COOPERATIVE SOLUTIONS:

How the Fair Trade and organic coffee markets support forested ecosystems on Nicaraguan coffee farms

by

MICHAEL M. ZELMER

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Abstract

Widespread deforestation throughout Latin America has accentuated the importance of forested coffee farms as bastions of biodiversity that in many respects mimic tropical forests. However, a trend towards producing coffee within highly productive, chemically intensive monocultures has increasingly left these important ecosystems within the hands of small-scale farmers and indigenous communities, who are typically unable to capture much of the value of their coffee because of power asymmetry within their trading relationships. Notable exceptions are farmers who belong to cooperatives, which enable farmers to enhance their power and access the high-value Fair Trade and organic markets. In exchange for high prices, these markets require that farmers meet a variety of certification criteria that, among other things, affect how small coffee farms are managed.

This thesis examines the means and processes through which the production of coffee for the organic and Fair Trade markets affects forested ecosystems on small-scale farms in Pancasán and El Coyolár, Nicaragua. In particular, it emphasizes the role of cooperatives as the institution through which standards are met, information is exchanged, decisions are made, access to global markets is facilitated, and a 'new' product with more resilient social and environmental benefits is achieved. While these markets do indeed require farmers to meet certification standards, it is the cooperatives and their allies that develop the capacity necessary for farmers to do so. Moreover, cooperative membership enables farmers to access resources that are embedded within networks they would not otherwise be able to access, and which are significant to both their livelihoods and the forested ecosystems they manage.

Table of Contents

Abstract ... ii
Table of Contents ... iii
List of Tables ... v
List of Figures ... vi
Acknowledgements ... vii

CHAPTER ONE - INTRODUCTION ... **1**

1.1 When Market and Ecosystem Collide ... 1
1.2 Cooperatives and the Fair Trade and Organic Alternatives ... 2
1.3 Purpose of this Study ... 2
1.3.1 Expected and Actual Outcomes ... 3
1.4 Chapter Outline ... 4

CHAPTER TWO - STUDY CONTEXT AND METHODOLOGY ... **6**

2.1 Context/Study Area ... 6
2.1.1 Pancasán ... 7
2.1.2 El Coyolár ... 7
2.2 Methodology ... 7
2.2.1 Sampling in Pancasán and El Coyolár ... 8

CHAPTER THREE - COFFEE ECOSYSTEMS AND THEIR ECONOMIC ROOTS ... **11**

3.1 Understanding Coffee Ecosystems ... 11
3.1.1 Classifying Coffee Ecosystems ... 13
3.2 Coffee Farming as a Means of Reforestation ... 14
3.3 Biodiversity ... 15
3.3.1 Birds ... 16
3.3.2 Mammals and Other Animals ... 17
3.3.3 Arthropods ... 17
3.4 Soils and water ... 17
3.5 Chemical use ... 19
3.6 Organics ... 20
3.7 Farm Economics ... 22
3.8 Chapter Summary ... 25

CHAPTER FOUR: THE SOCIAL CAPITAL OF COFFEE COOPERATIVES ... **27**

4.1 Social Capital and the Cooperatives: For the Good of the Individual ... 27
4.2 Social Capital and the Cooperatives: For the Good of the Group ... 29
4.3 History of Cooperatives and small-scale farming in Nicaragua ... 31
4.4 Birth and Structure of ACOPAN and La Esperanza ... 34
4.4.1 ACOPAN ... 34
4.4.1.1 Birth ... 34
4.4.1.2 Structure ... 35
4.4.2 La Esperanza ... 36
4.4.2.1 Birth ... 36
4.4.2.2 Structure ... 36
4.5 Social Capital and Primary Cooperatives ... 39
4.6 Supporting the Cooperatives: The Importance of ADDAC and CECOCAFEN ... 41

4.6.1 The Role and Influence of ADDAC 42
4.6.2 The Role and Influence of CECOCAFEN 44
4.7 CHAPTER SUMMARY 47

CHAPTER FIVE – COFFEE ENVIRONMENTS AND GLOBAL VALUE CHAINS 49

5.1 STRUCTURE OF A GVC – WHAT DOES IT LOOK LIKE? 49
5.1.1 The Nicaraguan side of the coffee GVC 50
5.2 A RECENT HISTORY OF COFFEE 53
5.2.1 The Rise and Fall of the International Coffee Agreements 53
5.2.2 Consolidation of Market Power 56
5.2.3 Impacts on Nicaraguan Growers 57
5.3 ALTERNATIVE VALUE CHAINS: SPECIALTY COFFEE 59
5.3.1 Rent or Own: Upgrading on the Coffee GVC Through Cooperation 61
5.4 ALTERNATIVE VALUE CHAINS: FAIR TRADE AND ORGANIC 63
5.5 GOVERNANCE IN COFFEE VALUE CHAINS 65
5.6. CERTIFICATION STANDARDS AND COFFEE ECOSYSTEMS 68
5.6.1 Fair Trade 68
5.6.2 Organic 71
5.7 CHAPTER SUMMARY 74

CHAPTER SIX - CONCLUSIONS 76

6.1 ANSWERING THE RESEARCH QUESTIONS 76
6.1.1 Question 1 76
6.1.2 Question 2 77
6.1.3 Question 3 78
6.1.4 Question 4 79
6.2 IMPLICATIONS OF THIS STUDY 79

BIBLIOGRAPHY 81

APPENDIX A: INTERVIEW SCRIPT (COFFEE FARMERS) 87
APPENDIX B: COFFEE ECOSYSTEMS 89
APPENDIX C: TECHNOLOGY 92
APPENDIX D: FARM AND HARVEST DATA 95
APPENDIX E: HISTORICAL COFFEE PRICE DATA, 1984-2003 99
APPENDIX F: PRODUCTION AND EXPORT DATA, 1984-2003 101

List of Tables

Table 3.1: Farmer responses to questions on the value of forests on farms. 15

Table 3.2: Crops and animals (food or service only) observed on study farms.....23

Table 3.3: Farm and harvest data, ACOPAN and La Esperanza.....25

Table 5.1: Typology of coffee producers, and farm and harvest data for Nicaragua.....51

Table 5.2: Production, Export and Price (Other Mild Arabicas only) Data (ICO Members and Nicaragua), 1983-2003.....54

Table 5.3: Average prices reported at the farm gate for the 2000-01 harvest.....63

Table 5.4: Supplementary price data 2003-04.....64

Table 5.5: SolCafé /CECOCAFEN dry milling and exportation fees (US$).....65

Table 5.6: Examples of legislative, judicial and executive value chain governance.....67

List of Figures

Figure 2.1: Study area and the five Nicaraguan coffee producing states. Pancasán and El Coyolár, Nicaragua.....6

Figure 4.1: The Cooperative as a Closed Network.....28

Figure 4.2: The Cooperative as an Entity.....30

Figure 4.3: CECOCAFEN before and after the purchase of SolCafé.....46

Figure 5.1: General structure of the Nicaraguan coffee value chain.....50

Figure 5.2: Processing stages from coffee cherry to green bean.....52

Figure 5.3: Prices (Other Mild Arabicas, World and Nicaragua), 1983-2002.....55

Figure 5.4: Vertical integration versus *virtual* integration.....62

Figure 5.5: Monitoring the Fair Trade Coffee Value Chain (Canada) 69

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Chapter One - Introduction

Coffee is an important part of millions of peoples' daily lives, but few give pause to consider the manner in which their daily habit is produced. This thesis examines the means and processes (social, economic, and environmental) through which organic and Fair Trade coffees have become a 'value-added' product with evident consequences, largely positive, that benefit both communities and ecosystems.[1]

1.1 When Market and Ecosystem Collide

Not many people realize that coffee from Latin America has traditionally been produced within forested ecosystems that possess a rich biodiversity and are the wintering grounds for dozens of species of migratory birds. Fewer still probably know that a massive transformation has been occurring on coffee farms since the 1970s, with these "coffee forests" giving way to modern industrial monocultures. The rise of these monocultures has been a function of economics. The development of high yield coffee trees that can produce under the full light of the sun, planting those trees closer together, and the application of a suite of agrochemicals has enabled these farms to produce more coffee per hectare than is possible on their more forested counterparts. However, this higher productivity has come at considerable cost. The elimination of trees and other vegetation to make room for higher coffee tree densities and to expose them to more sunlight damages the long-term productivity of these systems and drastically affects their biodiversity. Soils are drier and more vulnerable to erosion, and reduced structural complexity and intensive chemical use make these farms inhospitable to most birds, animals, and insects.

Conversely, forested coffee ecosystems in Latin America have been described as, "the region's most environmentally benign and ecological stable agroecosystems" (Rice and Ward 1996: 9). These coffee farms provide habitats for a rich diversity of plant, animal, arthropod, and microbial species and are similar in many respects to primary tropical forests, making them vitally important systems in a region that has seen extensive deforestation. Agrochemicals are rarely used, if ever, and these farming ecosystems typically produce harvests of various crops of medicinal, food, and financial value alongside their coffee harvests. Producing coffee in this way is almost the exclusive domain of small-scale farmers and indigenous communities, with larger operations pursuing the monocultures that provide them with a higher return for their investment.

While forested coffee farms have been losing ground to their chemically intensive counterparts, extreme volatility in the coffee market since its deregulation in 1989 has introduced a new set of problems and opportunities regarding the relationship between coffee ecosystems and economics. On what has largely been blamed on a massive oversupply of coffee, the international prices for coffee were so low between 2000 and 2004 that the period was referred to by industry, governments and development agencies as the "Coffee Crisis". Prices dropped well below most farmers' costs of production, which led to widespread farm foreclosure, worker displacement, homelessness, disease, and death. While it had been documented that modernized coffee farms flourished during periods of high stable prices, it was not clear from the literature

[1] It is recognized that the term "fair trade" is applied to a range of different coffees to denote some "social benefit" associated with these products. However, this study focuses only on coffee that is certified Fair Trade by the Fairtrade Labelling Organizations (FLO) International. This in no way is meant to indict or confirm the "fairness" of non-certified Fair Trade coffees. Moreover, the term is capitalized in keeping with both academic and popular literature.

whether highly productive monocultures or small coffee forests would be more threatened during periods of sustained low prices.

1.2 Cooperatives and the Fair Trade and Organic Alternatives

Neither fair trade nor organic coffees were created specifically to preserve the forested agroecosystems managed by small-scale producers in Latin America. And yet, these benefits have allowed Fair Trade and organic marketers to represent their coffee as a means through which coffee consumers can indulge their habit in an environmentally and socially responsible manner. In exchange for higher prices than are otherwise available, these markets require producers to meet a set of standards designed to achieve particular objectives. The organic market is primarily concerned with the manner in which coffee is produced, thus much of its certification criteria revolve around the coffee environment. Fair Trade certification also requires producers to meet various environmental criteria, although they are not as stringent as are those associated with organic certification. However, Fair Trade certification criteria are such that the market is only accessible to small-scale producers, who typically farm within forested ecosystems. Therefore, any shelter it provides from persistently low prices in other markets supports this type of coffee farm.

Although the Fair Trade and organic markets do indeed provide benefits to small-scale coffee farmers, what is not often apparent in the literature is that these farmers must belong to some form of producers' organization, generally a cooperative, if they are to access either market. This is a condition of certification in the Fair Trade coffee market, where only democratically run cooperatives of small-scale producers can be certified, rather than the producers themselves. With the organic market, belonging to a producer organization is a matter of necessity for small-scale producers, since certification is both expensive and requires considerable technical capacity in order to meet organic standards. Where farmers connect to the organic market through a cooperative, it is the cooperative rather than the producer that is certified. Thus, because they are responsible for implementing certification criteria, cooperatives are important intermediaries between the forested ecosystems their members manage and the Fair Trade and organic markets.

However, cooperatives do not exist to facilitate the Fair Trade and organic markets' access to small-scale producers and their ecosystems. Rather, they exist to further their members' interests, which may or may not include the pursuit of organic or Fair Trade certification. They are important social institutions that are the result of considerable effort, particularly on the part of their members, that provide benefits beyond those associated with organic and Fair Trade markets, including agricultural extension programs that influence how coffee agroecosystems are managed.

1.3 Purpose of this Study

Within the context of the devastatingly low prices of the Coffee Crisis, and the trend towards coffee farm modernization in Latin America, this study examines how the Fair Trade and organic markets encourage the production of coffee within forested ecosystems on small farms in Nicaragua.

Early in the course of developing this study, it was anticipated that participation in both the organic and Fair Trade markets would lead to the preservation and development of cooperatives, which would both improve the general welfare of small-scale coffee farmers and

promote resource management practices that result in a higher degree of ecological integrity than would otherwise exist. To this end, the following four research questions were asked:

1. To what extent do Fair Trade and organic price premiums enable farmers to continue producing coffee within forested ecosystems?
2. To what extent do the environmental standards associated with Fair Trade and organic certification affect farmers' land-use practices?
3. What is the significance of the cooperatives as intermediaries between ecosystem managers (farmers) and the Fair Trade and organic markets?
4. What is the significance of coffee cooperatives to their members and the ecosystems they manage?

1.3.1 Expected and Actual Outcomes

The above questions in part presupposed several expectations about the relationships between coffee markets, cooperatives, and coffee ecosystems.

First, it was assumed that persistently low prices in the conventional markets would drive small-scale farmers to abandon coffee production or lose their farms altogether. In the case of the former, farmers were expected to redirect their coffee plots towards subsistence production (principally beans and corn) or cattle pasture as an alternative income generator, since it was already known to be popular in the area. In the latter case, it was assumed that subsequent owners of a bankrupted coffee farm would not continue to produce coffee, and would likely convert the farm to pasture. Regardless of whether the farm was converted to pasture, bean, or cornfields, the forested coffee ecosystem would be lost. However risk of small-farm bankruptcy was found to be less severe than anticipated, as was farmers' willingness to substitute coffee with other crops in response to low prices.

Conversely, large coffee monocultures were believed to be better able to weather poor coffee prices because of their higher productivity and access to credit. They were also thought to be more efficient and better positioned to take advantage of government assistance (should it exist) than small-scale farmers. Given this, it was predicted that the modern methods of large coffee farms would proliferate once the prices for coffee in the conventional markets eventually rebounded. However, field interviews and subsequently obtained reports revealed that large farms were in fact more financially vulnerable to low prices, precisely *because* they had access to credit and little access to high value markets.

Second, it was expected that desirable agricultural practices would be found to have existed prior to organic or Fair Trade certification, but that these practices (and the forested ecosystems they created) would be in jeopardy if left to the conventional markets. Therefore, the primary role of the Fair Trade and organic markets in protecting forests would not be the enforcement of certification criteria, but rather the creation of opportunities for small-scale farmers to avoid bankruptcy. Desirable agricultural practices were found to predate Fair Trade and organic certification, however it appears that organic criteria continue to enhance these practices. As mentioned above, most small-scale farmers did not appear at risk of bankruptcy, however the higher prices found in the Fair Trade and organic markets did provide additional benefits and opportunities that were sometimes beneficial to coffee agroecosystems.

Third, the environmental standards associated with organic certification were expected to create noticeably more forested and diverse ecosystems by encouraging improvements in farmers' land-use activities. Conversely, Fair Trade environmental criteria were not expected to

noticeably affect coffee ecosystems. Organic certification criteria did not create noticeably more forested and diverse coffee farms, although interviews with farmers and agronomists suggested that they did affect farmers' land use behaviours to the betterment of the coffee ecosystem. As well, methodological limitations made comparisons between the organic and non-organic farms included in this study inappropriate.

Fourth, higher prices, cost sharing, and access to credit through cooperatives were also expected to preserve forested coffee farms by reducing the vulnerability of its members to the volatility of the conventional markets. As well, the networks of communication between farmers, certifiers, buyers, and non-governmental organizations (NGO) that were mediated through the cooperatives were expected to create significant value in terms of better market positioning, access to alternative markets, and informational resources. These networks were expected to be especially strong within the Fair Trade market. Fieldwork supported both the notion that cooperatives reduced the vulnerability of their members and their members' forested coffee farms, as did network opportunities that were available through them. These network opportunities appeared more common within the Fair Trade market.

Fifth, high prices in the Fair Trade and organic markets were expected to lead farmers to perpetually increase coffee production, which in the long-term would have two effects. The ratio between organic coffee supply and demand would increase to the point that there would no longer be a price premium for organic coffee. Since the Fair Trade market employs a floor price beneath which the price for coffee channelled through this market can never fall, the premium per pound of coffee could not be eliminated. However, it was expected that the ratio between coffee channelled through the Fair Trade market and total cooperative production would become so small that the value of that premium to farmers would become negligible. Fieldwork would later reveal that most small-scale farmers are not inclined to maximize coffee production in response to persistently high prices, and face significant limitations and disincentives with respect to increasing their production as well.

1.4 Chapter Outline

The above questions are examined within the following chapters. In particular, I rely on concepts borrowed from the social capital literature to provide insight into cooperatives' operations and the economic and social possibilities so realized. This was balanced by the value chain literature, which provided insights into the economic context in which cooperatives operate, markets are accessed, and products assume additional value.

Following the introduction above, Chapter Two details the methods used in this study, and locates and describes the field where the study took place (Pancasán and El Coyolár, Nicaragua).

