from the food production and ensure a sustainable, dependable source of food, rather than relying on an industrialized, global system of agro-imports and exports.

Traditional Indigenous agroforestry methods are not only for food production but also bring Indigenous People closer to the cosmological components within the forest. Juanita explained to me, name by name, the sacred non-human beings who are the owners of the forest and from whom we must ask permission to cultivate and harvest. She said that the equilibrium created by Sibö, with these beings to care for the planet and sustain life, has been thrown off balance in the modern world. However, Juanita explained that Sibö never anticipated that humanity would cause such extensive damage to nature, and therefore the celestially established order of nature has been corrupted and requires additional intervention. It is important to understand the complex dynamics of non-human actors in nature to respect the Bribri cosmovision, something that has been highlighted by

state REDD+ policies through the Indigenous consultation.

If REDD+ is designed to incentivize reforestation, then encouraging revitalization of traditional agroforestry methods would strengthen these conservation efforts. The cultural mediators would be an excellent conduit for revitalizing these traditional Bribri values and fortifying subsistence techniques by translating technocratic REDD+ and climate jargon into Bribri cosmological terms connected to traditional agroforestry methods. REDD+ could therefore support the Indigenous right to be “secure in the enjoyment of their own means of subsistence and development” (Article 20, UNDRIP, 2008). By permitting and encouraging increased use of agroforestry methods in and around forest areas protected by PES now and REDD+ in the future, a more sustainable economic model would emerge, as Indigenous People could cultivate for their own consumption and contribute to forest conservation. This agroforestry approach should qualify for the financial incentives under REDD+, as it would contribute to the connectivity of areas protected by REDD+ and would achieve more environmental benefits than just simply carbon sequestration.

Conclusions and Recommendations

While scholars point to Indigenous People as being key to mitigate climate change (Frechette, 2019; Mathiesen, 2016; Stevens et al., 2014), the literature supports that there has been a lack of actually turning to their authority and their proposals in many global contexts (Doolittle, 2010; Gascoigne, 2015; Guzmán León, 2016; White, 2014). Instead, we consult them on their potential participation in Western market-based mitigation efforts, like REDD+. At the Latin American Indigenous Forum on Climate Change, March 2010, in San José, Costa Rica, the Indigenous organizations from throughout Latin America denounced REDD+ as a threat and demanded decolonized alternatives. These autonomous proposals involved a rejection of the geopolitical economic threat of market logic dominating industrialized development paradigms (Declaration of the Latin American Indigenous Forum on Climate Change, 2010).

My analysis of the case of the KékōLdi territory shows that to more effectively encourage subsistence farming, first decolonizing our understanding of progress and world order of dominance would need to be conceptualized in REDD+, rather than focusing on a

top-down approach, which is the current model for REDD+. Even developing a curriculum in traditional agricultural approaches based on subsistence farming to teach these more sustainable and environmentally friendly techniques to other communities that currently participate in practices of forest clearing would be an ideal initiative for REDD+. The degradation of cultural values supporting equilibrium with nature and mutual conscious care of nature and humans together as one integrated creation is a symptom of the violent history of cultural oppression and acculturation. Intentional, concerted funding and work towards cultural resurgence around the world is needed to maintain essential cultural values that have maintained equilibrium with the broader creation since before the arrival of non-Indigenous Peoples to these essential forests (Gaworecki, 2019; Rowling, 2019).

This case study example of REDD+ and the decolonial transformations related to an Indigenous PES approach and revitalization of traditional agroforestry methods in the KéköLdi territory of Costa Rica is an example of resistance to destructive industrial methods of food production and conservation. This Bribri example is applicable to global contexts of Indigenous populations potentially enrolling in the REDD+ strategy through the UNFCCC.

To close this chapter, I will quote Bribri Elder Gloria at length:

They taught me that I am Indigenous, and I need to love that which is mine. They told me “This is yours. Your language is yours. Nobody can take it away from you. Your story is yours. The earth is yours, the forest. You know that the forest has spirits, gods, that care for it. You believe that. That is yours.” People who don’t see it that way do not belong. So, only people who were educated in this way believe and see these things.