Chapter Three provides a thorough account of the different coffee ecosystems that exist as explained by ecologists, among others, and as are evident in the study communities. This includes some investigation of the differing economic bases supporting the different ecosystems found on coffee farms. Overall, this chapter is intended to provide the reader with a sense of what is at stake when forested coffee farms are threatened, and a clear picture of the communities involved in this study.

The purpose of Chapter Four is to showcase the value of the cooperatives, which are seen as vital institutions for promoting farmer and ecosystem prosperity. The cooperatives are interpreted (as noted) using concepts from the social capital literature, which explain both what the cooperatives are and how they work.

Chapter Five discusses the international dimensions of the problem, including the nature of the Coffee Crisis and the influence of Fair Trade and organic criteria on forested coffee ecosystems. The global value chain literature is deployed in this chapter to better explain the relationships between coffee cooperatives and downstream actors than could be achieved by framing the discussion in terms of farmers accessing markets. These relationships are important for understanding both farmers' ability to capture a greater share of the value of their coffee, and the manner in which information flows between cooperatives and their international partners, including organic and Fair Trade certifiers.

Chapter Six concludes the study by drawing out the important concepts presented in the previous three chapters, and answering the research questions presented in this chapter.

Chapter Two - Study Context and Methodology

2.1 Context/Study Area

Fieldwork for this study was conducted in the Nicaraguan state of Matagalpa in early 2004, which is located in the central highlands of the Cordillera Isabella and is one of five coffee producing states in the country (see Figure 2.1). This region was selected because of the importance of coffee to its economy, its well-documented history of agricultural cooperatives, its experience with Fair Trade and organic coffee, and the author's previous experience there.

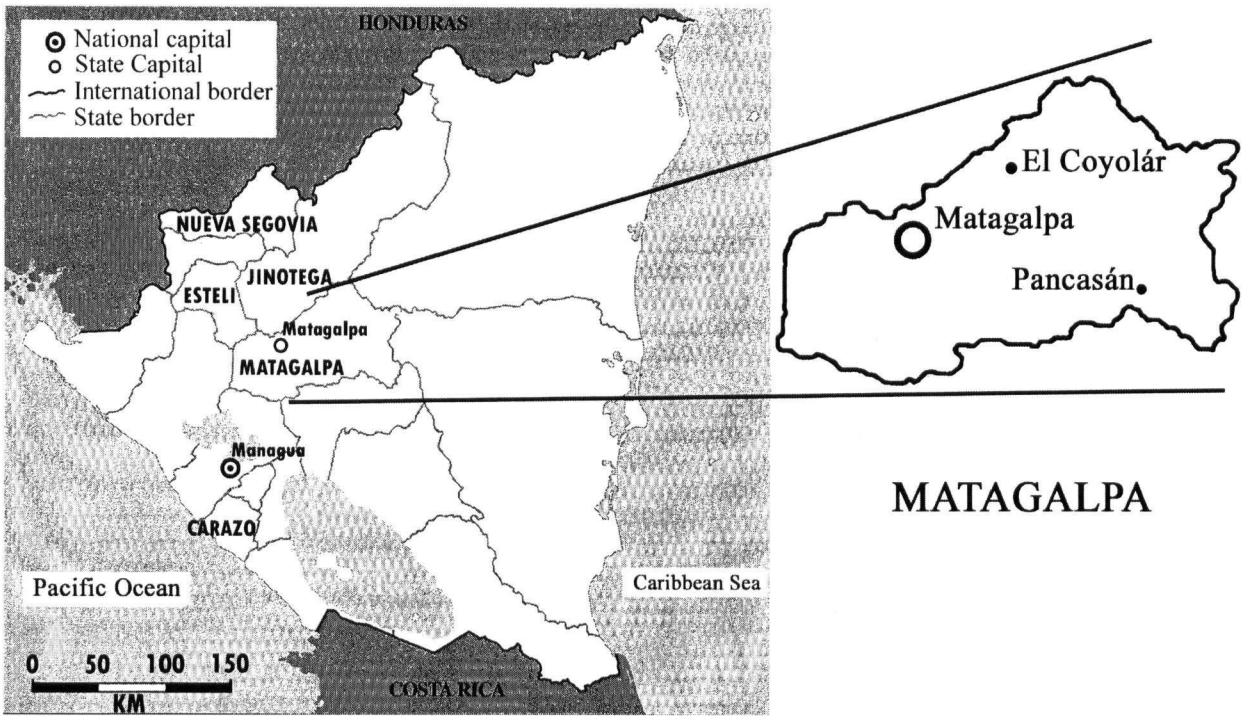

Figure 2.1: Study area and the five Nicaraguan coffee producing states. Pancasán and El Coyolár, Nicaragua

Source: Mordt 2002 (modified from the original)

Coffee has been particularly important to the history of Nicaragua, both because of its central importance to the economy and because it engages a substantial number of the population at every social strata, from landless labourers and poor peasants to rich and powerful agribusiness. Coffee is the country's second most important cash crop, and accounted for seven percent of its national income in 2001 (Gresser and Tickell 2002). As well, Matagalpa was known to have been hit very hard by the Coffee Crisis (Bacon 2005; Monsarrat 2002; WFP 2002). Because of this, the communities of Pancasán and El Coyolár were selected as the primary research sites for this study, with additional research conducted in the state capital, Matagalpa.

2.1.1 Pancasán

Pancasán is approximately 55km southeast of Matagalpa, and is located in the Tropical Humid Zone of the country. The farms included in this study ranged in altitude from 496 to 900 metres above sea level (masl), and were all owned by members of the Pancasán Association of Organic Coffee Producers (ACOPAN).[2] A base of operations was set up near the intersection of the main access road to and from Pancasán and a bisecting road that divides the community into quadrants. The furthest farms could be reached in ninety minutes by foot, or less time by bus if a farm was located on the main road.

Prior to the Revolution of 1979, Pancasán was divided among four large *haciendas*, on which many of the current members of ACOPAN once worked. Subsequent land redistribution and entitlement schemes throughout the 1980s granted these members their own farms, though most did not produce coffee until 1989. With the assistance of the Nicaraguan non-governmental Association for the Diversification and Development of Communal Agriculture (ADDAC)[3], ACOPAN received its organic coffee certification in 1997.

2.1.2 El Coyolár

El Coyolár is the location of La Esperanza, a coffee cooperative that has existed since 1991. The community is much larger and more populated than Pancasán, is approximately 45km northeast of Matagalpa, and sits between 600 and 1200masl. A base was set up in the home of the cooperative's president, who provided transportation to and from the farms visited in El Coyolár.

El Coyolár has a long history of small-scale agriculture, and coffee has been produced in the community for longer than farmers could remember. Members of La Esperanza often managed farms that had been in their families for generations, and none had ever worked on a hacienda. La Esperanza is also a founding member of the Organization of Northern Coffee Cooperatives (CECOCAFEN)[4], through which it has Fair Trade certification. At the time of fieldwork, approximately half of La Esperanza members also had organic certification or were in transition to obtain it.

2.2 Methodology

The original intent of this study was to select one "Fair Trade community" and one "organic community" in order to more easily distinguish between the influences of each market on the respective communities and ecosystems. Thus, ACOPAN was selected as the primary unit of study for the "organic case", and La Esperanza for the "Fair Trade case"

Having lived in Pancasán with an ACOPAN member for one month in 2001, the community, cooperative, and ADDAC were already familiar, and so, it was selected prior to fieldwork. Based on research conducted by Monsarrat (2002), La Esperanza was also identified as a possible research site prior to departure. However, final determination was not made until CECOCAFEN managers were consulted during the early stages of fieldwork. These managers concluded that La Esperanza was the best choice once they were informed that a cooperative without organic certification and with the same "distance" (number of intermediaries or

[2] *Asociación de Cafetaleras Orgánicas de Pancasán*
[3] *Asociación para la Diversificación y el Desarrollo Agricola Comunal*
[4] *Central de Cooperativas Cafetaleras del Norte*

cooperative levels) between farmers and international coffee buyers as Pancasán was sought. La Esperanza is what is known as an independent cooperative within the CECOCAFEN structure, meaning farmers belong to a primary cooperative (La Esperanza) that belongs to CECOCAFEN (secondary cooperative), which has direct relationships with international buyers (Monsarrat 2002). Similarly, farmers in Pancasán belong to ACOPAN, which is assisted in the marketing of its coffee by ADDAC. ADDAC has direct relationships with international buyers on ACOPAN's behalf, and provides many of the services (extension, credit, transportation, communications) that CECOCAFEN provides for La Esperanza.

Data was gathered primarily through a combination of participant observation and semi-structured interviews during a period of two weeks in each community. Twelve members of both ACOPAN (12) and La Esperanza (12) were interviewed individually for approximately one hour, according to an "interview script" that focused on topics related to farming history and future, dependence on coffee, relationship to cooperative (and CECOCAFEN or ADDAC), and their understanding of the organic or Fair Trade market (see Appendix A). Audio recordings of interviews were made, and post-interview notes were subsequently written in a field journal. A thirteenth farmer who did not belong to a cooperative was also interviewed in El Coyolár.

Guided tours of farms were conducted with each interviewee and, in some cases, other farmers or agronomists. Photographs were taken of important features, and data provided by farmers and agronomists were also recorded in a field journal. No scientific testing was conducted in the farming ecosystems, and comparisons between them were made according to impressions, photographic evidence, and data provided by farmers and agronomists.

Time between interviews and farm tours was spent casually observing and interacting/informally interviewing farmers and agronomists in both communities. As well, cooperative meetings were observed in both communities, and short presentations about the study were made in each.

During the two weeks prior and following interviews in the study communities, five expert interviews with CECOCAFEN (3) and ADDAC (2) managers were conducted in Matagalpa, as well as one (1) with a representative from an international development organization that works with both CECOCAFEN and ADDAC. These interviews were unstructured and lasted approximately two hours each. When they occurred after community interviews, trends and other data were brought into expert interviews in order to corroborate or identify discrepancies. Additional informal interviews were conducted with people associated with CECOCAFEN (notably an American roaster and two (American and French) coffee importers), as were consultations with an academic who had been working with the cooperative for more than a year. Copies of supporting documentation were also obtained in Matagalpa where possible.

Field notes were summarized daily, and interview recordings were reviewed upon return to Canada. Notes were taken on each interview and collated according to theme. They were subsequently combined with field notes in order to ground theory, and were eventually incorporated into chapters where it was appropriate.

2.2.1 Sampling in Pancasán and El Coyolár

Due to prior familiarity with the area, a relatively high degree of control over sampling was possible in Pancasán. Thus, it was not difficult to ensure representation from a diversity of members that varied according to relative wealth, involvement with ADDAC and ACOPAN, age and gender. Using cooperative documents and consultations with resident ADDAC agronomists, of the twelve (of thirty three) ACOPAN members interviewed:

- All three female members were included
- One of three internal organic inspectors was interviewed
- Five of six cooperative directors were interviewed
- Four of ten members who were also members of the local dairy cooperative were interviewed
- A member in organic transition was interviewed (newest member – 2 months)
- An even age range was possible (fifty-two years between oldest and youngest)
- People who joined ACOPAN at different times were interviewed
- An equal geographic distribution of members was possible
- Farm sizes ranged from largest coffee plot in cooperative and second largest farm to the smallest coffee plot and farm, with an even range in between

Much less control over sampling was possible in El Coyolár because both the area and the people were unfamiliar. With the latter, this was problematic because, unlike in Pancasán where members could be selected according to information contained in documents, the president of the cooperative provided names of possible interviewees. In the case of the former, the size of El Coyolár and the complexity of its road system required that the president (or his friends) provide transportation to and from interviews. Thus, sampling was potentially biased according to the president's preferences, and relationships with interviewees may have been affected through association with the president.

Sampling was further complicated by the revelation that much of the membership was involved with organic production. It became clear early on that the non-organic members I was initially directed to were actually in transition towards obtaining their organic certification. Unfortunately, correcting this meant that five members with less than three years in the cooperative were interviewed in order minimize the number of farmers who had already entered the cooperative's organic program. Predictably, these farmers could not provide much information about the cooperative or report much in the way of their history with it. Of the twelve (of sixty-two) La Esperanza members interviewed:

- Two were (certified organic) cooperative directors
- Two were in organic transition
- Eight were non-organic producers (five of these used some form of agrochemical)

While later interactions between the president and many interviewees that were observed would help allay fears that only the president's friends and allies were being interviewed, the inexperience of five members with the cooperative inhibited the diversity of data on cooperative interactions that might otherwise have been possible. As well, the relative newness of some members' coffee plots limited the extent to which "organic farms" could be compared with "Fair Trade farms".

The addition of techniques that would have provided comparable measures of farming ecosystems would have enhanced the data included in Chapter Three, and may have strengthened any conclusions on the effectiveness of Fair Trade and environmental criteria as well. However, because of limitations stemming from farm age, comparisons between farms would still face too many confounding factors even if these methods had been adopted. Consequently, repeated visits to farms over a period of more than a year would have been preferable, in order to track differences in farm development. Longer and more frequent

exposure to farmers would have also enhanced social capital data, however this was not possible due to financial and programmatic constraints.

Nevertheless, it was entirely appropriate for this study to primarily rely on interviews since it is more concerned with the perceptions, reasoning, and behaviours of small-scale producers, than comparisons between organic and Fair Trade coffee ecosystems. The adoption of semi-structured interviews and participant observation techniques was particularly appropriate given the exploratory nature of the study.

Chapter Three - Coffee Ecosystems and their Economic Roots

A coffee farm is a curious thing. Depending on which farm you look at, the ideas and images of agriculture that many of us have might seem absolutely correct or completely false. For instance, how often have we heard of countless hectares of tropical forests being lost to poor farmers trying to eke out a living or large farming enterprises looking to make a profit? This combined with a look at any Canadian farm, small or large, could lead anyone to reasonably conclude that agriculture and forests are mutually exclusive. However, as the title of this thesis might suggest, such conclusions are false. Indeed, far from being mutually exclusive, some of the examples presented here will demonstrate that farms can actually *be* forests.

This chapter is devoted to the small-scale coffee farm. It will begin with an exploration of the diversity of coffee farms documented in the academic literature, which ranges from large monocultures to small forests. Thereafter, I consider data collected from the farms included in this study. The focus across types of farms compares how coffee agroecosystems differ in terms of biodiversity, soil and water dynamics, agrochemical use, and organic production. Following this, the economics of small coffee farms is discussed to provide a better understanding of why the ecosystems of small and large farms are so fundamentally different.

The purpose of this chapter is twofold: First, to provide the reader with a sense of the environmental differences between modern monocultures, which are the exclusive domain of large farms in northern Latin America, and forested polycultures, which are the domain of small-scale farms and indigenous communities. Second, it provides the reader with a better sense of the farming ecosystems that are managed by members of ACOPAN and La Esperanza.

3.1 Understanding Coffee Ecosystems

Coffee is produced under a wide range of conditions that vary according to the country of production, size of the farm, and availability of capital and credit. On the one hand, you can find coffee farms that are very similar to farms that you might see in Canada; a few hundred to several thousand hectares of nothing but tightly-packed waist-high to six-foot trees planted in neat rows, tended by workers on foot and tractor, applying a range of fertilizers to encourage production and herbicides, insecticides, and fungicides to combat pests.

On the other hand, you can find coffee farms that are virtually indistinguishable from tropical forests or, in some cases, may actually be tropical forests that have stood for centuries. These farms are usually only a few hectares, managed by hand using family labour, and using almost no synthetic fertilizers or pesticides. Far from the homogeneity of their more modern counterparts, these farms can house dozens of different tree species that provide habitats for countless species of birds, mammals, and invertebrates. Indeed, these systems have been described as providing, "nearly all the same environmental benefits as primary rainforests – biodiversity support, habitat for medicinal plants, carbon storage, and watershed protection" (Fleischer et al. 2002: 3; Bray et al. 2002; Rice and Ward 1996). In addition to providing a coffee harvest, these farms also often provide harvests of fruits, vegetables, grains, root crops, herbs, honey, and may contain various farm animals as well. The environmental significance of these coffee forests is profound especially in regions that suffer or have suffered from high levels of deforestation, including the Pacific slope of the Central American cordillera where the study area for this thesis is located (Perfecto et al. 1996; Rice and Ward 1996). Indeed, following Perfecto's work:

> "the importance of shade coffee as a refuge for biodiversity may not be in the total land it involves, but in its location in areas that have been particularly hard hit by deforestation.... In areas where deforestation is high and coffee is still produced on traditional shade plantations, these plantations are likely to be a critical refuge for forest biota. In fact, coffee plantations may already have served as a critical refuge during a human-caused habitat bottleneck." (Perfecto et al. 1996: 600)

In some cases, the total area covered by these forested (or shaded) coffee farms can actually exceed the total area of remaining primary forest. This is evidenced by El Salvador, where nine percent of total land area is shaded coffee farm versus the one percent that is primary forest (Fleischer et al. 2002). In other cases, forested farms can provide the genetic material necessary to allow forests to return. This is the case in Puerto Rico where, after ninety-nine percent of the country's original forests had been lost by the turn of the nineteenth century, new forests have expanded from abandoned coffee estates (Perfecto et al. 1996). That, "thirteen of the world's 25 biodiversity hotspots are found in coffee growing areas" only adds to the environmental importance of these agroecosystems (Fleischer et al. 2002: 3; Moguel and Toledo 1999).

Despite the environmental advantages of shaded coffee production, economic considerations have led to the rapid conversion of these farms to the coffee monocultures that were described earlier. Although more productive coffee trees that thrive under the full light of the sun were developed in the 1950s, it was not until the 1970s that conversion to this form of production really got under way.

> "Modernization was initially seen as a way of combating fungal diseases, particularly coffee leaf rust (*Hemileia vastarix*). The role that coffee rust played in plantation modernization is significant, because the disease ranks as the most feared obstacle to production in most coffee-producing areas. Early on, coffee leaf rust provided the hook on which the entire modernization process hung its hat." (Perfecto et al. 1996: 599; see also Rice and Ward 1996)

Once the threat posed by leaf rust in the Americas turned out to be less dire than anticipated, the high production capabilities of coffee monocultures, which can produce coffee harvests many times greater than forested farms, became the driving force towards full-sun conversion (Nestel 1995; Colburn 1986).

However, despite their advantages in coffee productivity, some have pointed out that the profitability of these farms is somewhat subsidized by the state or people near the site of production, who are left with polluted water systems, ill health due to chemical exposure, and eroded and exhausted soils (Perfecto et al. 1996). As well, the long-term productivity of these systems is questionable, since the structural and biological simplification of these farms leaves them more vulnerable to soil erosion and depletion, thereby undermining the productivity gains that may have been the logic for conversion in the first place (Fleischer et al. 2002; Perfecto et al. 1996). This corresponds with information provided by ADDAC's lead coffee agronomist in Pancasán, who reported that coffee trees on a well-managed "full-sun" monoculture could produce well for eight to ten years before needing to be completely replaced, whereas trees on a properly managed coffee forest could produce well for up to forty years before needing to be replaced.

Regardless, while some countries embraced the new production methods more heartily than others,[5] it has been estimated that approximately half of the total area under coffee cultivation in northern Latin America was converted by 1990 (Perfecto et al.1996; Rice and Ward 1996; Romero-Alvarado et al. 2002).

3.1.1 Classifying Coffee Ecosystems

While broadly differentiating coffee ecosystems according to whether they are shaded or unshaded is useful shorthand, it does not adequately represent the diversity of coffee ecosystems that exist. Moguel and Toledo (1999) have identified five categories of coffee ecosystem (*rustic*, *traditional polyculture*, *commercial polyculture*, *shaded monoculture*, and *unshaded monoculture*) that are distinguished by their different levels of management intensity and structural complexity. Put another way, their classification system is organized according to the extent to which a coffee ecosystem resembles a tropical forest (or rather, how much of the pre-existing forest remains intact), which is inversely related to the extent management activities focus on the coffee trees themselves.

The rustic farm sits on one end of the coffee ecosystem continuum, and simply involves removing the lower strata of an otherwise intact tropical or temperate forest, planting coffee trees in its place. This approach entails minimal management and is marked by very low yields. According to Greenberg et al. (1997), the rustic coffee farm is very rare, except among indigenous farmers in parts of Chiapas, Mexico.

Traditional polyculture or "coffee gardens" is the next category on Moguel and Toledo's continuum, and it involves the introduction of more foreign, but useful, plant species to the forest to be managed alongside the coffee. Essentially farmers create and manage a sophisticated agroforestry system that blends the native species of the pre-existing forest with introduced species of commercial or subsistence value (coffee, bananas, mangos, etc.). Coffee gardens require greater modification of the original forest than do rustic farms, but Moguel and Toledo (1999) refer to both as "traditional" or "indigenous" coffee systems (see also, Colburn 1986: 49, 65-8).

Commercial polyculture entails the complete replacement of all pre-existing vegetation with coffee trees and other species of plants, some of which will be commercially or domestically valuable while others are included to provide shade or additional services to the coffee crop. Commercial polycultures can be complex systems containing a large diversity of plants, animals, and invertebrates, or they can be simpler systems of just a few species of shade, fruit, and coffee trees.[6]

Shaded monoculture has none of the diversity of the previous categories, and is characterized by rows of coffee trees shaded by a single species of tree (likely leguminous) and no other vegetation. The purpose of the shade tree is to slow the rate of photosynthesis of the coffee tree and, more importantly, take advantage of the soil building and retention qualities of the shade and coffee trees' root systems.

Moguel and Toledo's (1999) final category of unshaded monoculture or "sun coffee" describes densely packed coffee trees in neat rows that are fully exposed to the sun. Production is normally chemically intensive, at least partially mechanized, requires year-round labour, and

[5] According to Fleischer et al. (2002), 17% of the Mexican, 40% of the Costa Rican, and 69% of the Columbian land under coffee cultivation has been converted to full-sun monocultures.

[6] These shade trees are typically leguminous, which means they contain nitrogen-fixing bacteria in their root systems. Nitrogen is often a limiting nutrient in soils, so the interaction between the soils and these bacteria are beneficial to production.

produces very high yields. Whereas the first three coffee ecosystems are typical of small-scale producers, the latter two are characteristic of larger farms *that exist solely for the production of coffee.* Moguel and Toledo (1999) refer to both unshaded and shaded monocultures as modern coffee farms. (See Appendix B for photos of different coffee ecosystems, particularly commercial polyculture, shaded monoculture, and unshaded monoculture).

3.2 Coffee Farming as a Means of Reforestation

As mentioned previously, the above classification scheme conceptualizes the different coffee ecosystems according to the extent to which a pre-existing forest is modified or replaced with a coffee farm, with ecosystems near the beginning of the continuum being favoured for their environmental characteristics over ecosystems towards the end (Moguel and Toledo 1999; see also: Perfecto et al. 1996, Romero-Alvarado et al. 2002; Schroth et al. 2001). As well, the authors make a point to distinguish the forests found in commercial polycultures from those found on rustic farms or traditional polycultures.

> "The commercial polyculture system is a less diversified design, directed mainly to the production of cash crops under a multispecific canopy of introduced trees. Thus, although the two traditional systems are both agroforests where coffee and other cultivars are introduced to native forests, commercial polycultures are "artificial forests" created through the complete manipulation of the arboreal species." (Moguel and Toledo 1999: 13)

However, while rustic and traditional polyculture systems may possess greater species diversity than commercial polycultures, rustic systems are rare and both are only possible where coffee plantations have been introduced into pre-existing tropical forests (Greenberg et al. 1997).

Fieldwork in both Pancasán and El Coyolár revealed another phenomenon. Rather than being the cause of relative degrees of deforestation, coffee farms in both communities were being used as methods of reforestation in areas that had been largely pastureland or basic grain plots for decades. Because no remnants of primary forests remained in the vast majority of these farms, their coffee plots can only be classified as commercial polycultures, regardless of the levels of biodiversity or structural complexity they exhibit.[7] However, these ecosystems were often extraordinarily complex and, at least in Pancasán, coffee agroforestry was being used expressly for the purpose of reclaiming degraded land, as it has been used in Mexico and elsewhere (Bray et al. 2002; Young 1997).

According to interviews with farmers, every farm that now belongs to an ACOPAN member is on land that once belonged to one of four haciendas. These haciendas were primarily large cattle farms that were either left fallow or converted to basic grain production (beans and corn) following the Revolution. Farmers and ADDAC technicians alike revealed that the area was almost completely devoid of forest, except on the mountains, due to the clearing of the land for these cattle pastures and, later, by peasants collecting fuel and construction materials.[8] As is

[7] At least one farmer in Pancasán had a small rustic plot in a pre-existing forest, and several farms in El Coyolár were observed to have varying degrees of original forest that could be classified as traditional polyculture. In some cases these latter farms had original forest in only part of their coffee plots.

[8] When land was eventually parcelled out to farmers, several ACOPAN members received several *manzanas* (0.7Ha) of primary forest. With the exception of one farmer who created a small rustic plot in some of his forest, farmers have left these areas untouched by agriculture. Forest/total farm ratios were: 10/26mz, 15/30mz, 15/28mz, and 3/17mz. One farmer received 25mz of nothing but forest, though he later purchased 9mz of land to farm.

discussed more fully in the next chapter, ADDAC came to Pancasán in 1989 to begin work on restoring the Humid Tropical Zone of Matagalpa, using coffee as the primary driver of their reforestation programme (despite most of the farmers and farm land having no prior experience with the crop).

No La Esperanza members had ever worked on a hacienda, nor had any of their farms ever been part of one. However, many of the farmers interviewed in El Coyolár reported that their farms had either been small pastures or basic grains farms that were completely devoid of trees when they purchased them. Even where farmers did not initially begin cultivating coffee, several reported planting trees for a variety of reasons (see Table 3.1). Once they started or expanded their coffee plots, their reforestation efforts increased. These responses were consistent with those given by members of ACOPAN.

Table 3.1: Farmer responses to questions on the value of forests on farms

Reasons for Not Cutting Forests (pre-existing or around watersheds)	Reasons for Reforesting Farms (excluding coffee production)
• To protect the quality and quantity of water for them and others (most commonly cited reason) • Against the law to cut • Cutting is forbidden by cooperative and organic certifier • Better for the environment • Fresher air • Nice place to be when it is hot	• To increase the availability of water (most commonly cited reason) • To have fuel and construction materials • Makes the farm climate more comfortable

3.3 Biodiversity

Regardless of whether a shaded coffee farm was introduced into a pre-existing forest or said farm is the driving force behind the creation of a new forest, the advantages of forested polycultures over coffee monocultures, in terms of biodiversity, are well documented. The vegetative layers that exist on these forested polycultures, from the upper-canopy to below the ground, create a high degree of structural complexity that provides habitats for enormous species diversity (particularly of birds, mammals, and invertebrates) not found on coffee monocultures (Moguel and Toledo 1999; Nestel 1995; Perfecto et al 1996; Rice and Ward 1996).

For instance, studies of forested coffee farms in Mexico have found up to fifty-eight different species of shade tree (range: 13-58), with average heights ranging from 15m on commercial polycultures to 20-30m on traditional polycultures (Moguel and Toledo 1999). Shade tree densities in coffee farms vary, but agronomists in Pancasán reported that ACOPAN members averaged 200 shade trees/mz (though 125 is ideal for coffee production). These shade trees, which included several different flowering and fruit trees, created different canopy levels that, when combined with associated vegetation, provided habitats for countless observed birds, insects, rodents, and the occasional snake.

The farms visited in Pancasán were, on average, much more lush and teeming with life than those visited in El Coyolár. It was initially assumed that this resulted from greater tree density in Pancasán since there seemed to be less shade on La Esperanza farms. However, subsequent interviews and photographic evidence revealed that shade tree density in the two areas were comparable, though shade tree diversity and canopy density were not.[9] Soils were drier and the microclimate was warmer on most La Esperanza farms, which seemed to result from thinner canopies, and biological diversity on the farms appeared inhibited when compared with farms in Pancasán (for more on the importance of shade canopies on coffee farms, see Perfecto et al.1996; Romero-Alvarado et al. 2002; and Soto-Pinto et al. 2000)

3.3.1 Birds

As previously mentioned, shaded coffee farms are frequently cited as important sanctuaries for migratory and domestic bird species (Moguel and Toledo 1999; Rice and Ward 1996; Perfecto et al. 1996). Beyond the nesting opportunities provided by the its different canopy layers, a coffee polyculture also offers a range of food options, such as fruits (including coffee cherries), nectars, and insects, that are attractive to birds (Greenberg et al. 1997; Halweil 2002; Moguel and Toledo 1999; Rice and Ward 1996).

In terms of the differences in bird diversity among different coffee agroecosystems, studies of Mexican farms provide ranges of 82-184 species in traditional farms, 104-107 species in commercial polycultures, 50 species in shaded monocultures, and 6-12 species in unshaded monocultures (Moguel and Toledo 1999). Indeed, according to Perfecto et al.,

> "even the most cursory observation in sun plantations shows them to be almost devoid of birds.... In part, birds respond to the same loss of food resources, structural complexity, and microclimate buffering that is responsible for changes in arthropod assemblages." (1996: 604)

Variations in bird diversity appear to relate to a farm's proximity to tropical forests, with those closest to forests having the most diverse bird populations (Fleischer et al. 2002; Moguel and Toledo 1999). However, paradoxically, diversity of bird species on shaded coffee farms often exceeds levels found in nearby forests. For instance, the same studies on Mexican farms found average avian diversity in nearby cloud forests ranging from 100-110 species, 50-80 species in humid oak-pine, 60 species in oak forests, and 50 species in pine forests (Moguel and Toledo 1999; Rice and Ward 1996). The reason shaded coffee farms may contain greater bird diversity is that they contain habitats that are suitable for both forest-dwelling birds and birds preferring more open agricultural environments (Greenberg et al. 1997; Perfecto et al. 1996). Moreover, beyond providing suitable habitats for migratory bird species, forested coffee farms also act as important dry-season refuges for local bird species (Greenberg et al. 1997; Moguel and Toledo 1999). Conversely, the transformation of shaded coffee farms to unshaded farms over the last several decades has been blamed for a correlating decline in migratory bird populations (Greenberg et al. 1997; Rice and Ward 1996)

[9] It is also possible that the species of trees in El Coyolár provide shade that is more seasonal than those in Pancasán, or that the canopies in Pancasán were "in-season" when the farms there were visited whereas the canopies in El Coyolár were not.

3.3.2 Mammals and Other Animals

Forested coffee farms can also provide habitats for various species of animals, particularly small mammals. Although population density and species diversity vary greatly among different farms, studies based in northern Latin America have discovered considerable diversity in small terrestrial and scansorial mammal populations in some coffee polycultures (Moguel and Toledo 1999; Perfecto et al 1996). Squirrels were reportedly a major pest for the cacao crop in ACOPAN, as was evidenced by numerous half-eaten cacao fruits laying about the ground. Bats, small cats, otters, and howler monkeys have also been found on shaded coffee farms in northern Latin America, although howler-monkeys and a cat's den were only observed on the one rustic coffee plot included in this study (Perfecto et al 1996).

In addition to mammal populations, a study based in Guatemala found, "that mixed-shade plantations can support up to 50% of the original snake fauna [of primary tropical forests]" (Perfecto et al 1996: 603). A half dozen medium and large snakes were observed in and around shaded coffee farms in Pancasán and El Coyolár.

Interviews with ACOPAN farmers revealed that the cooperative forbade the killing of (non-farm) animals, including squirrels. Follow-up interviews with ADDAC staff confirmed that this was the case and that it was also a condition of organic certification, citing environmental protection as the motivation behind the regulation, even if it was sometimes detrimental to production. Interviews with La Esperanza farmers revealed that a similar prohibition was in effect there, but it could not be ascertained whether it was only forbidden for organic producers or all cooperative members. One farmer said it was a national law, but this could not be confirmed nor could it be determined if that law would apply to farm pests.

Regardless, these animals may provide services to the farms that help justify their protection. According to Moguel and Toledo (1999), 50% of mammals recorded on Mexican coffee polycultures eat fruits, which suggests they are important seed dispersers on and around the farms. As well, these mammals may be important pest controllers as 46% were insectivorous and 25% had small rodents as important components of their diets (Moguel and Toledo 1999).

3.3.3 Arthropods

Forested coffee farms also contain enormous populations and diversity of invertebrates that simply do not exist on sun plantations. Two studies, one of Mexican coffee gardens and the other of Costa Rican plantations, found that arthropod communities in these coffee systems closely resembled communities found in nearby undisturbed forests (Moguel and Toledo 1999; Perfecto et al. 1996; Rice and Ward 1996). Other studies based in Indonesia and Puerto Rico found even greater diversity in arthropod populations (ants in the case of the Puerto Rico study) than primary forests (Perfect et al. 1996). Three bee stings, six ticks, and dozens of ant bites confirmed that arthropod populations also exist on coffee farms in Pancasán and El Coyolár. In addition to at least four distinct species of ants, populations of wasps, hornets, and several different spiders were also observed on these farms.

3.4 Soils and water

Biodiversity aside, keeping a coffee farm forested and diverse is also important for ensuring water quality and availability, as well as conserving, building, and maintaining the fertility of soils (Soto-Pinto et al. 2000, Young 1997).

For instance, the presence or absence of a shade canopy on coffee farms greatly affects soil temperature and humidity, with temperatures of soils in unshaded coffee systems approaching 75° C versus soils in shaded coffee farms, which rarely exceed 30° C (Nestel 1995; Perfecto et al. 1996). According to Nestel, "the extreme soil temperatures in unshaded coffee have been linked to a depletion of soil micro-organism abundance and diversity, and with a low soil water content" (due to greater evaporation and evapotranspiration) (1995: 174). This both reduces the nutrient content in the soils and the available water supply for the coffee trees, making the use of external inputs (fertilizers and irrigation) necessary to sustain coffee yields on unshaded farms (Fleischer et al. 2002).

As previously mentioned, water quality and availability were the most commonly cited reasons by farmers when asked why they would not cut primary forests (Pancasán) or why they initially planted trees on their newly-acquired farms (Pancasán and El Coyolár). For example, one member of ACOPAN said that when she and her husband first bought their farm there were no trees and the creek that runs through it ran dry during the dry season. Now it is quite forested around the creek and she reported that it carried water throughout the year.