Indigenous ancestral knowledge holders have important wisdom to protect and preserve. Permitting traditional Indigenous conservation and agroecological practices strengthens conservation efforts in a more sustainable and autonomous approach. Indigenous People have cared for the forests since time immemorial with agroecological food production methods. New international forest-financing strategies like REDD+ must recognize Indigenous authority and wisdom both in policy and in practice.

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Chapter 9

Coffee culture and women's empowerment in Costa Rica

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Introduction

Coffee culture is a microcosm that both questions and perpetuates traditional notions of gender and national identity in Costa Rica. Costa Rican women have historically played a significant role in the entire coffee supply chain, but they have also been excluded from agrarian reforms. They were traditionally seen only as supporters of male activities, yet their work has been essential for the development of the worldwide reputation of Costa Rican coffee. As gender norms evolve, women's role in the coffee industry is gradually becoming more visible and recognized.

The United Nations links sustainable development to gender equality (SDG 5). This chapter analyzes the results of an informal survey and personal interviews with 43 women in Costa Rica's coffee sector. Our research shows how gender and cultural perceptions shape practices of sustainable development and documents how traditional ways of life become increasingly threatened and replaced with more active roles for women in the coffee economy. The stories collected here present an overview of women's participation in coffee and are a point of departure to think of sustainable development practices as marked by traditional notions of gender and identity.

The Importance of Coffee in Costa Rica's Economy and Culture

In 2020, Costa Rica's Law 9814 declared coffee a national cultural symbol, an act that demonstrates the significance of culture as the fourth pillar of sustainable development (Ministerio de Cultura y Juventud, 2020). This is grounded on the view that sustainable development is only achievable if there is alignment between cultural diversity, social equity, environmental responsibility, and economic viability. Since it blossomed in the 1830s, coffee has been called "the golden

bean” because of its achievements in exports and international awards. In the 1850s, Costa Rica became Central America’s main coffee producer, and at the end of the 19th century, coffee was its main export. Nowadays Costa Rica ranks as a small exporter, with high-quality specialty coffees aimed at select or “gourmet” markets. Coffee is one of Costa Rica’s main agricultural activities, representing 3.5% of the gross value of agricultural production (COMEX, 2023).

Coffee brought more prosperity, peace, and political development to Costa Rica than the rest of Central America ever enjoyed. The 19th century coffee elites of the Central Valley strengthened the economy and contributed to nation-building and identity formation, popularizing the idea that what was good for coffee was good for everyone. Their influence can still be seen in the monuments they financed in San José, such as the National Theatre, as well as in the presidents who came from these families. The 1986 election of Oscar Arias, the Nobel Peace Prize winner and a member of the agroindustrial elite, to the presidency affirmed the values that were closely linked to coffee: culture, stability, equality, democracy, and peace, which have defined Costa Rican identity since the 1950s, the golden age of coffee production.

Costa Rica is one of the few coffee-producing countries where coffee is also consumed as part of daily rituals akin to tea in Great Britain, or mate in Argentina and Uruguay. Coffee is integral to every stratum of modern Costa Rican culture. For example, Article 137 of the Labor Code provides for a fifteen-minute “coffee break” in the morning and afternoon for workers in most economic activities. Events—from international conferences to business meetings, from academic symposia to training workshops—always include a coffee break in the agenda. It is common practice to “have coffee” to conduct formal business operations. A visitor anywhere is always offered coffee, often accompanied by traditional Costa Rican snacks.