With respect to soils, the introduction of nitrogen-fixing leguminous trees into agroecosystems has been shown to increase soil fertility and improve crops, particularly in nitrogen-depleted areas (including former pastures) (Schroth et al. 2001). In addition to the contribution of nitrogen from the root systems of legumes, the decomposition of tonnes of annual leaf litter from these trees and non-leguminous species contribute considerable amounts of nitrogen and other nutrients to the system as well (Nestel 1995; Perfecto et al. 1996; Schroth et al. 2001). Moreover, the complex root systems of many forested polycultures better protects against soil erosion than do the simpler systems found on coffee monocultures (Nestel 1995; Rice and Ward 1996).

Beyond reducing soil erosion, these dense and complex root systems also inhibit nutrient leaching to some degree. However, "more important may be the fact that, at any given time, at least some of the plants in the system should be actively growing and taking up nutrients, thereby reducing the nutrient concentration in the soil solution, and should have a transpiring canopy, thereby reducing water percolation" (Schroth et al. 2001: 94-5). The thick canopy present on many coffee polycultures also provides protection to the soils against storms and enhances carbon sequestration (Fleischer et al. 2002; Halweil 2002; Nestel 1995). This would be more difficult to achieve in a coffee monoculture.

The importance of high-quality soils to coffee ecosystems was made obvious by the variable growth rate found on different farms. Two-year old coffee plants on one soil-poor ACOPAN farm were only ten to twelve inches tall, whereas three-year old coffee trees of between seven and eight feet were observed on another farm only days earlier. These latter trees were being grown on soils that had been managed under ADDAC's tutelage since 1989, which the farmer reported were now his best and that he expected the soils on the rest of his farm to be as productive within a few years. Both farms were located on former pastures that had suffered considerable soil depletion and compaction. The farm with the 10-inch coffee trees had not been involved with ADDAC programs as extensively or for as long as the more productive farm had been. That soils in the area were poor but improving under ADDAC's instruction was confirmed by most of the farmers interviewed and the ADDAC technicians themselves. No one reported that soils had been rich prior to ADDAC's involvement, or that the soils were worse now than they had been before.

With respect to conservation efforts, most farms in Pancasán and many in El Coyolár kept soils covered with leaf litter or compost in order to fertilize and protect topsoil from erosion. Other efforts to conserve soil that were observed in farms included the creation of small terraces and planting along the natural contours of hillsides.

3.5 Chemical use

That coffee monocultures, particularly unshaded farms, suffer productivity losses relatively quickly when compared with forested polycultures is due to the toll such concentrated production takes on the soils (Fleischer et al. 2002). While the removal of harvestable products from any agroecosystem represents a loss of energy and nutrients, the composition of shaded coffee farms, particularly the presence of leguminous trees and considerable leaf litter, makes external energy inputs (chemical or organic fertilizers) less necessary than on larger farms (Nestel 1995). Specifically,

> "Shaded coffee systems possess intrinsic mechanisms for the recycling of nutrients, reducing the dependency of the system on an external supply of nutrients. In addition, the humus layer is enhanced in shaded systems, resulting in greater diversity and abundance of detritivorous fauna. [As well], the extensive root system of shade trees stabilizes soil particles, reducing soil erosion during torrential rains." (Nestel 1995: 176)

Thus, not only does the more concentrated production of coffee monocultures make greater demands on the soil, it does so within an ecosystem that lacks the nutrient cycling and soil building mechanisms present in forested polycultures. Worse, greater aridity, simpler root systems, and little to no canopy leave the soils that do exist more vulnerable to erosion, and thus, more dependent on chemical fertilizers (Fleischer et al. 2002; Nestel 1995; Perfecto et al. 1996; Rice and Ward 1996). However, the productivity gains that can be made using chemical fertilizers are considerable. One La Esperanza member, who had the most experience with agrochemicals of anyone interviewed, reported that when he worked on his uncle's farm they could produce 71.4 quintales/mz pergamino using three applications of chemical fertilizer.[10] This was more than twice the productivity of the most productive non-chemical farm included in this study, and nearly seven times the average (see Appendix D).

Beyond soil fertility problems, unshaded monocultures are also more vulnerable to weeds than are there shaded counterparts. According to Romero-Alvarado et al. (2002), the thick layer of leaf litter present on most shaded polycultures inhibits weed growth. Those weeds that do develop tend to be broad-leafed plants that are easier to cut by hand than weeds that would develop without such a layer. As well, the canopies created by shade trees tend to inhibit the herbaceous stratum on coffee farms by limiting photosynthesis, which limits the competition of weeds for nutrients and thus the need for chemical herbicides (Nestel 1995; Perfecto et al. 1996). Using herbicides can also have unintended consequences. According to the same La Esperanza member mentioned above, despite frequently using a host of agrochemicals on his farm, he chose not to use herbicides the year he was interviewed because lack of rain had caused his soils to be much drier than usual. He said that he wanted to let the small weeds and grasses around his coffee trees grow in an effort to retain moisture in the soil.

Insect and fungal pests are the final concerns that motivate the use of agrochemicals on coffee farms and, as mentioned earlier, the arrival in Latin America of a much-feared fungus was the early driver of coffee modernization there. However, the effectiveness of the simplified ecosystem at fighting pests has been challenged. Indeed, while the drier climate may help stave coffee leaf rust infections, "insect-pest outbreaks and large fluctuations of insect-pest populations are correlated with the reduction of plant and structural diversity in agroecosystems"

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[10] 1 quintal (qq)= 46kg. Pergamino is the furthest state to which coffee could be processed on the farms included in this study. See Chapter Five for more details.

(Moguel and Toledo 1999: 15; see also Nestel 1995). The reason monocultures are more vulnerable to insect infestations relates to their lack of biodiversity.

Within the diverse invertebrate, bird, and microorganism populations on shaded polycultures are hosts of natural parasites and predators of insect pests that could not survive in the simpler and more toxic monoculture ecosystems (Halweil 2002; Nestel 1995). For instance, the previously cited study of arthropod communities in a Mexican coffee garden described earlier revealed that, while 25% of the species and 37% of the individual arthropods found on the farm were potential pests for coffee and other crops, the farm experienced no problems with insect pests. Moguel and Toledo (1999) attribute this to the high proportion of natural predators and parasites on the farm, especially ants and web-building spiders, which represented 42% of the species and 25% of the individuals. Due to the high occurrence of natural predators and parasites of insect pests on shaded polycultures, the need for synthetic pesticides on these farms is therefore less than on coffee monocultures (Fleischer et al. 2002; Perfecto et al. 1996).

Despite their greater vulnerability to insect pests, coffee modernization has been somewhat successful in combating some fungi, notably coffee leaf rust. However, with sufficient knowledge and effort, shaded coffee farms can successfully combat the pest without the use of agrochemicals. According to ADDAC's main coffee agronomist in Pancasán, there are four key variables that affect the severity of coffee leaf rust in a farm: management efforts, shade and humidity, size of harvest, and age of the coffee plant. Proper management involves measures taken to make the leaves of the coffee tree inhospitable for the leaf rust, which could involve the use of synthetic fungicides or, as preferred in both communities, organic treatments. Shade is important because coffee leaf rust thrives in damp and warm environments, which can be affected by adjusting the canopy shading the coffee trees. Harvest size is important because high levels of production leave coffee trees with fewer resources to fight off infection. Lastly, older coffee trees are more susceptible to coffee leaf rust, and thus frequent renewal of coffee trees (every 6-8 years) is important for combating the fungus.

Evidence that these variables were indeed related to the severity of a coffee leaf rust invasion was provided by one farm in Pancasán that had the worst case of leaf rust of all farms visited. This farm had very little shade compared with the farms of most other ACOPAN members, and the coffee trees ranged in age from 15-23 years. As well, the farmer was quite old and his farm suffered from poor soils, which meant effective management was more difficult for him and soil nutrients for staving off infection were less available.

3.6 Organics

Various aspects of organic production are discussed in the next two chapters, but the focus of the discussion here is the extent to which it affects the farming ecosystem. Because unshaded monocultures do not meet the conditions for certification and small-scale farms are never shaded monocultures, this section is restricted to comparison between the organic and non-organic farms included in this study. According to Bray et al.,

> "the environmental benefits [of organic production] include the elimination of agrochemicals that enter organisms and watersheds, use of locally available materials for fertilizers eliminating pollution from manufacture and transportation of chemical fertilizers, installation of small-scale terraces and other structures to enhance the formation and conservation of soil, and accelerated changes in the richness of soil organic matter." (2002: 439)

Thus, it was anticipated that organic farms would, in general, possess an obviously higher degree of structural complexity and biodiversity than non-organic farms. However, this was not the case. Tree and canopy density, farm microclimate, observable bird and invertebrate populations, and level of vegetation did not correlate with possession of organic certification or lack thereof. Farms in Pancasán, all of which were organic, did generally appear more lush and diverse than farms in El Coyolár. However, variability was greatest within the communities rather than between them, and may be due to climatic differences between the two communities, or the distinct trajectories of ADDAC and CECOCAFEN's extension programmes, which are discussed more thoroughly in the next chapter. Despite this, three La Esperanza farms were as forested and lush as the best examples in Pancasán, and none of these farms were organic.[11]

Although two of the twelve La Esperanza farms that were visited were organic and two were in transition towards becoming so, even comparisons between organic and non-organic farms in El Coyolár were difficult for three main reasons: First, many of the La Esperanza members who lacked organic certification were new to coffee farming. Thus, their coffee farms were much younger than the organic farms in the area, and differences between the two were more likely due to the amount of time each ecosystem had to develop.[12] Second, while five of the eight non-organic producers used chemicals on their farms, most made only small applications of fertilizer. Third, many of the soil building and conservation techniques that are characteristic of organic coffee farms were used on non-organic farms as well. Farmers had learned these techniques from either CECOCAFEN agronomists or other La Esperanza members.[13]

However, rather than profoundly affecting the coffee ecosystem, of more significance may be the adoption of organic techniques on other parts of the farm, such as corn and bean fields. As was also observed by Bray et al. (2002) in Mexico, organic production of coffee leads to organic production of all other crops on the farm. According to interviews with farmers and staff at ACOPAN, La Esperanza, ADDAC, and CECOCAFEN, certification of the coffee plot entails certification of the entire farm, meaning even areas not planted with coffee (like corn and bean fields, which are not forested ecosystems) must meet organic standards.[14] Although interviews revealed that ADDAC had been training ACOPAN members to farm organically since before certification was even available, the primary driver for organic production in La Esperanza (and CECOCAFEN) was the higher prices certified organic coffee received in the market. While organic farmers at La Esperanza acknowledged or touted the environmental, health, and production advantages of organic farming, it was the financial costs versus benefits related to coffee that every farmer interviewed said either led them to or kept them from organic certification. Thus, even if organic certification does not significantly affect the coffee ecosystems on ACOPAN and La Esperanza farms, certified organic coffee can be the driver for spreading organic production methods to other parts of the farm.[15]

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[11] No chemicals had been used on one farm, chemical fertilizers were being used on the second farm, and small amounts of chemical insecticides were being used on the third.

[12] This also confounded any attempt to compare organic ecosystems with "Fair Trade" ecosystems.

[13] Because of different ages of coffee farms, the most appropriate way to study the impact of organic agriculture is through longitudinal studies.

[14] There was some disagreement regarding how soon organic criteria would apply to areas not planted with coffee. An interview at CECOCAFEN reported that the coffee plots could be certified alone, and that there was at least a year "grace period" before other parts of the farm would be included. Other interviews suggested that the entire farm must be certified, meaning organic criteria would apply to all parts immediately.

[15] However, as discussed in Chapter 2, lack of rigorous scientific testing and limitations on sample sizes prevents any conclusion that organic production methods provide no benefits to coffee or other farming ecosystems.

As for the additional costs that come with organic production, farmers in both El Coyolar and Pancasán reported that smaller harvests and greater labour requirements were the two main impediments that kept farmers from organic production.[16] According to Fleischer et al., "a substantial yield decrease is normally observed in the first few years after transitioning from high chemical inputs", and this was corroborated by several La Esperanza farmers who claimed a 50% drop in production even when only small amounts of fertilizers had previously been applied (2002: 3). While agronomists and farmers in both communities did report a gradual restoration of production levels after the initial drop, contrary to Fleischer et al. (2002), they did not expect them to return to where they had been. Those farmers who had not used chemicals on their farms often experienced production increases once they developed a comprehensive organic management plan for their farm, as was also found in a study of traditional farms in Guatemala (Fleischer et al. 2002).

Some farmers claimed the cost of any loss in production they experienced was mitigated by the higher prices their coffee received in the organic market. However, they acknowledged that these prices could only be obtained with organic certification, which requires a three-year transition period despite immediate production losses.[17] Other farmers believed the higher price (per pound) for organic coffee either did not always or at all compensate for the loss of production and higher labour costs.[18] If these latter farmers produced organically, they cited volatility in the conventional markets, or environmental (especially soil) or health benefits as the final compensations that led to their conversion.

3.7 Farm Economics

Regardless of any loss of production ACOPAN and La Esperanza members experience through their conversion to organic production, as mentioned prior, their levels of coffee production are virtually incomparable to those of chemically intensive monocultures. However, small-scale farms have a completely different logic of production than do large monocultures, and their lower productivity in coffee should not lead one to conclude they are less efficient producers.

Much like a factory, large coffee farms are in the business of producing coffee; every hectare of land is devoted to its production, and production will eventually cease if it is no longer economic to continue. In other words, large monocultures *exist* to produce coffee. Conversely, coffee is only one source of income for small-scale farmers, though often the primary source. Their farms are both sites of production and the homes where they live, and they do not exist to produce coffee, rather coffee is a means for their subsistance.

However, coffee is not their only means of support. It has been well documented that an enormous range of products of both domestic and market value are grown in small-scale polycultures throughout Latin America that are not present in coffee monocultures (Bray et al. 2002; Fleischer et al. 2002; Moguel and Toledo 1999; Perfecto et al. 1996; Rice and Ward 1996; Schroth et al. 2001). Indeed, the inclusion of these products in coffee polycultures (and elsewhere on the farm) is responsible for much of the biodiversity and structural complexity that was discussed earlier in the chapter. Farms belonging to ACOPAN and La Esperanza farmers were no exception to this trend, as we can see in Table 3.2.

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[16] In the case of ACOPAN, where members must at least be in organic transition, this was the response when farmers were asked why more people did not join the cooperative. In El Coyolár, this was how farmers responded when asked why more people in the cooperative did not have organic certification.

[17] If no chemicals had been used on the farm for several years, the transition period is only two years.

[18] One ACOPAN farmer claimed that two days with an herbicide sprayer was equal to eight days of work with a machete.

Table 3.2: Crops and animals (food or service only) observed on study farms

Crops within coffee plot	Crops in other parts of farm	Animals
Bananas	*Achiote* (for condiment or dye)	Chickens (eggs and meat)
Cacao	Anise	Cows, dairy (milk only)
Canistel (glossy yellow fruit)	Beans, black	Ducks
Coffee	Beans, jack	Fish – aquaculture (*guapote dilapia, and sardines*)
Guavas	Beans, red	Geese
Lemons	Cabbage	Horses
Lemons, sweet	Cardamom	Pigs
Mandarin oranges	Cilantro	Turkeys
Mangoes	Cinnamon	Turtles – aquaculture
Oranges	Corn	
Papayas	*Malanga* (or dasheen; type of taro)	
Pejibaye (peach palm)	Pepper, black	
Plantains	Pepper, pimiento (similar to red bell)	
Wood, construction (e.g. cedar) and fuel	Pineapples	
	Quequisque (pink hairy tuber)	
	Sugar cane	
	Yuca (white starchy tuber)	

There are several reasons why small-scale farmers manage more than just coffee on their farms. Food security is an obvious advantage, and the ability to produce coffee under the canopies of several species of fruit, fuel, and construction trees provides an excellent opportunity to farm on several different strata. Thus, while monocultures produce much more coffee on a single hectare of land, production occurs within a single vegetative stratum. Conversely, forested polycultures produce harvests of several different crops by fully utilizing the vertical space that is available to them, simultaneously providing the benefits to coffee production, biodiversity, soils, and water that were described earlier.

The importance of intercropping is especially significant when a field is first planted with coffee, since the coffee trees will not bear fruit for two to three years. The crops planted next to the new coffee trees then, especially those that will produce a harvest within the first year, lessen the opportunity costs associated with starting a new coffee plot. If the trees are planted in a former pasture or fallow field, banana and plantain plants are especially valuable since they bear fruit quickly and provide some shade for the young coffee trees until the trees planted for that purpose sufficiently mature. Beans and other quick-harvest sun-crops may also be planted in the new coffee plot during this early period, though they will eventually be phased out as the trees and canopy develop, making the area unsuitable for them. Nevertheless, as was pointed out by an ADDAC agronomist, planting beans during the first few years of a new coffee plot is additionally beneficial to the soils because they are legumes.

However, one of the most important reasons for not committing themselves solely to coffee production is risk-management. Indeed,

> "for small farmers, committing oneself to total dependence on coffee puts one at great risk, not only with the vagaries of local weather and pest outbreaks, but with the often dramatic and unpredictable fluctuations of the global market." (Perfecto et al. 1996: 605)

Coffee market volatility is discussed in Chapter Five, however, the annual variability of coffee harvests alone can be so great that concentrating on coffee production is exceedingly risky. For instance, one La Esperanza member reported that harvests from his five-manzana coffee plot had been as high as 80 qq. pergamino, but in 2003-2004 he was only able to harvest 38 qq. (78 qq. the year before). However, despite a drop in production of more than fifty percent, he said he was not especially concerned about the variation since coffee was not his only source of income, nor was it his primary means of subsistence.