Women Coffee Producers in Costa Rica

Traditionally, women have not been considered part of Costa Rica’s economic development in any sector. Our goal is to make women’s contributions to the coffee supply chain visible, with the belief that these efforts will eventually result in a larger allocation of public resources and in a process of empowerment

that will lead to diminishing inequality and getting closer to achieving SDG 5. Lastarria-Cornhiel et al. (2011) have studied aspects of women's traditions and social knowledge as producers, and of gender discrimination in markets and landholding. As in other countries, Costa Rican women have shown "progreso desigual en participación política y en titularidad de bienes productivos en familias y fincas pequeñas" [uneven progress in political participation and in ownership of productive assets in families and small farms] (Bacon et al, 2008, p. 265). According to Bilfield et al (2020, p. 27), "la mujer productora de café ha sido siempre marginada como trabajo invisible" [women coffee producers have always been marginalized as invisible work]. It is difficult to determine how many women own agricultural land in Costa Rica, since available data is based solely on legally registered properties, and not all women register their lands or businesses in their own names (Castillo, 2015; Cuadra et al., 2002, p. 29). This is common in Latin American countries; in Mexico, for example, having a deed gives women a higher status and more decision-making power within the family and within organizations (Jazíbi et al., 2010, p. 167), but it is still uncommon.

Though no published data exists for Costa Rica, there are many indicators that the "feminization of agriculture" observed in Guatemala by Bilfield et al. (2020, p. 27) is also happening there. Between 2020 and 2024, the volume of coffee production and exports by Costa Rican women's groups increased and drew the attention of buyers worldwide (CoopeVictoria, personal communication). This has been beneficial for the reputation of Costa Rican coffee, and the distinction of having been produced by women attracts higher prices. Trademarks such as "Esencia de Mujer" [Essence of a Woman] (CoopeVictoria, Alajuela), "Café Cosecha de Mujer" [Coffee Harvested by Women] (CoopeTarrazú), or "Women Care Certified" (International Women's Coffee Alliance, IWCA) have been layered on to other certifications to add value through abstract concepts and emotions associated with femininity. We must note, however, that some of these initiatives come from boards of directors with a very small or nonexistent female representation and have more to do with gender policy mandates than with a genuine desire to achieve true equality.

Conceptual Framework and Literature Review

There are no formal published studies of the participation of Costa Rican women in coffee-related activities, other than internal data gathered by ICAFE (2021) for the creation of their gender policy. During this process, they observed growth in women's participation in different processes along the coffee supply chain. Throughout our field research, we found similarities between the stories told by Costa Rican women and studies based in Guatemala (Bilfield et al., 2020), Chiapas (Vencis 2007; Jazibi et al., 2010), Honduras (Dietz et al., 2018), Nicaragua (Cuadra et al., 2002), and Peru (Latorre, 2011).

The promotion of women's social equality in Costa Rica began with the Programas de Ajuste Estructural [Structural Adjustment Programs] (1980s) and Law 7142 (1990), which led women to assume different roles and began to make them visible. In the early 2000s, the United Nations requested female labor statistics to document women's double and triple shifts, demonstrating that in the agricultural sector, women worked on the farm, in the home, and in child- or older-adult care. According to Díaz et al (2019, p. 34), women's participation in the coffee sector "en Latinoamérica es un 20%, pero se limita a reserva de trabajo en períodos pico, trabajadoras secundarias con salarios más bajos, y trabajo familiar no remunerado" [in Latin America is 20%, but this is limited to peak-time labor reserves, to lower-paid secondary workers, and to unpaid family work]. The Food and Agriculture Organization (FAO; 2011) documents women's limitations to access supplies and credit to work the land and to make decisions about it. Acuña Alvarado (2020) indicates that "la brecha de género en el acceso a la tierra es definida como la desigualdad entre hombres y mujeres en el disfrute pleno de derechos relativos a la tenencia, uso y control de la propiedad" [the gender gap in land access is defined as inequality between men and women as to the full enjoyment of rights relative to the possession, use, and control of the property]. The closure of this gap, which is caused by lower access to financial resources, "llevará a mayor crecimiento económico y seguridad alimentaria, acelerará el desarrollo comunitario a través del empoderamiento de la mujer. Esto requiere más que acceso a oportunidades económicas y materiales" [will lead to larger economic growth and food security, and accelerate economic development through women's empowerment. This requires

more than access to economic and material opportunities] (Bilfield et al., 2020, p. 27).

When women have autonomy to make decisions about the land, they obtain social recognition (Agarwal, 1994) and contribute to sustainability efforts to a greater degree than men. According to Guillamón and Ruiz (2015), women in environmental organizations have played an important role in resisting extractivist projects through legal actions and protests. They also tend to use fewer synthetic and more organic fertilizers than men (Golen and Medina, 2017). As Bacon et al. (2008, p. 260) demonstrate, “los productores familiares pequeños sostienen mucha de la diversidad biológica y cultural a través de sus maneras de vivir y gestionar los recursos naturales” [small family producers sustain much of the biological and cultural diversity through their lifestyles and management of natural resources] (Gliessman, 2006; Moguel & Toledo, 1999). Díaz et al. (2021, p. 1704) also note the promotion of ecological habits in women-owned coffee farms.

Women have played traditional roles such as housewife and assistant, and institutional programs have thus been directed mainly to improvements in the home. When governments and institutions see women as protagonists of sustainable development, their plans become directed towards broader gender equity and inclusion (Acuña Alvarado, 2020). For example, many women enrolled in large coffee cooperatives receive credit, yet this money is controlled by their husbands (Mora, 2013), who in some cases use them as collateral to obtain more credit and take advantage of programs originally designed to promote female participation. When women receive their own income, they tend to focus on the principles of economic solidarity: increasing productivity to promote family development, investing in their children's education and nutrition, and creating community-improvement programs (Díaz et al., 2021, p. 1704; Cuadra et al., 2002, p. 10, p. 50). Women especially promote the education of their daughters in professional fields that lead to financial independence. Women with access to credit and property management develop both internal and external social capital, as they are more likely to associate with others, share their experiences in the public sphere, and lead to broader social change (Díaz et al., 2019, p. 36; Bacon et al., 2008; Bilfield et al., 2020, p. 27). Women's associations result in the creation of even more businesses

shared by women partners, such as the ones promoted by IWCA.

Costa Rica has made a significant effort to create the right conditions to promote gender equity. As a result of the evolution in gender roles, between 1994 and 2015 a series of public policies for gender inclusion in the agricultural sector were created. Some examples (Acuña Alvarado, 2020) include:

- Programa de Coordinación de las Oficinas Ministeriales y Sectoriales de la Mujer [Program of Coordination of Women's Ministerial and Sectorial Offices], 1994.
- Programa Mujer y Familia del Instituto de Desarrollo Agrario [Program for Women and Families, Institute of Agrarian Development], 1994.
- Eje Mujeres del Plan Nacional de Combate a la Pobreza [Women's Axis of the National Plan to Combat Poverty], 1995.
- Asociación Nacional de Mujeres Campesinas [National Association of Women Farmers], 1996.
- Plan de Acción Sectorial de Género [Gender Action Plan], 1999-2002.
- Gender Policy for the Costa Rican Agricultural Sector, 2002-2010.
- Equidad e inclusión de la población [Population Equity and Inclusion], 2015.
- A strategic priority within the state policy for the Development of Rural Territories, 2015-2030.

The above programs are complemented by the Central American Program for Integrated Coffee Rust Management, an initiative implemented by the Inter-American Institute for Cooperation on Agriculture. The European Union also supported the creation of ICAFE's gender policy for the coffee sector in Costa Rica (2021).

And yet, the women we interviewed seemed oblivious to the existence of these programs and felt that they were not on an even ground with men. Similar situations have been identified in other countries, such as Honduras, where official policies are disconnected from the women they were created to serve (Dietz et al., 2018).

Methodology

This chapter contains the preliminary results of a broader research project. We used a qualitative methodology, validated by researchers such as Santos et al. (2018), for whom a case study strategy allows for the detailed analysis of specific, contextualized situations of female coffee growers. Qualitative, participative research helps understand inequality, identify barriers, and create an “ambiente social que permita el desarrollo y que incluya a hombres y mujeres” [a social environment that allows for development and includes both men and women] (Bilfield et al., 2020, p. 27). This methodology allowed us to observe women as individuals and as groups, and to identify common patterns and correlations with the broader Costa Rican cultural context.