Beyond limiting risk by intercropping within their coffee plots, as Table 3.2 and 3.3 suggest, both ACOPAN and La Esperanza members tend to keep a portion of their farms as pasture or planted with crops other than coffee. As mentioned in the introduction to this thesis, one of the assumptions of this study was that these non-forested sections would expand at the expense of the forested polycultures (and their environmental benefits) whenever coffee prices failed to meet production costs for a sustained period. Of particular concern was that coffee plots would be predominantly replaced with pastures, since dairy cattle were already known to be the other most common source of income for farmers in the region.[19] This reasoning is supported by Nestel, who argues,

> "if the price of coffee does not fluctuate drastically, the household will slowly commercialize its enterprise and accept innovations, such as planting of high-yield varieties (HYV) and the removal of shade trees. If, in contrast, coffee production does not satisfy minimal consumption and reproduction requirements for the household, farmers may change crops and reduce the amount of energy and assets devoted to the production of coffee." (1995: 168)

While fieldwork supports the assertion that stable prices lead farmers to commercialize their coffee production and accept innovations (although innovations in this case meant organic production methods), the second assertion is only partially supported. Although market prices did appear to affect the extent to which farmers increased or decreased the size of their coffee plots, most did not seem willing to completely commit to coffee nor to completely abandon it, regardless of price. For example, interviews with all but one farmer (in El Coyolár) revealed a "coffee threshold" after which point farmers would not expand their coffee plots. It is not clear how farmers decided where their threshold was, and each farmer had a different threshold and rate at which they were trying to reach it. While two La Esperanza members apparently planted their entire farm with coffee (see Appendix D) (and a third who was interviewed revealed he would cover his entire farm with coffee trees, provided prices were high), every other farmer who was interviewed had either reached their threshold or was slowly working towards it.[20]

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[19] Despite earlier concerns of the spread of dairy cattle on small-scale farms, interviews with farmers and ADDAC agronomists suggested the incorporation of a small number of cattle into the farming ecosystem would actually be beneficial, since cattle could process much of the vegetative waste (like pulped coffee cherries) into organic fertilizers. As well, cattle pastures on small farms tended to have more trees on them than their larger counterparts. From an economic point of view, dairy provides a more stable year-round income that provides a good counter-balance to coffee's single harvest, and this was appealing to many farmers (most of the coffee farmers who were interviewed wanted cattle if they did not already have some). One farmer also pointed out that dairy cows have the additional advantage of having "two auctions"; milk could be sold under normal circumstance, and the cow could be sold when extra cash was needed.

[20] There was a greater propensity among La Esperanza members to plant coffee in a greater proportion of their farm than there was among ACOPAN members, and it is not clear why this is the case. Average in La Esperanza = 43.8%; ACOPAN = 23.4%. (Proportion by farm, not total area; see Appendix C)

Most farmers in both communities wanted to at least maintain enough basic grains production to satisfy domestic consumption needs, although one member of ACOPAN had completely replaced his bean fields with a coffee plot.[21] When asked whether they would ever replace their coffee plots (and shade trees) if coffee prices fell below their costs of production for a sustained period, every farmer said no, citing a lack of alternatives to coffee or non-coffee related value associated with maintaining their coffee plot (i.e. other harvestable crops, and reasons listed in Table 3.1).

Table 3.3 Farm and harvest data, ACOPAN and La Esperanza

ACOPAN (n=32)	Size of coffee plot (mz)	Size of farm (mz)	Coffee plot as % of total farm area	2001/02 Production (qq. perg)	2001/02 Productivity (qq. perg./mz)	2003/04 Production (qq. perg.)	2003/04 Productivity qq. perg/mz)
Total (group)	116.75	655.5	17.8%	1116.6	9.6	1304	11.17
Average (farm)	3.6	20.5	23.4%	34.9	10.3	*not available*	
Median	3	20	19.1%	30	10.0		
Smallest	0.25	1	3.3%	0.6	2.3		
Largest	15	60	72.7%	127	25.0		
Source: ACOPAN documents, 2003							
La Esperanza (n=38)*	Size of coffee plot (mz)	Size of farm (mz)	Coffee plot as % of total farm area	2002/03 Production (qq. perg.)	2002/03 Productivity (qq. perg./mz)	2003/04 Production (qq. perg.)	2003/04 Productivity (qq. perg./mz
Total (group)	206.5	584	35.4%	3146	15.2	2551	12.4
Average (farm)	5.4	15.4	43.8%	82.8	13.0	67.1	11.0
Median	4	10	40.0%	55	12.5	50	10
Smallest	1	2	12.0%	3	1.5	4	2
Largest	20	63	100.0%	380	38	350	35

Source: La Esperanza documents, 2004

3.8 Chapter Summary

That members of ACOPAN and La Esperanza are reluctant to plant their entire farms with coffee, let alone devote their coffee plots solely to its production, is indicative of the differing production logics behind small coffee polycultures and large coffee monocultures. Because coffee is means of survival for small farms rather than a reason to exist, it is only sensible that farmers diversify their production to include food and fuel crops that are necessary for domestic consumption, and diversify their income so they are not as vulnerable to market and climatic variations.

This interest in diversification, combined with the ability of the coffee tree to produce under a shaded canopy, create the conditions necessary for forested agroecosystems like commercial and traditional coffee polycultures. It is this convergence of coffee ecology and socioeconomic reality that is responsible for the high degree of biodiversity and structural complexity characteristic of coffee polycultures, as well as the benefits to soil and water they bring. Farmers maintain fruit bearing, construction, fuel, and shade trees, which provide habitats and food for enormous species diversity of birds, mammals, invertebrates, plants, fungi, mosses, and microorganisms. Soils are sheltered from violent storms and retained through complex root

[21] Although his brother's farm (which had a sizeable bean crop) was adjacent to his own.

systems. As well, these varied root systems, leaf-litter, and vegetative diversity ensure both constant nutrient cycling and absorption.

That this convergence is responsible for such ecological complexity is also precisely why large coffee farms, which exist solely to produce coffee, will never come close to replicating it. Efficiency in coffee production requires the removal of shade and use of chemical fertilizers to maximize production, and the concentration of coffee trees to fully utilize productive space. The resulting simplification of the farm's ecosystem leads to greater vulnerability to insect pests and weeds, as well as decreased soil fertility due to nutrient loss and erosion, all of which require additional applications of agrochemicals. Higher soil temperatures further reduce soil fertility, while simultaneously increasing aridity. Moreover, this aridity is exacerbated by the high concentration of coffee trees competing for water through identical root systems, which increases the need for irrigation. As the methods used to combat the problems that arise on large coffee farms tend to exacerbate the underlying cause (ecosystem simplification), the resulting acceleration of soil loss and infertility decreases the longevity of production by several decades.

This chapter should leave the reader with an understanding of the relative environmental and production advantages of the different coffee ecosystems, as well as the logic behind their existence. Armed with an understanding of the value of the forested polycultures of small-scale coffee producers, we are able to move from the farmer to the next level of the relationship between these ecosystems and the Fair Trade and organic markets, the producer cooperative.

Chapter Four: The Social Capital of Coffee Cooperatives

Were it not for producer associations and cooperatives, small-scale farmers would be unable to access the Fair Trade and organic markets.[22] These associations are then necessary intermediaries between ecosystem managers (farmers) and the Fair Trade and organic markets, and are the channel through which these markets influence how small-scale coffee ecosystems are managed. Certifiers enact regulations that are passed on to cooperatives, which in turn implement programs to ensure compliance among the membership. While farmers have the final word on how their land is managed, it is the responsibility of their cooperatives to ensure that all members comply with the requirements of the collectively held Fair Trade or organic certification (lest the actions of one lead to the de-certification of all). This is not to say that these associations are agents working on behalf of Fair Trade or organic certifiers. Quite the opposite, the associations featured in this study participate in the Fair Trade and organic markets because *their members* wish it. Moreover, these cooperatives are vehicles through which farmers advance their interests in the Fair Trade and organic arenas and elsewhere. In so doing, the cooperatives provide access to resources and opportunities that would otherwise be unattainable for their members, including but not limited to those associated with the Fair Trade and organic markets. Because of their position between coffee ecosystems and the Fair Trade and organic markets, cooperatives are key to understanding the influence of these markets on forested coffee ecosystems in Nicaragua. Drawing on concepts from the social capital literature, this chapter explores the nature of the cooperatives and the value they hold for small-scale farmers and their ecosystems.

4.1 Social Capital and the Cooperatives: For the Good of the Individual

Two formulations of social capital are drawn from the literature to explain the origin of the cooperatives and the benefits they provide their members. The first formulation is provided by Lin, who defines social capital as, "resources embedded in a social structure that are accessed and/or mobilized in purposive action", where purposive action means investment in the marketplace with an expected return (Lin 2001a: 29, 19).[23] Similar to other forms of capital, social capital exists where resources are invested in order to generate 'profit', which may be in the form of additional resources (social, personal, economic, etc.) or increased capital stocks (social, human, economic, natural). Thus, it is through investment that resources become capital, social or otherwise, and this investment is made by individuals. Because this conceptualization considers social capital to be the product of an individual's actions, meaning ego benefits as the result of his/her investments, it is hereafter referred to as the *actor-oriented approach* to social capital.

Social capital differs from other forms of capital in that the resources to be invested do not reside with the investor, but with those to whom the investor is related. That is, we have access to these "social resources" by way of the relationships we have with others. We do not actually possess these resources ourselves, but we may borrow or draw on them from others (Coleman 1990: 300-1, 304-6). A social resource could be something of economic value that

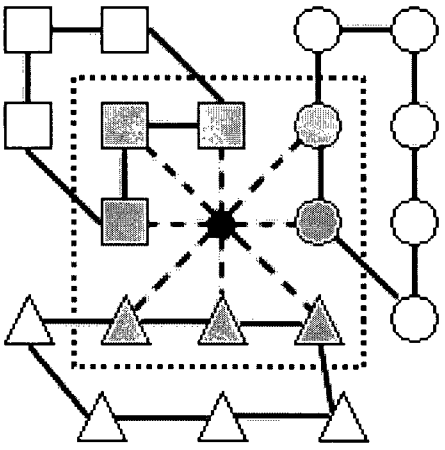
[22] In the case of the Fair Trade market, membership in a democratic association of small farmers is a requirement for certification. In the case of the organic market, membership in a producer association is a functional requirement since small-scale farmers lack the necessary resources to meet certification criteria on their own.

[23] Lin (and I) use the term 'marketplace' broadly. Thus, "the market chosen for analysis may be economic, political, labour or community" (Lin 2001a: 19).

belongs to someone else, such as a tool that could be borrowed to help with harvest (Lin 2001a: 129); something attached to a position or office held by someone in our network, such as a job reference (Fernando and Castilla 2001); or it may be of less tangible value, such as the willingness of parents to supervise others' children in a park (which could lessen the demands on those children's parents) (Coleman 1990: 303). Regardless, social resources reside with others to whom we are connected, and our ability to access and mobilize them for our purposes make them social capital. As such social capital is often described as residing in the relations between actors, whereas other forms of capital, such as human or economic, reside with the actors themselves (Coleman 1990: 305; Putnam 1993: 170).

Using this perspective, cooperatives are portrayed as purposely-constructed, institutionalized networks of actors bound together through coinciding economic interests (production and sale of coffee) and a sense of solidarity that is rooted in either socioeconomic similarities among members, or association through other social or kin networks (Lin 2001a: 38-40). These formal networks are not only founded on farmers' pre-existing social networks, they are also vehicles through which the same social networks can be strengthened and expanded.

In the first instance, farmers institutionalized some of the productive aspects of their networks by creating cooperatives (with considerable encouragement from ADDAC in the case of ACOPAN) in order to improve farm-gate prices and opportunities. In the second instance, through their involvement with the cooperative farmers are exposed to others with whom they are able to form durable relationships but might not otherwise be associated (for example, because they live far apart). With these personal relationships come varying amounts and quality of social capital. That is, access to resources that would not necessarily come by way of the cooperative (e.g. personal loans, personal references, free labour, marriage opportunities, etc.). This increases the volume and variety of social resources available to them (their social capital), and provides additional opportunities to expand their personal networks as their cooperative takes on more members (see Figure 4.1).



In this diagram, a cooperative (contained within the perforated box) is shown as a closed network of farmers (represented by the shaded shapes). These farmers, already in possession of personal networks (of like shapes), formalize the productive aspects of their relationships and join with others who share similar productive interests. These farmers, who would not otherwise be associated, are now linked together through the cooperative structure.

Figure 4.1: The Cooperative as a Closed Network

Thus, cooperatives are the result of farmers investing in the relationships they have with each other. Recognizing mutual interest in cooperation (i.e. higher prices for product, shared costs), farmers initially form closed networks with others who may be part of their pre-existing personal networks. While to some extent these networks may overlap, relationships between cooperative members are qualitatively different (in terms of appropriate activities, level of intimacy, embedded social capital, etc.) than the relationships those members have with others in

their personal networks. That is, they are restricted in scope to a pre-defined set of productive activities that are governed by a set of explicit rules and an authority structure that are subject to the will of the membership. By way of this association, farmers make collective investments that return profits, which are in turn divided amongst those within the closed network. Hence, cooperatives are vehicles through which farmers accumulate social capital in ways they would otherwise not be able. First, by expanding their social networks to include others with whom they previously had no relationship. Second, and most importantly, by enabling them to make collective investments using resources embedded in the social structure (i.e. the cooperative).

4.2 Social Capital and the Cooperatives: For the Good of the Group

This actor-driven construction of social capital is useful for describing the agency that farmers have within their cooperatives, and is consistent with much of the social capital literature. However, its focus on the individual actor tends to obscure the collective value of social capital and inadequately represents both the nature of the cooperatives and how they relate to their members. Rather than simply being formal expressions of underlying networks of actors, cooperatives also function as entities in and of themselves, capable of accumulating capital and forming their own networks (Bourdieu 1986).

For example, the cooperative structure allows farmers to pool their resources, collectively invest them (or have them invested on their behalf), and either have the returns distributed equitably amongst them or reinvested in the cooperative. However, unlike ownership of shares in a company, the capital that remains with the cooperative belongs to the membership. Individual members do not receive a "pay out" for their stake in this capital if they leave the cooperative, nor do new members purchase shares in it when they join. Members have access to this capital by way of their relationship to the cooperative and, in a functional sense, no one owns these resources, all do. Thus, in a manner of speaking, these resources *belong* to the cooperative, which, through the actions of its managers, invests these resources and accumulates more capital. In this respect a cooperative behaves as though it was a person or entity in its own right.

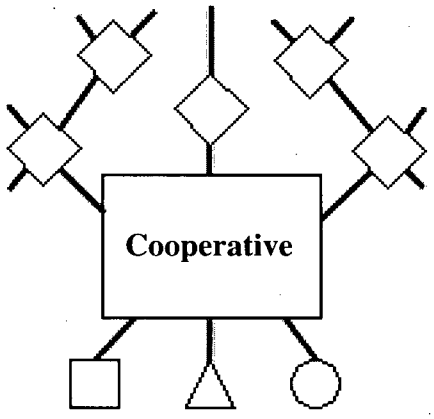
These "cooperative-owned" resources bring us to the second formulation of social capital used in this chapter. According to Bourdieu,

> "Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in the group – which provides each of its members with the backing of the collectivity-owned capital, a "credential" which entitles them to credit, in the various senses of the word." (1986: 248-9)

This formulation of social capital differs from the one provided by Lin in that the focus of analysis is on the group rather than the individual (Lin 2001b). While the underlying notion of individuals' access to resources embedded in social relations remains intact, it acknowledges that, "the profits [physical or symbolic] that accrue from membership in a group are the basis of solidarity which makes them possible" (Bourdieu 1986: 249). In other words, social capital is a collective asset as well as an individual asset, inextricably linked to the reproduction or even enhancement of the group itself (Bourdieu 1986; Lin 2001b).

This collective approach enhances the analysis of the social capital of cooperatives in several respects. First, it allows for a more accurate characterization of cooperatives. More than just networks through which members accumulate social capital through their interactions with each other, cooperatives provide access to resources owned by the collective. It is by way of their relationship to the cooperative (as an entity), rather than their relationship to others within the network, that members gain access to these resources. Thus, cooperatives, particularly larger ones, behave as though they are actors located in their members' social networks, and the resources they provide can be seen as part of their members' social capital.

Second, the collective approach supports the view that interactions and capital exchanges between members and group, and any profits that accrue, serve to reinforce the cooperative (as an entity) and reaffirm its underlying network of relations (Bourdieu 1986). This is also implied by Lin who, despite his focus on the individual, acknowledges that, "institutionalized social relations with embedded resources are expected to benefit both the collective and the individual" (2001a: 26).