Our theoretical framework is twofold. First, we follow the principles of feminist standpoint theory, which considers knowledge to be socially constructed and advocates for “research, particularly that focused on power relations, [to] begin with the lives of the marginalized” (Bowell, n. d.). Second, we are inspired by the “diálogo de saberes” [roughly translated as “a dialogue among different ways of knowing”] methodology, which evaluates the “fourfold wisdom” of Indigenous people, women, classical traditions, and scientists as equally legitimate in order to face the current sustainability challenges of our planet (PRATEC, 2012, p. 6).

Despite its small size, Costa Rica has a large cultural and environmental diversity. Selecting participants in all the coffee-growing regions of the country allowed us to obtain a broader understanding of the topic. We collected data with the following instruments, validated by the methodology of gender transformative approaches employed by Bilfield et al. (2020) in Guatemala:

1. Semi-structured interviews: we created a conversation guide based on open, predefined questions, asked randomly. Giving interviewees freedom to expand on what interested them most yielded richer responses. Women opened up and volunteered detailed, contextualized data. Interviews were conducted in person in the interviewees' homes, businesses, and farms. We met with two small focus groups and attended prepared lectures by two professional women who are active in the world

of coffee. The interviews are full of impactful stories, which all women participants were eager to share and disseminate. The qualitative data obtained was analyzed using content and rhetorical analysis, identifying emergent patterns, recurring themes, and significant connections.

2. Threefold participant observation: we asked general questions first, then got deeper into issues of women's participation in coffee, and closed by thanking the participants, at which time new conversations often arose.
3. A twelve-question, anonymous Google Forms survey: eleven questions were closed (Likert scale); the twelfth was open and optional. We analyzed the qualitative information provided, looking for rhetorical patterns and significant anecdotes.
4. Library and film research: this contextualized the situations narrated in the interviews within national and regional frameworks. It allowed us to validate patterns in Costa Rica with studies conducted in other Latin American countries.

The interviews and surveys were applied to 43 women in the provinces of San José, Alajuela, Cartago, Heredia, Guanacaste, and Puntarenas between May 2022 and May 2024. We did not collect demographic data, though we did obtain a diverse group. Our only selection criterion was that the women were owners of their businesses. We began with four women and two cooperatives, and these contacts led to other individuals, and distributed the Google survey via WhatsApp to others who could not attend in person. Since this is preliminary research, we were interested in collecting stories, not in creating replicable survey data. Participation was entirely voluntary. This research proposal was evaluated by the Universidad Nacional de Costa Rica's equivalent of the IRB board at the request of Professor Vasconcelos-Vásquez. Since no sensitive or demographic data is involved, according to Costa Rican law (*Ley de Protección de la persona frente al tratamiento de sus datos personales* [Law of Protection of Personal Data], No. 8968), Professor Vasconcelos-Vásquez has obtained the necessary approval to apply the above instruments.

Data Analysis

Interviewee Profile

The women interviewed included heads of household as well as daughters and wives of producers; all produced coffee and other foods. They were married, widowed, or divorced. The majority were mothers with housekeeping and care responsibilities in addition to their businesses. Some were single mothers who saw coffee as an opportunity to advance. Some were professionals in other fields who were also involved in coffee. Some were exporters, and some were developing products derived from coffee. Some founded businesses, and all engaged in cooperatives, associations, and foundations. Their education ranged from primary to university. Our sample is representative of businesses of different sizes and at different stages. Some interviewees had led successful businesses for decades. "Projects" (a Costa Rican word for entrepreneurship) are more common, often built gradually as funds become available. A project can mean a drying area on the driveway or a cupping room on the porch, as coffee slowly invades the family home.

It is important to remember that women have always been present in coffee agriculture, and many were members of organizations, but did not always have a voice or a vote. Their male relatives collected paychecks, registered properties, and made decisions (Mora, 2013). The majority of women now active in coffee have been part of Costa Rica's coffee culture since childhood; some have taken on decision-making roles out of a desire to work in this field. The majority of female landowners inherited their land from fathers or grandfathers. Several mentioned progressive ancestors who left land to both male and female descendants, though many left the best lands to the men.

All the women we interviewed and surveyed owned their farms or businesses, with the exception of two CoopeVictoria employees who coordinated the women's group until 2022. Married women tended to employ their husbands, buy their lands, or sell them their products, maintaining commercial or labor relationships apart from the familial ones. In speaking about their male relatives, most women expressed gratitude for their support. Expressions such as "papi es otra mujer aquí"

[daddy is just another woman around here] or “Café Mujer no existiría si no hubiera hombres” [Café Mujer would not exist if there were no men] were common. The women rejected “feminism” as a word that segregates men; a few said that they liked the term but credited only their fathers for giving them access to education. Gratitude to coffee was frequently expressed for opening up opportunities for personal and professional growth and independence. Everything that has happened to them revolves around coffee.

The advantages of associating were a main theme in all the conversations. Pride and a sense of belonging to a community of women were often expressed. The women were either members or founders of associations, organizations, and cooperatives dedicated to promoting female participation in coffee. The influence and mentorship of international NGOs, such as Bean Voyage, IWCA, or the now-defunct Coffee Quality Institute (Scholer, 2008), is significant. These provide logistical and educational support that women consider crucial in the process of starting and sustaining their businesses and connect producers to consumers of specialty coffee in foreign markets. Similar results were identified in Nicaraguan women’s groups by Bacon et al. (2008, pp. 267-269).

Female representation on the boards of the large coffee cooperatives is low; CoopeDota, for example, had 300 female members (30% of all members) in 2022. Women are conscious of the fact that it is harder to do things individually and cite associations as the solution to many problems. They define themselves as “cooperativistas,” creating their own cooperatives or departments within traditional cooperatives, chapters within associations, or support groups of other types. The oldest women’s coffee cooperative in Costa Rica is ASOMOB, founded in 1997 in Biolley with the goal of improving the living conditions of local families. It became well known internationally through the documentary *A Small Section of the World* (Chilcott, 2014). There are many other small associations, such as the Grupo de Mujeres Emprendedoras (Group of Women Entrepreneurs) in Los Santos, but the most active group at the time of writing is IWCA with 20 members in 2024. The Costa Rica chapter was its first.

The interviewees consider learning and knowledge crucial and are very open to change. They train and study to fill

their knowledge gaps, taking advantage of public and private resources that offer credit and technical skill training.

Challenges of Women Coffee Producers

1. **Fear of technology:** women coffee growers seek support and training due to traditional attitudes that inculcate in them a fear of technology. Some are more comfortable using ordinary household tools rather than specialized equipment, such as kitchen spatulas or floor mops, to turn the drying coffee. Machinery and devices that are necessary for coffee production and processing have traditionally been a masculine domain; it is also men who are in charge of repairing them. As one interviewee remarked, “somos más temerosas de tocar cosas” [we are more fearful of touching things]. Women in remote rural environments are extremely slow in adopting common technologies such as social media or Excel. One woman decided to take advantage of the fact that men like to explain machines to women, which she saw as a chance to learn “for free” through her appointments with providers.
2. **Fear of paperwork:** women are afraid of signing long legal contracts and of adapting to the business methods of large corporations, which in some cases become their clients. There are many scams that take advantage of the fact that many women do not understand what they read and tend not to seek professional help. “Hay que estudiar para que no se aprovechen de una” [you have to study so that no one takes advantage of you], said one interviewee.
3. **Fear of entrepreneurship projects beyond traditionally “female” or “feminine” crafts** such as soap making or knitting. It is a challenge for women to create and maintain business relationships in a male-dominated culture.
4. **Lack of independence, visibility, and self-esteem:** when registering a business, if the woman is married, the husband tends to figure as head of household. This creates a lack of visibility of women's work. It becomes crucial for them to see their own names on coffee bags or letterhead. International conferences, documentary films, and fairs are some of the venues through which women make themselves known.
5. **Isolation:** even though women are generally very eager to innovate and be flexible, this is easier for those who live in the Central Valley. The more remote and isolated they are,

such as those in Biolley or Guanacaste, the harder it is to solve problems. In these areas, the support of other women is crucial. It is common for women to feel like pioneers because they do not always know others in similar situations.