In this diagram, the cooperative is depicted as though it was an actor with its own social networks. Shown here is its open network (of diamonds) through which it accumulates capital and accesses resources not available in its closed network (shown in Figure 4.1). Because network building and capital accumulation are done largely on farmers' behalf (rather than on their direction), the benefits they derive from these activities is analogous to the social capital they possess through their relationships with others. Thus, the cooperative is like an actor within a farmer's social network. (Farmers represented by the shapes from Figure 4.1)

Figure 4.2: The Cooperative as an Entity

Third, this formulation creates an opportunity to explore how cooperatives (as entities) accumulate their own social capital through the expansion of their own networks. As described in the previous section, cooperatives *are* closed networks of farmers that facilitate collective investments that pay dividends to their members in the form of higher prices for product, technical advice, credit, and healthier environments. However, they also *possess* open networks of their own through which they search and obtain resources to invest.[24] The resources found in these open networks may be channelled into the cooperative's closed network (to its members),

[24] While there has been some debate as to whether closed networks (possessing clearly demarcated memberships) are preferable to open networks (non-demarcated membership) or are even required for the accumulation of social capital (Bourdieu 1986; Putnam 1993: 173), Lin (2001a: 26-7) denies the debate by identifying different uses and therefore values for each type of network. According to Lin, network closure allows for greater in-group interaction (network density), which can better enhance trust among members and maintain group norms and authority structures. This in turn facilitates better preservation and reproduction of group resources. However, open networks are considerably more useful for searching for and obtaining resources because they are less restricted in terms of size and composition. Thus, while CECOCAFEN's closed network ensures that farmers' membership benefits (such as better prices, technical advice, etc.) are not diluted to oblivion, its open network allows the cooperative to obtain resources (such as large-scale financing, market information, etc.) not possessed by the cooperative or contained in its closed network.

back into its open networks (of clients, partner organizations, allies) to search for additional resources and opportunities, transformed into other forms of capital (such as processing facilities) that reside with the cooperative (as an entity), or any combination of the three. CECOCAFEN possesses a particularly extensive open network and uses the resources contained therein for all three purposes (see Figure 4.2).

The models presented in Figures 4.1 and 4.2 are merely heuristic tools for understanding how and where social capital is accumulated. The closed-network model of the cooperative is much more conducive to the actor-oriented approach, where social capital is accumulated by individual farmers by way of their own investments. This is particularly the case where group size is small and there are greater opportunities to influence group investments.

However, investments in social (or other forms of) capital are also made on farmers' behalves, who only benefit from these investments because of their membership in the group. This is most likely to be the case where members are less familiar with the rest of the membership, or when the cooperative is large enough that outsiders interact more with it than the membership. In such instances, the cooperative-as entity model is likely more appropriate.

4.3 History of Cooperatives and small-scale farming in Nicaragua

One of the stronger criticisms that has been levelled against social capital theory relates to the ahistorical analysis that is predominant in the literature, with the work of Bourdieu being a notable exception (Fine 2001: 65-7, 75, 86-9). Even seminal works (Coleman 1990; Putnam 1993) are charged with leaning too heavily on rational-choice in their analyses and paying too little attention to the historical processes involved in both forming and evolving the networks and relationships that facilitate social capital (Fine 2001: 75, 88). Bray et al. (2002) have similarly charged eco-labellers with a lack of attention to the processes behind producer organizations in favour of a focus on certification criteria and marketing. In documenting the rise of organic coffee production in Mexico, they argue that more than a decade of rural organizing and agrarian policy development, in response to changing economic realities within the coffee sector, led to the accumulation of the substantial amount of social capital (largely embedded within an extensive network of producer organizations) on which the organic market relies (Bray et al. 2002).

As was the case in Mexico, the emergence of cooperatives in Nicaragua directly resulted from social and political processes of previous decades. Specifically, the agricultural policies of the Revolutionary government of the FSLN (Sandinista National Liberation Front)[25] provided the legacy on which the cooperatives were built, and on which the Fair Trade and organic markets for Nicaraguan coffee rely.

Within weeks of assuming control in 1979, the FSLN had already nationalized the country's key foreign exchange earning sectors, which included coffee (Colburn 1986: 14, 42). Despite promises of a "mixed economy" that combined a healthy private sector with a powerful state presence, the FSLN was involved first and foremost with a political project, which meant economic and social policies were intended to move Nicaragua down a path of socialist development (Close 1999: 19). Agrarian and economic policies were thus geared towards two main objectives: The first was to expand and consolidate control over the foreign exchange earnings of the predominantly agricultural Nicaraguan economy. The second was to significantly reform the relations of production in the rural sector by improving access to land, credit, inputs, technology, and transportation through state programs targeting the poor. Both

[25] *Frente Sandinista de Liberación Nacional*

objectives were firmly rooted in the greater Sandinista ideological/political project; the latter intended to undermine the dependence of the poor on the rich, and the former to strengthen the state to better act on behalf of "the people" (Enriquez 1997:16).

However, the FSLN would never achieve total control over production of any export crop. Although state seizures of assets became less discriminating over time, initial seizures were restricted to the assets of the former dictator Somoza's family and their supporters (Close 1999: 21; Spoor 1995: 55). These early seizures did leave the FSLN with approximately 25 percent of the country's agricultural land, but rural elites still possessed 64.5 percent, most of which was devoted to the production of export crops including coffee (Colburn 1986: 31, 43; Spoor 1995: 54-55). Not having initial control over production, the FSLN created monopolies over many upstream and downstream activities (inputs, credit, processing, marketing, and exportation), all of which elites had traditionally used to control the poor (Spoor 1995: 54).

The government had initially envisioned an agricultural sector dominated by large state farms on which a rural proletariat would labour. However, the peasantry wanted to be farmers not labourers, and their dissatisfaction with the state farm model led the government to move towards a policy of cooperative agriculture as early as 1981 (Colburn 1986: 87, 32-33; Spoor 1995: 55-56, 59, 62; Weinberg 1991: 86-87). The FSLN showed a clear preference for a cooperative structure based in collective ownership and management, rather than a structure in which individual farmers associated in order to pool resources and improve collective market power. The reason for this was that peasant agriculture was seen as a relic of the past that suffered from both low productivity and a capitalist logic of development, and the collective ownership model more closely resembled the state-farm model the FSLN had originally intended to use to remedy these concerns (Colburn 1986: 42-3; Close 1999: 21). Despite this bias against independent farming, the Sandinistas would come to support the two main types of cooperative.

The more common but less (state) favoured model was the landed peasant-oriented Credit and Service Cooperative (CCS). This model was designed to accommodate landed peasants by allowing them to retain title over their farms and manage them however they saw fit, while simultaneously ingratiating the Sandinista socialist project with them. Thus, the CCS was a form of "training cooperative" that partially exposed peasants to collective agriculture, operating within a democratic governance structure. ACOPAN, La Esperanza, and most of the cooperatives within CECOCAFEN are organized according to this model.

The less common but more preferred model was known as the Sandinista Agricultural Cooperative (CAS). These cooperatives were similar to the CCS except production was collectivized and title to the land was held by the entity (Enriquez 1997: 17-9). Functionally, both cooperative models provided the government with an efficient means through which it could efficiently distribute inputs, credit, and technical assistance to the peasantry, but the CAS would receive more support from the government throughout the decade of Sandinista rule (Enriquez 1997: 16-17).

The Sandinistas left Nicaragua with a radically different countryside. Rural health, literacy, credit, and technical assistance programs combined with the formation of the cooperatives and distribution of land to them and individuals, created a sizable peasantry that was both politically active and less dependent on powerful landlords (Close 1999: 31-2; Enriquez 1997: 26, 181). As hoped by the Sandinistas, the cooperatives played a major role in mobilizing the peasantry and facilitating their participation in political processes. Through its disruption of traditional productive relations and development of democratic practices and educational capacity, the cooperatives led to a greater identification with the Sandinista socialist project amongst much of the peasantry than would have otherwise occurred (Enriquez 1997: 24). Moreover, it has been the organization and mobilization of the peasantry that has provided the infrastructure necessary for both the organic and Fair Trade markets to access coffee produced

on small-scale Nicaraguan farms. Without it, there could be no certified Fair Trade coffee from Nicaragua, and the supply or organic Nicaraguan coffee would be greatly reduced as well.

Following their defeat at the polls in 1990 and as a final salute to socialist principle, the FSLN began a rapid but limited divestment of state assets that led to a further transfer of wealth to the poor and the creation of a pseudo support system that would not be controlled by the incoming government. This was euphemistically known as the "piñata", and entailed both the granting of more land titles to cooperatives and individuals, and the ransacking of several parastatals and ministries to create and supply an explosion of NGOs geared towards providing assistance to the lower classes (including cooperatives and small-scale farmers) (Close 1999: 135, 162; Spoor 1995: 199-200)

Successive governments would continue the divestment of state assets and more generally limit state involvement in the economy, including a withdrawal from extension, production, and marketing functions in the coffee sector (Close 1999: 132-3, 135; GAO 1992; Spoor 1995: 202-3)

On the positive side, this retraction of the state from coffee production and marketing meant that some farmers were in a better position to capture the full value of their coffee on the international markets, especially since the government no longer maintained its national monopsony. For instance, cooperatives like CECOCAFEN would not have been able to obtain an export license, purchase downstream processing facilities, or market their coffee to international buyers had the state not withdrawn from the coffee sector. Moreover, there could have been no Fair Trade market for Nicaraguan coffee with the government as an intermediary between growers and buyers, and an organic market would have required a special government program.

On the negative side, this meant farmers would be more vulnerable to market volatility, which would prove significant in the years ahead. As well, government-backed affordable credit programs and subsidized farm inputs were no longer available for small-scale producers. Although, from an ecological standpoint, the loss of these subsidies may have been a positive step towards reversing the damage caused by the Sandinista's modernized approach to agriculture, as peasant farmers became less able to afford chemical inputs (Spoor 1995: 207; Sinclair and Thompson 2001).

In the case of rural properties and enterprises, the conservative government that took power from the FSLN devised a scheme that saw the redistribution of the considerable state lands that had been accumulated under the Sandinistas, and rapidly concluded the process of land distribution that the FSLN had reluctantly begun several years earlier. In fact, many of the peasants who had been calling for land since the Revolution saw the election of the new government as an opportunity through which they would finally be able to farm without government interference (Enriquez 1997: 49, 52-3). Others feared the new government would not respect the cooperatives' claim to land and would return land seized by the Sandinistas to the original landlords or other private interests.[26] For instance, every former CAS member interviewed in Pancasán reported that their cooperatives dissolved and were partially parceled to members for fear that the new government would not respect the cooperatives' title to the land. That 59 percent of the value of these land transactions was transferred to private businesses, while workers and peasants received about half as much, suggests these fears were well founded (Close 1999: 133-5, 162; GAO 1992; Spoor 1995: 202-3).

[26]These same farmers reported that many of the recipients of these lands in turn sold to large farmers or other private interests.

4.4 Birth and Structure of ACOPAN and La Esperanza

4.4.1 ACOPAN

4.4.1.1 Birth

In 1990, ADDAC came to Pancasán with a plan to restore Matagalpa's Tropical Humid Zone after years of deforestation and agricultural mismanagement, which had begun with the haciendas and continued throughout the 1980s (Segura 2003: 54-7). Farmers and employees alike reported that when ADDAC arrived, most of the region had been severely denuded and the soils compacted from decades of extensive cattle and later basic grain farming. Little remained of the cooperatives that had been established by the Sandinistas, and many farmers were ill equipped to fully utilize the land obtained through land reform. For example, an ADDAC technician told of one farmer who had been growing beans and corn on only two manzanas of the more than twenty-five he had received from the Sandinista Agrarian Reform, leaving the remaining sixteen manzanas not covered by forest fallow.

ADDAC began by working with a small group of farmers, introducing them to new plants to cultivate, including coffee, and new methods to manage their land. According to its president, there is an underlying belief at ADDAC that the prosperity of the environment is inexorably intertwined with the prosperity of the people who live in it, and so it focussed its efforts on where the two meet. Consequently, ADDAC's projects, which according to its president began with 30 producers in Pancasán and now extend to 3000 families in 82 communities, are organized into four working components: 1. organization, 2. credit, 3. environmental protection, 4. diversification (of both the environment and farmers' economic activities).[27] Marketing would emerge as a fifth component in 1997, which entails a range of activities from providing a venue for a local farmers market to coordinating with international coffee buyers (Segura 2003: 32). Responsibility for marketing operations was eventually transferred to the commercialization wing of ADDAC, *Antorcha Ecológica*, which was formed a few years later.[28]

As ADDAC began to work with an increasing number of farmers in Pancasán, it eventually assisted with the creation of ACOPAN for coffee farmers, as well as a cooperative for small-scale dairy producers and a community association.[29] One farmer reported that there was little in the way of organization in Pancasán prior to ADDAC, with the exception of political factions, and this was corroborated in later interviews with original members of ADDAC. These cooperatives had two main functions: first, to provide an efficient means through which ADDAC could channel knowledge and resources to a number of farmers, and second, to improve the prices and lower the costs for coffee and dairy farmers. In 1997, ACOPAN obtained its organic certification from the Organic Crop Improvement Association (OCIA) International.

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[27] These "working components of ADDAC projects" were outlined in a poster hanging in the ADDAC office in Pancasán.

[28] Literally means "Ecological Torch". Figuratively, it is the torch that guides us (to ecological responsibility).

[29] The dairy cooperative is called ASOGAPAN (*Asociación de Ganaderas de Pancasán* – Cattlemen's Association of Pancasán)

4.4.1.2 Structure

ACOPAN was formed in 1992 and functions as a collective of individual farmers with no apparent hierarchy save for a seven member Board of Directors (BoD)[30] made up of a president, vice-president, financial officer, treasurer, production officer, secretary, and a vocal.[31] The cooperative originally consisted of eight members, but now boasts thirty-three, ten of which also belong to ASOGAPAN. ACOPAN members meet once per month to discuss issues ranging from cooperative leadership, coffee production and commercialization, internal organic inspections, changes to organic criteria, upcoming events, ACOPAN projects, or anything else a member wishes to discuss, and no ADDAC staff are present for these meetings unless invited to speak to a particular issue.

Influence in the cooperative appears to have less to do with the position one holds than it does the respect one commands as a member of the community. Indeed, the BoD seemed to be more about tasks that needed to be done than power within the cooperative. For example, in 2003 on the behest of one of the cooperative's Canadian customers, a representative of TransFair Canada visited ACOPAN to assist the cooperative with its application to the Fairtrade Labelling Organizations (FLO) International for Fair Trade certification. While there, the TransFair representative remarked that having only two female members, neither of whom sitting on the BoD, might reflect poorly on the cooperative's application. Within a few months ACOPAN members had elected the two women to the BoD (president and vocal), and a third woman had begun the process of joining the cooperative.[32] I discussed the matter with the previous president of the ACOPAN, who remarked that the move was very positive and that he had absolutely no reservations about it. He also felt that the wives of the male ACOPAN members did not have sufficient voice in ACOPAN, nor did they receive their due recognition for work that directly impacted the cooperative (such as involvement in coffee farming and processing). Indeed, all three female members appeared to be highly respected both in the cooperative and the greater community, irrespective of the position they held.[33]

Beyond providing some insight into the status of women in ACOPAN, this example demonstrates that the composition of ACOPAN's BoD can easily be changed by the membership, and thus power within the cooperative was not evidently entrenched. Indeed, status in the community and personal charisma appear to be more important determinants of influence in the cooperative than is positional authority, which is supported by the following observations of a ACOPAN assembly,

> "No one appeared to be "in control" of the meeting, and they managed to keep to task as a group for the most part. Some people were listened too more closely than others when they spoke, and this might be a respect issue. [Some members, including the current president] had most people listening to them when they spoke... other people couldn't command as much attention, though no one

[30] *Junta de Directivas*

[31] A vocal fills in for anyone who cannot fulfill their duties for any period of time.

[32] Though she participated in meetings and activities, she could not sell coffee through ACOPAN because she lacked organic certification and thus was not a full member. She still had almost two years to wait before her farm could be certified organic.

[33] The status of women within the cooperatives is not a part of this study, and thus the opinions of other ACOPAN members on this matter were not solicited. This member was asked only because, as the outgoing president, he was perceived as the only person who may have felt a loss. The purpose of its inclusion is to to demonstrate the fluidity of BoD membership.

> was ever ignored.... [The third woman] came late and though she's the youngest, a woman, and not yet a full member, she was heard by everyone and treated with a great deal of respect."

In general, the closed network model of cooperatives provides a more accurate sense of how ACOPAN functions. That is, the cooperative functions very much like a network of individuals enhancing their outcomes through collective action. This is because ACOPAN has a relatively small membership that meets regularly to conduct cooperative business, and the cooperative has limited resources with which to offer services to its members. It may also be because ADDAC has been providing the services that would normally be provided by a larger and more complex cooperative (like CECOCAFEN). Indeed, the relationship between ACOPAN members and ADDAC conforms more closely to the cooperative-as-entity conceptualization than does their relationship to ACOPAN, despite ADDAC not being a cooperative.

4.4.2 La Esperanza

4.4.2.1 Birth

La Esperanza was formed in 1991 with the support of the Sandinista affiliated Union of Farmers and Cattlemen (UNAG), which had been the political voice for small farmers since the early 1980s.[34] The organizing principle behind the cooperative is reported to have been the improvement of farmers' market power in order to obtain better prices. When asked why farmers would choose to join the cooperative rather than continue farming on their own, one of the original members replied, "because united we are stronger".[35] Similar to ACOPAN, La Esperanza was not a continuation of a previously formed Sandinista cooperative. However, at least five prominent members of the cooperative had been members of the basic grain CCS that had existed in El Coyolár prior to the FSLN electoral defeat of 1990, all of whom are founding members of La Esperanza, and four of whom have been heavily involved in the cooperative's leadership since its inception. As well, the organizational structure of La Esperanza mirrors that of the Sandinista Credit and Service Cooperatives of the 1980s.