6. Generational change: women are well aware that their children lose interest in coffee once they go to university. They feel responsible for preparing the next generation. Many of our interviewees kept their professional adult children involved in the family business, helping with accounting and employee health, managing social media, or executing employment contracts. In some cases, mothers train their daughters to run the business; in all cases, adult children keep coming back to the farm to help out, especially during the harvest, as was traditionally done. Some do it as a way to return to their roots. But several of these children, who happened to be present during the interviews, reported that they remain involved with coffee only part-time, due to a sense of duty to their mothers, not because of a personal interest in coffee.
7. The double or triple shift: female participation in the management of coffee associations is hurting due to the disadvantages faced by many, who continue to coordinate everything in the household. This leaves little time to participate in other activities. Men's assistance was often mentioned as a solution.
8. Discrimination and *machismo*: some women reported that suppliers make things difficult for them or charge them more than men; that their farm workers refuse to take orders from a woman; that they are embarrassed when attending workshops and being the only woman in the room. They grew up with the phrase "porque usted es mujer" [because you are a woman], especially from their mothers, as an explanation for being denied permission. Some husbands were opposed to their wives' progress, but this was not the norm in the sample.

Despite these challenges, each woman interviewed for this research stands out in her community because she dared to do what had traditionally been seen as a man's business.

Social, Environmental, and Economic Impact

The UN SDG 5, Achieve gender equality and empower all women and girls, is essential for the sustainability of any country. This section focuses on the impact that Costa Rican women growers are already having on the country's sustainability. Similar results have been identified by Latorre (2011) in a study about women coffee growers in Peru.

Social sustainability: Female coffee growers have a sense of responsibility toward their community's improvement. They take special care of migrant workers, providing dignified housing, promoting health, creating daycare centers, handing family paychecks to women pickers instead of their husbands, providing free lunches, etc. They think about sustainability in a broad sense, prioritizing "dormir con la conciencia tranquila" [sleeping with a clear conscience] and knowing that a socially sustainable business will last longer and produce more.

Environmental sustainability: Some women indicated that "como tienen la casa tienen la finca" [they keep the farm as they keep their home]. They consider the farm a garden, treating the coffee plants with maternal love. Women have become resilient in their environment. For example, they have taken the lead in promoting the management of organic residues to produce fertilizer.

Economic sustainability: Economic development that began as a circular or local economy has been growing as women went from coffee pickers to farm owners, and from selling coffee to their communities to marketing it nationally and internationally. ASOMOB's roasting services to other organizations, for example, create an additional income stream. When women create jobs, their communities benefit, as workers remain in their homes and the local economy grows. When women's cooperatives and associations export their coffee, they bring in U.S. dollars, which affects the national economy.

Female Coffee Growers: Cultural Sustainability

The consideration of culture for the balance of sustainability is a relatively new phenomenon. Because coffee is such a crucial element of Costa Rican national identity and culture, we include a separate section detailing the cultural impact of women coffee growers on sustainability, with the knowledge that this issue needs further research:

1. Resilience, self-improvement, and empowerment: all interviewees narrated stories of personal challenges and obstacles they had to overcome. These included health issues, disability, divorce, widowhood, abandonment, single motherhood, abuse, and poverty. They credited their coffee activities as the catalyst to overcome personal difficulties. They were aware of their process of empowerment, of small changes, of the strategies and support that helped them get where they are. Some went as far as to say that coffee had saved their lives.
2. Future thinking: women coffee growers have a vision of how the crop will affect their daughters and granddaughters and live in homes decorated with motivational phrases. Their goals are empathy with other women, mutual support, and lifelong learning. Women have faith, concrete plans and projects, and they are hungry for success.
3. Sense of social impact: women are keenly aware of the impact that their own success can have on other women. Their main objective is to improve the lives of workers, especially mothers, and they see selling coffee as an instrument for that. They seek to expand their experience and knowledge, to tell their stories and spread the word. They do this through education: they take courses and workshops, and they also welcome foreign volunteers, interns, and researchers into their homes to disseminate this knowledge beyond their communities (Gütte, 2023).
4. Emphasis on values: women farmers are guided by norms, principles, and values that align with Costa Rica's national identity. All interviewees mentioned family, traceability, empowerment, transparency, good practices, sharing resources and knowledge, and breaking masculine patterns.