4.4.2.2 Structure

La Esperanza is considerably larger and organizationally more complex than ACOPAN. It began with eighteen members in 1991, and as of 2004 had grown to sixty-two, with thirty-two members having joined within the previous year. In addition to a five member BoD (president, vice-president, secretary, and development officer) responsible for leadership and administration, the various activities of La Esperanza are governed by the following:

Oversight Committee (*Junta de Vigilancia*)
Monitors the behaviour of all committees, boards, and members to ensure proper conduct.
Consists of a coordinator, secretary, vocal

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[34] *Unión Nacional de Agricultores y Ganaderos.* At the time, UNAG had been working with some farmers to help them begin cultivating and processing coffee. One farmer reported that though he had been working his land for forty-four years, he only began producing coffee since 1991 (with the assistance of UNAG).
[35] "*porque unidos, somos mas fuerte*"

Credit Committee (*Comité de Crédito*)
Manages the credit system, including applications, approvals, and rejections.
Consists of a coordinator, secretary, vocal

Internal Control Committee (*Comité de Control Interno*)
Manages the La Esperanza organic program and conducts internal inspections or organic farms.
Consists of a coordinator, secretary, vocal, and (currently) one inspector

Education Committee (*Comité de Educación*)
Responsible for La Esperanza education programs.
Consists of a coordinator, secretary, vocal

Considerably more power appears to be invested in the La Esperanza BoD than was the case in ACOPAN, and possibly in recognition of its power, it, the Oversight Committee, and the Credit Committee may not share members.

However, positional authority has been dominated by a small group of people throughout the history of the cooperative, with the same people occupying the five BoD positions since La Esperanza's inception until 2003. Moreover, all five of these directors were organic producers and, when one died in 2003, another organic producer replaced him. I asked one of the current board members about the disproportionate number of organic farmers in power and he initially quipped that one had to have organic certification in order to be on the BoD. Upon further questioning he admitted that in actuality it was because the organic farmers tended to vote together as a block and so it was difficult for non-organic farmers to get elected. When I asked why the organic farmers would do this he replied, "because they have to use separate bags, keep the coffee separate, use separate trucks... because the rules for organic are tough/strict".[36] When I then asked, "so because the coffee is separate, the members are separate as well?" he smiled and said "yes".[37] He also said in a later conversation that it was important for him, as a Board member, to be organic in order to set a good example. He and other directors later reported that they were working hard to achieve organic certification for the entire cooperative. With respect to the near unchanging membership of the BoD, he could provide no answer but conceded that five others had run against him in the last election (which occurs every two years) and that he had only won by two votes.

However despite these efforts and the monopoly of organic producers over BoD positions, the membership as a whole appeared to be very engaged with the cooperative's activities and governance. The following observations were made during one of four yearly "Work Assemblies" in which members discuss topics related to coffee production.[38] This particular meeting concentrated on finalizing some members' registration, legal matters, and the construction of coffee mills. The observations clearly show how the greater positional authority of the La Esperanza BoD has not necessarily translated into greater control over the membership.

> "[The president] is very animated and impassioned in how he addresses the group.... He's also running for political office (City Councillor), and uses the opportunity to hand out flyers for the coming election. People seem on the whole more attentive than at ACOPAN, even though some people are standing in the sun....

[36] "*porque usamos bolsas diferentes, camiones diferentes... porque los reglas organicas son dura*"
[37] "*¿entonces porque el café es separado, los socios son separado también?*"; "*si*"
[38] *Asamblea de Trabajo*

> After 35 minutes, discipline starts to break down and conversations start up... [The president] modulates his voice and all other discussions stop. There is quite an argument raging that has some people ridiculing a policy (regarding legal title and credit), and [the president] has become agitated and has begun to smoke after passing the meeting over to someone else.
>
> Unlike in Pancasán, when the internal organic inspector was speaking, almost no one was listening....
>
> Based on where much of the opposition against [the president] is coming from, it has become clear that he didn't only send me to interview his friends. In the end, it seemed as though NO issue was able to go by smoothly, though almost everyone showed up to the meeting. I presume this is a good thing, and evidence of a robust and active membership."

In addition to the Work Assemblies, two general assemblies occur every year, and there are (separate) monthly meetings of the BoD and the committees. Members are expected to attend all assemblies, and there is a rule that a member will be expelled from the cooperative if he or she misses three consecutive meetings, though it was not clear how evenly or stringently the rule was applied. In one case, a founding member of the cooperative estimated that he had missed between twenty and thirty meetings before he was expelled, though he had since rejoined the cooperative the year before he was interviewed. Another farmer admitted that the meeting we would both later attend would be his first and that he knew very little about the cooperative except that he received better prices through it than he would otherwise. His father, who had died more than a year prior, had also been a founding member of La Esperanza and had been a close friend of several board members.

In addition to the rule on attendance, all members are expected to: 1. grow coffee, 2. not join another coffee cooperative, and 3. have legal title to the land. The requirement that all members grow coffee is, of course, a reflection of La Esperanza's current status of coffee cooperative (rather than a more general agricultural cooperative). However, there is some flexibility on this rule. Farmers who had recently begun farming coffee but had yet to produce a harvest were still full members of La Esperanza and could even draw on the cooperative's credit system, as was the case with one farmer who was interviewed. The third rule is also somewhat flexible in that women may be full members of the cooperative even if their husbands are the only ones with legal title to the land. The reasoning behind this is to keep men from having all of the power, as one female member reported, however only one of the seven women in La Esperanza held title via their husbands in this way. When I asked the same member why she thought so few women took advantage of the opportunity, she suggested that most women were simply not interested in joining the cooperative, despite being entitled to do so.[39]

[39] As previously stated, the status of women in the cooperatives is not a focus of this thesis and so no effort was made to uncover why few women are involved with the cooperative. However, it is a matter of importance for many Fair Trade actors, and this example is intended more for them, to show that cooperative policies that reduce institutional barriers facing women do not necessarily translate into their greater participation. Parenthetically, the cooperative member who provided this information was president of one of the two CECOCAFEN-affiliated women's savings groups in the community.

4.5 Social Capital and Primary Cooperatives

At the local level, it is easy to see the relationship between personal networks and the more formal networks within the cooperatives. In Pancasán, ACOPAN's original membership was drawn directly from ADDAC's earlier working group of farmers. In some cases members have had relationships with other members that date back to years spent working in the same hacienda, Sandinista cooperative, or simply living in the same general area. In other cases, people have expanded their own personal networks by forming enduring relationships with people they met through the cooperative. As well, these personal networks and the respect afforded to individuals in the greater community appeared to have some effect on each member's influence in the cooperative. Nevertheless, the existence of personal networks underlying the formal cooperative network has not evidently led to the formation of factions. Indeed, based on interviews and the one assembly observed, there appears to be general agreement on the direction of ACOPAN among the membership.

If this is the case, then ACOPAN conforms perfectly to the network model of the cooperative that was introduced at the beginning of the chapter. Farmers invested in their relationships with other farmers in order to create a formal structure through which they could make collective investments that would return in the form of higher prices and lowered costs. That the resources collectively invested were embedded within the relationships that constitute ACOPAN means that any resulting higher prices and lower costs are dividends from investments of social capital. As mentioned earlier, these profits not only benefit the individual members, they reinforce the value of the cooperative and its underlying network of relations (because they are the purpose of the cooperative). Had factions or entrenched power existed within ACOPAN, the concept of collective investments would have been more complicated, as it is with La Esperanza.

In terms of resources residing with the cooperatives, ACOPAN has relatively few in comparison to La Esperanza. Beyond higher prices and shared expenses for coffee, ACOPAN provides little in the way of obvious tangible benefits. It has growing social and capitalization funds, but members revealed that both had yet to be utilized on account of their small size. Although ADDAC staff reported that ACOPAN is rapidly developing and taking on new responsibilities, its most important value to farmers thus far has been as a bridge to access ADDAC's programs and resources, which are described more fully in the next section.

La Esperanza was also built on pre-existing social networks, however the dynamic among members seemed somewhat different than at ACOPAN. Perhaps owing to its larger size, greater complexity, or the domination of one close-knit network over positional leadership, the direction of La Esperanza appears to be more contested than ACOPAN's, and factions are more obvious. Other possible explanations include geography (cooperative members come from more disparate locations than do ACOPAN members)[40], a longer tradition of farm ownership (some members have had their farms for generations, and so may be less inclined to take direction on their management)[41], or the resistance of some members to organic production versus the enthusiasm of others. Despite this, or possibly because of this, as a whole the membership appears to be more personally involved with the direction of the cooperative than was the case in

[40] ACOPAN draws its members from a much smaller and less populous area. As well, members are clustered in three main areas and travel common roads, which means greater interaction among the membership.

[41] Most ACOPAN members have had their farms for less than twenty years, with most of that time spent in a cooperative of some form.

Pancasán. Nevertheless, the formation of factions, especially within a democratic framework, somewhat complicates the concept of "collective investment" of shared resources.[42]

Possessing the power to access and control resources embedded in social relations is a necessary precondition for social capital accumulation and investment, however this power is not necessarily equal amongst actors. The size of the membership, the distances members would have to travel to meet, and, more recently, the inexperience of so many members with cooperatives, require that investments of the resources embedded within La Esperanza would be made more on the membership's behalf than by the membership itself when compared with ACOPAN. Thus, the power to direct these resources is concentrated more strongly in the cooperative's various boards and committees, particularly the BoD. The dominance of organic producers in the BoD and the block voting that, at least to some extent, allows that dominance to continue is therefore more significant. For example, as is discussed more fully in the next chapter, the prices La Esperanza pays its members for their coffee differ according to whether it is organic or not, but not according to its quality. This was a concern for some of the higher-altitude producers who believed they should receive a premium that corresponded with the better price their higher quality coffee received in the market.[43] Rather than moving the cooperative towards quality-based pricing, the BoD was more concerned with moving towards total organic certification and thus directed cooperative resources towards this end.

The importance of this control is magnified by the amount of resources embedded within the cooperative. As with ACOPAN, membership in La Esperanza also provides opportunities for cost sharing and better coffee prices, but the cooperative owns its own building, trucks, and manages its own credit program as well. Further, La Esperanza has sizeable and active social and capitalization funds, which the membership has used for various projects. As ACOPAN serves as a bridge to ADDAC, La Esperanza is a bridge to CECOCAFEN. However, La Esperanza members are also members of CECOCAFEN, and thus have more control over CECOCAFEN's resources than do ACOPAN members over ADDAC's. For example, La Esperanza runs its own credit program using funds that partially come from CECOCAFEN. CECOCAFEN charges La Esperanza an interest rate, and La Esperanza charges a little more to its members who draw from the fund. Members make all decisions on how the money is allocated, and some of the value of the transactions is retained by the cooperative. Where La Esperanza does not have direct control over CECOCAFEN resources, it has influence via its position in CECOCAFEN's organizational structure (as is detailed later in the chapter). As these resources and the cooperative grow, so does the significance of factions and block voting to control these resources. Despite higher stakes in terms of resource control than at ACOPAN, a greater degree of member non-engagement was also observed among many of the farmers interviewed at La Esperanza. The relationship these members, particularly new ones, have with the cooperative conforms more closely to the cooperative-as-entity model. That is, these members have cultivated more of a relationship with the cooperative by simply accessing its credit programme or passively receiving the benefits of membership, than with the other member by becoming more engaged with cooperative activities and direction. The benefits they receive from membership, then, come from investments made on their behalf. Thus, these benefits are similar to resources belonging to someone else that they are able to access because of their relationship with that person. Whether this lack of engagement results from the inexperience of so many members with the cooperative, the amount of effort required of many members simply

[42] In more hierarchical structures, who is empowered to make (and benefit from) collective investments is more obvious. As well, the power to determine the extent to which others in the structure benefit from these investments may be more explicit.

[43] All of the high-altitude producers (1000m+) reportedly used fertilizers to mitigate their smaller harvests (coffee trees produce beans more slowly at higher altitudes, which improves quality at the expense of volume).

to attend a meeting, or something else is not known. However, the rule on attendance may be seen as an attempt to encourage full member participation, if not to counter "free-ridership".

Another advantage of requiring attendance is the enhancement of the communicative value of the cooperative. As one farmer pointed out, cooperative meetings provide an excellent venue through which members often share information about farming techniques, how to deal with crop plagues and pests, advice, and any other matters with each other. I had noticed such exchanges occurring between interviewees and my guides when I visited different farms in La Esperanza.[44] In some cases, a farmer would advise another farmer on techniques learned from a CECOCAFEN or ADDAC technician. In other cases, a farmer would simply relay the experiences of another farmer who had encountered a similar problem to the one being discussed. What became clear was that the cooperative structure provided an excellent forum through which information of all kinds could be disseminated, and through these interactions strengthen the relations between farmers who lived miles apart and would likely not otherwise interact. The ability to access this knowledge is by definition social capital from the actor-oriented perspective. Someone located within the farmer's network (cooperative) possesses the resource (useful information) and the farmer is able to access it because of the relationship that exists between the two actors.

The potential benefits of this become magnified when brought to the secondary cooperative level, where a single transmission of information to someone in CECOCAFEN could be directly disseminated to more than two thousand cooperative members through assemblies and cooperative technicians, who in turn could activate their own social networks and disseminate the information further. ADDAC occupies a similar space to CECOCAFEN in this respect, where the generation or transmission of a particular piece of information (such as a new farming technique, quality standard, environmental concern, certification criteria, etc.) can be easily disseminated to all farmers connected through ADDAC projects or affiliated producer associations. Farmers in the CECOCAFEN or ADDAC networks could then, in turn, disseminate the same information throughout their own social networks. Such transmission of information is one of the primary ways in which social capital enhances outcomes, and thus represents one of its most important values (Lin 2001a: 19-20). Several examples of such knowledge transfers that have occurred through the cooperatives' open and closed networks are provided in Appendix C.

4.6 Supporting the Cooperatives: The Importance of ADDAC and CECOCAFEN

While ACOPAN and La Esperanza are remarkable achievements in their own right, members of both owe much of their success and possess considerable social capital through their relationships with ADDAC and CECOCAFEN. In the case of Pancasán, ADDAC's influence and importance to ACOPAN, the local ecosystem, and the community at large cannot be overstated. CECOCAFEN also plays a significant role as it relates to the commercialization of ACOPAN's coffee (and hence the success of Pancasán's coffee agroecosystems), but is in no way comparable to the significance of ADDAC in Pancasán. Similarly, CECOCAFEN has been enormously important for La Esperanza on many levels, and its importance continues to grow. Likewise, ADDAC provides valuable services to La Esperanza members, though not necessarily related to coffee production.

[44] Although no doubt farmers in Pancasán share such information with each other, the accessibility of trained ADDAC agronomists reduces the importance of such member-member exchanges of agricultural information.

As is the case with the primary cooperatives, embedded within farmers' relationships to ADDAC and CECOCAFEN are enormous resources that represent considerable social capital (at least when farmers access these resources). Predictably, the relationships that most farmers have with CECOCAFEN, and certainly ADDAC, conform to the cooperative-as-entity model.[45] Indeed, only those most involved with CECOCAFEN governance discussed the cooperative in terms of it being a network of farmers. This in no way devalues the benefits farmers receive through their involvement with these organizations; it is only mentioned to illustrate the nature of the relationship between them.

Lastly, these organizations provide opportunities for resources to flow from their members to others. Cross-membership or involvement with CECOCAFEN, ADDAC, and their subgroups certainly increases the volume of resources (knowledge, seeds, opportunity, etc) available to these "cross-members" as well as, in some cases, members of all such connected networks. These "cross-members" link the different networks (i.e. groups, cooperatives, etc.) thereby facilitating a general increase of social capital for anyone located on their networks (such people are represented in Figure 4.1 by the shaded shapes).[46] In other cases, cross-membership simply allows farmers to choose the best option from a milieu of services offered by the different organizations.

4.6.1 The Role and Influence of ADDAC

As mentioned prior, ADDAC began working with farmers in Pancasán in 1989. According to interviews, early work focussed on teaching producers new farming methods that would both diversify their environments and their livelihood strategies (see also: Segura 2003). New crops were introduced, including coffee, and ADDAC agronomists demonstrated how ecosystem and farmer interests and health were intertwined. Farmers learned how to diversify their environments from the pastureland or basic grain plots they had been, to varied ecosystems that still included pastures and basic grains, but also multi-level canopies in rich forested agro-ecosystems of coffee, cacao, bananas, plantains, mangos, guavas, oranges, and lemons, to name a few.

As the years passed, ADDAC assisted with the eventual formation of ACOPAN for coffee producers, ASOGAPAN for dairy producers, and a community association to which anyone can belong. Through these associations ADDAC provides technical, organizational, and administrative assistance for a range of projects including youth programs, household gardens, and small-business development. Any resident of Pancasán can be a member of a group provided they fulfill the requirements for membership (i.e. grows organic coffee (ACOPAN)), and there is no restriction on the number of groups someone can. As well, at least two of the three female members of ACOPAN and several spouses and children of ACOPAN members belong to the community association. These associations are the only inclusive and democratic institutions for community action in Pancasán, which has no municipal or regional governmental presence.