Conclusions and Recommendations

Conclusions

The interviews we conducted revealed a great sense of story and History. All the women had a story, many times told, structured in a well-defined narrative arc oriented toward their origins. They wanted to be actively listened to, and to that effect they broke down their stories in stages and chapters

with transitions and a sense of how the elements go together: “ya lo cuento después” [I’ll talk about that later], “estamos terminando” [we are getting to the end], etc. They displayed an awareness of how their personal stories are inserted within the histories of their families, their regions, and their country, and of how coffee was the connecting thread of all those histories, personal values, and the nation’s foundations. Several mentioned that their efforts give continuity to “el sueño de mi papá” [my daddy’s dream], and in this way they claimed their role in the family tradition. Similar stories can be found in the video *Más que un café* (Mora et al., 2023).

Many women used words like “miracle” or “unimaginable” when describing the success of their businesses, because they never saw themselves as capable of achieving the goals that today are a reality. Despite their geographical diversity, they share similar challenges. But they were all incredibly resilient, an example for other women in their communities. In the words of an interviewee, “Nos decían locas y hoy somos un ejemplo a seguir” [they called us crazy and today they follow our example]. Despite legislation fostering gender equality, there is still a cultural vacuum that prevents women from occupying high-ranking positions or making decisions in large organizations. Such policies and laws were implemented to favor women, but the participants were not aware of benefiting from them. It is clear that the UN SDG 5 has a long way to go in Costa Rica.

Recommendations

1. Creating a national network of female coffee growers that strengthens their growth and development in all regions and that can expand to other Central American countries.
2. Supporting women’s businesses systematically, so that experiences that favor the development of women coffee growers can be replicated within the sector and in other sectors of the economy.
3. Promoting the participation and visibility of women in the coffee sector as landowners, producers, innovators, and members of associations and governing boards.
4. Learning from the experience and wisdom of women farmers as they overcome a variety of obstacles and create knowledge.

Future Research

Our future research will focus on:

1. The innovative ways in which female coffee producers are evolving, with the intention of observing tendencies and growth of female innovators in coffee culture.
2. The evolving pieces of legislation and policies that promote women's agricultural businesses, with the intention of testing whether these policies truly favor women entrepreneurs or whether there are other factors contributing to growth.
3. The role of documentary film and video to promote the visibility of women in coffee, to see if the media truly has an effect on making women's roles in coffee visible.
4. Creating replicable surveys that collect demographic data, and distributing them to more women and women-led organizations nationally to determine ranges and levels of development.
5. Replicating this research with other agricultural products in Costa Rica and comparing the situation with other countries in Central and South America, with the intention of identifying similarities and differences socially, economically, environmentally, and culturally.
6. Strengthening the study of cultural sustainability as it applies to women's economic endeavors.

Acknowledgments

We are most grateful to all the women who opened their homes, offices, and farms to us and told us their stories over endless cups of delicious coffee. We are grateful to the Monteverde Institute for putting us in contact with Xinia Chávez and Cecilia Genis, two women who generously shared their research with us and our students and helped guide our project. Beatriz is grateful to Widener University for financial support that made travel to Costa Rica possible, and to Dr. Steve Madigosky for driving us safely on Costa Rican roads so we could reach our interviewees. Kattia is grateful to Universidad Nacional de Costa Rica for the time to conduct this research, and to José Quirós and Giovanni Badilla for their support.

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