ADDAC also has several working groups and side-projects running, including a group of farmers called "The Experimenters" and an extensive seed-sharing program that is connected to all ADDAC affiliated groups. The Experimenters are a group of approximately thirty farmers who are receiving special agricultural and methodological training from ADDAC agronomists.

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[45] Obviously ADDAC is not a cooperative, but the depiction of the relationship with farmers and its location between them and an open network in Figure 4.2 is identical.

[46] According to the social capital literature, these people could be considered as occupying what are known as "structural holes" (Burt 2001).

Each farmer has chosen a topic (such as "bird feeds", "corn varieties", etc), and has been taught how to develop hypotheses about their topics, how to test their hypotheses, and how to record the results in special lab books provided by ADDAC. The group meets regularly to share the results of their experiments and to receive additional training from ADDAC. The results of these experiments are often disseminated to other ADDAC affiliated groups by way of the seed-sharing program, as are any seeds obtained through fieldtrips to other regions or countries, or varietals developed on ADDAC's own experimental farm.[47]

Membership in any ADDAC affiliated group also provides access to its micro-credit program, which had C$678 555.70 in loans to thirty-seven ACOPAN members in 2002 (Seguro 2003: 79).[48] These loans, which can be no smaller than C$75 and no larger than C$30 000, are at a rate of 17% on the existing principle, which is far better than bank rates. Nicaraguan banks charge between 24 and 40% interest against initial principles, and bank loans are not normally accessible to small farmers anyway. The interest that ADDAC-affiliated farmers pay on their loans goes directly into the fund that sustains it, thus increasing the scope and value of the program.

Farmers reported that having access to credit was of crucial importance to them, both for effective farm development and for investment in other areas of their lives. Credit from the ADDAC system can be applied to a range of activities, including expanding production of current crops, diversifying into new crops, buying equipment, developing house or farm infrastructure, and small business development. One ACOPAN member that was interviewed said that having access to the ADDAC credit system allowed him to pursue university studies in agronomy.

Support for the three associations and The Experimenters group in Pancasán are obvious examples of ADDAC's role in facilitating farmers' accumulation of capital. Transferring skills and knowledge increases farmers' human capital, and assisting with farm investments assist with the accumulation of natural and economic capital. That these opportunities exist because of the farmers' relationships to ADDAC are indicative of the social capital embedded there. As well, linking these groups to each other and to groups in other communities through inter-group projects (like the seed-sharing and credit programs) extends the scope of the networks that underlie them, and further increases farmers' social capital and investment opportunities.

These benefits are in addition to the direct assistance that ADDAC agronomists provide to farmers by way of on-site consultations regarding farm development and management, which are also indicative of social capital embedded within the relationships between ACOPAN farmers and ADDAC. The services of these agronomists are currently provided free of charge, and are only part of how ADDAC subsidizes ACOPAN's operations.

In addition to extension and credit services, ADDAC handles much of ACOPAN's administration requirements including communication with customers and its current organic certifier (because Pancasán has no communications infrastructure), and arranging for dry-milling, exportation, and transportation services. Without these services, ACOPAN would have access to neither the organic market nor international buyers, and thus would be forced to sell to local intermediaries or through the domestic market. In this respect, ADDAC functions very much like a secondary cooperative, except that the costs of ADDAC's services are not ultimately borne by the producers. Essentially, producers have been "out-sourcing" these activities without having to pay for them, although ADDAC staff did report of a plan to gradually shift

[47] This farm is run by ADDAC agronomists and is located near the city of Matagalpa. Its purpose is both to test new seeds, methods, and technologies, and to serve as a demonstration farm for farmers, allies, and financial supporters.
[48] Fieldwork revealed that five members had either left or been forced to leave ACOPAN in the previous two years, while one new member had joined during that period. On 31/12/2002, CAN$1=C$9.24316 (Cordoba gold). Thus, ACOPAN members owed CAN$73 411.66 to the system in 2002.

responsibility for these functions back to their affiliated cooperatives (which could include paying ADDAC for its services, if the cooperatives so chose).

ADDAC also provides services to people in El Coyolár, including La Esperanza members. ADDAC has established a coffee cooperative similar to ACOPAN in the area called ACODALIA[49] that, while La Esperanza members are forbidden to join (second rule of membership)), family and neighbours of La Esperanza members often belong. As well, La Esperanza members are free to consult ADDAC or join any ADDAC sponsored group not involved with coffee. Consequently, in many instances a La Esperanza member's wife or son would be a member of ACODALIA, or another La Esperanza member would join an ADDAC group involved with basic grains or with some other focus. Indeed, it was a surprise to see ADDAC technicians, whom I had met during my fieldwork in Pancasán, helping the son of the president of La Esperanza with a beekeeping project. I was told that families often wanted to be associated with both La Esperanza/CECOCAFEN and ADDAC so that they could maximize their credit opportunities. I was also frequently told that La Esperanza/CECOCAFEN provided the best opportunities for marketing coffee, but ADDAC agronomists provided assistance on anything from basic grains to cows. Maintaining relationships with both clearly demonstrates how increased social capital facilitates the accumulation of other forms of capital and resources.

4.6.2 The Role and Influence of CECOCAFEN

CECOCAFEN is what is known in Nicaragua as a secondary cooperative, which is a cooperative made up of smaller independent cooperatives and (in this case) Unions of Agricultural Cooperatives (UCA).[50] The UCA themselves are also known as secondary cooperatives, and are similarly made up of smaller cooperatives that may be similar in size to La Esperanza, though they do not necessarily deal exclusively in coffee. While the UCA are much larger than La Esperanza, they are afforded the same rights and power within the CECOCAFEN structure because their relationships to the cooperative are identical.[51] However, due to their size UCA have considerably more resources than La Esperanza, and thus are able to maintain agricultural and credit programs that are independent of CECOCAFEN and not solely focussed on coffee production.

Similar to La Esperanza, CECOCAFEN has a BoD and various committees to which representatives from its member cooperatives and UCA are elected. La Esperanza is well represented in CECOCAFEN; the president of La Esperanza is also the secretary of CECOCAFEN's BoD and its Development Officer is the coordinator of CECOCAFEN's Oversight Committee. In addition to monthly BoD and committee meetings, CECOCAFEN holds an annual General Assembly for which the UCA and independent cooperatives each seat three representatives. CECOCAFEN is highly regarded among the leadership of La Esperanza, with one Director remarking that the organization was getting better every year and describing the relationship between the two cooperatives as excellent. Those not on the La Esperanza BoD had little to say about CECOCAFEN, largely because many of those interviewed had only recently joined the cooperative. Nevertheless, no one ever complained about CECOCAFEN, and all were positive about the higher prices and services they could access through the cooperatives.

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[49] Asociación de Cafetaleras Organicas de La Dalia

[50] *Unión de Cooperativas Agropecuarias*

[51] CECOCAFEN is made up of UCA and independent cooperatives (*cooperativas independientes*), all of which have identical representation in the coop. La Esperanza is one such independent cooperative.

CECOCAFEN provides many of the same services to its member cooperatives that ADDAC provides to its affiliated cooperatives, though with a greater emphasis on the coffee business at the expense of ADDAC's more environmental focus. Like ADDAC, CECOCAFEN handles all communications and administration associated with certification bodies, including BioLatina, OCIA, and FLO, and without these services member cooperatives would be unable to access the organic and Fair Trade markets. CECOCAFEN also runs a credit program, though it provides credit to its member cooperatives rather than to its members. As well, CECOCAFEN runs women's savings and credit programs for which beneficiaries need not belong to the cooperative and the funds can be applied to more than coffee production. CECOCAFEN also funds youth leadership groups, two baseball teams, and distributes free cooperative-branded paraphernalia (hats, shirts, posters, stickers, etc.) throughout the communities.

CECOCAFEN extension services include regular farm visitations by cooperative agronomists, however these services are restricted to issues pertaining to the management and development of coffee production. La Esperanza members reported that CECOCAFEN agronomists visit their farms twice per year, but many found ADDAC agronomists more accessible and more helpful for the overall management of the farm, since ADDAC agronomists provided assistance on more than just coffee. However, while ADDAC provides superior assistance as it relates to managing the entire agroecosystem, CECOCAFEN's assistance appeared to be better grounded in the coffee market. For example, while many members of ACOPAN were busily planting the disease resistant coffee varietal *catimor*, members of La Esperanza were phasing it out because it produces lower quality coffee that fetches a lower price in the international market. The difference in focus between CECOCAFEN and ADDAC replayed itself at the primary coop level, with ACOPAN members generally more knowledgeable about farm ecosystem management and La Esperanza members better appreciating the importance of producing high-quality coffee.

While La Esperanza members frequently take advantage of the superior extension services offered by ADDAC, ADDAC and its affiliated cooperatives are increasingly taking advantage of the superior marketing opportunities provided by CECOCAFEN. Though La Esperanza members were forbidden from joining ACODALIA, CECOCAFEN was planning to market organic coffee from ACODALIA and ACOPAN to its own clients. CECOCAFEN has been so successful in forging relationships with downstream buyers that demand for its organic coffee has outstripped its considerable supply. This has created an opportunity for the ADDAC affiliated cooperatives to receive higher than usual prices for their coffee, made possible through these cooperatives' relationship with CECOCAFEN via ADDAC.

ACOPAN and the other ADDAC affiliated cooperatives also take advantage of processing opportunities created by CECOCAFEN's dry-milling facilities, which were purchased in 1999. Named SolCafé (literally "Sun Coffee"), the acquisition of these facilities was both a major gain of economic capital for the cooperative, and a clear example of how social capital can facilitate the accumulation of more capital, social or otherwise. A dry-mill is where farmers must send their coffee after all of the production processes that can be carried out on the farm have been performed.[52] SolCafé enables small-scale farmers to capture value for their coffee that had previously been out of reach (and thus forfeited to others), as did CECOCAFEN's purchase of an export license, which was made shortly before the purchase of the mill.

CECOCAFEN was able to purchase SolCafé and improve its pre-financing program for its members because of a US$245 150 loan from the ecumenical lending organization,

[52] Some farmers are capable of performing more production processes than others on their farms, but none can commercially dry-mill their coffee. More details on dry-milling and the significance of capturing this process are provided in the next chapter.

Oikocredit. It was able to access these funds (in part) because it was a cooperative representing the interests of a large number of small-scale farmers, as is Oikocredit's preference (Oikocredit Project Funding Criteria). The procurement of this loan was also enhanced by the support it received from its affiliated NGOs, cooperatives, FLO, and Fair Trade buyers, who facilitated the process and provided the necessary technical assistance. CECOCAFEN was therefore able to acquire a crucial piece of capital because of the social capital inherent in its considerable open network, which in turn, enhanced its members' (and cooperatives like ACOPAN's) social capital.

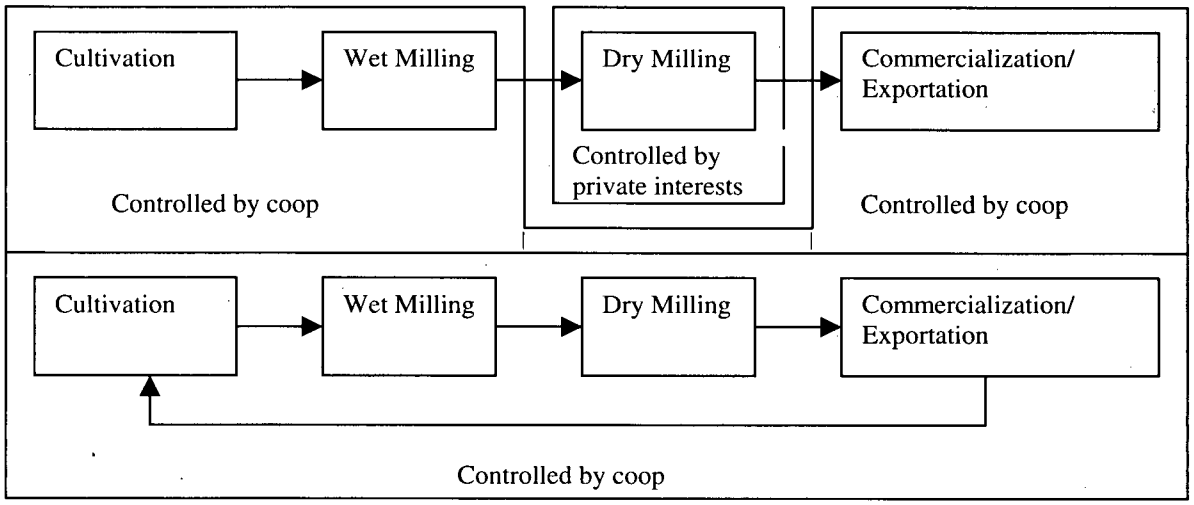

Figure 4.3: CECOCAFEN before and after the purchase of SOLCAFE

Source: CECOCAFEN employee, 2004
Notes: Capturing the dry mill closed a loop that facilitated control over:
1. Quality
2. System performance

SolCafé was a particularly important acquisition because, besides capturing value from dry-milling services, it continues to enhance the value of CECOCAFEN's coffee and the cooperative's social capital. As indicated in Figure 4.3, the acquisition of SolCafé created a "feedback loop" that has enabled CECOCAFEN to monitor and improve quality, which has subsequently led to greater demand and higher prices for its coffee. As well, SolCafé has improved CECOCAFEN's profile in the region and in the coffee industry (as the owner of a large certified organic dry-mill), and strengthened relations between it and other cooperatives in the area, including the ADDAC-affiliated cooperatives like ACOPAN, who use the services CECOCAFEN can now provide.

CECOCAFEN's ability to improve the quality of its coffee increased dramatically with the installation of a cupping laboratory in 2000.[53] As part of a project initiated by a Fair Trade and organic certified roaster in the US and funded by USAID, CECOCAFEN received the training and infrastructure necessary to understand the quality needs and language of gourmet buyers, who often pay premium prices. These benefits are in addition to enabling the cooperative to modify its production processes in order to improve the desirability of its coffee

[53] "Cupping" is a process in which coffee is subjected to various tests and scored to indicate its flavour, texture and aromatic qualities. Similar to wine tasting, coffees that "cup well" are often sold for premium prices in the specialty market (see next chapter).

to international buyers (Bacon 2005). As was the case with SolCafé, it was CECOCAFEN's relationship with this Fair Trade buyer and the resources available to him (social capital) that led to the acquisition of facilities and training that increase the value of its coffee (physical and human capital respectively). The benefits of the cupping lab are made available to all customers of SolCafé, including ACOPAN, thereby increasing their capital and resource generating capacities as well.

4.7 Chapter Summary

Whether through major capital acquisitions such as a cupping lab or dry mill, or more humble achievements like the Experimenters and seed-sharing program, the cooperatives clearly demonstrate the underlying tenet of social capital - that opportunity is borne through association. Through cooperation, the members of ACOPAN and La Esperanza have well surpassed their original goals of securing higher prices and sharing costs. Expanding and strengthening their relationships with other farmers and extending their networks to international partners, they have reaped dividends in economic, human, and natural capital. As well, these farmers would not have access to the Fair Trade and organic markets were it not for their involvement with their cooperatives.

On the other hand, the Fair Trade and, to some extent, the organic coffee market would not exist in Nicaragua were it not for the extensive social capital embedded in, and perhaps embodied by, the cooperatives on which they rely. Without the agrarian policies of the Sandinista socialist project, the groundwork for the modern Nicaraguan cooperative would not have been laid. Moreover, had there not been a divestment of state assets and a withdrawal of successive governments from the coffee sector, CECOCAFEN could not have obtained a dry mill or export license. Thus, the cooperatives and the Fair Trade and organic markets owe a great deal to social and political processes that preceded them.

However, while the Fair Trade and organic markets certainly rely on pre-existing social capital, they have been instrumental in farmers accumulating more. Particularly by way of the higher prices available through these markets, the cooperatives have been able to attract new members and acquire more resources to provide better services to them. As well, through participation in these markets, CECOCAFEN, ADDAC, ACOPAN, and La Esperanza have had more reason and opportunity to interact, and to develop the relationships with each other. For instance, CECOCAFEN providing opportunities for ACOPAN to sell its coffee through the organic market, or ADDAC's expertise in organic agronomy being sought by both members of La Esperanza and CECOCAFEN.[54] This process of strengthening relationships through increased interaction and the extension of networks continues to replay on the national and international levels. As the cooperatives expand in scale and scope, their value to the Fair Trade and organic markets also increases. Thus, there is an iterative effect on social capital accumulation that results from the involvement of the cooperatives in these markets.

As to whether the social capital of cooperatives should be seen as being for the good of the group or the good of the individual, the answer is both. The influence of the individual is certainly evident in a smaller and less complex cooperative like ACOPAN, but even here the collective takes on a life of its own as members come and go but the cooperative remains. With a cooperative as large and complex as CECOCAFEN, that life becomes more apparent with the cooperative appearing more like a (powerful) person with close relationships to its more than

[54] Apparently La Esperanza began moving towards organic certification after a member of the BoD was invited by an ADDAC technician to visit the farms in Pancasán to see the advantages or organic production.

2000 members. Farmers draw on resources from CECOCAFEN rather than from the people who sit on the board or manage the cooperative, and the cooperative, not necessarily its board or managers, have relationships with international buyers and organizations. Yet relationships between members and managers are apparent even with a cooperative of this size, and individuals engage in political activity that may or may not affect the direction of the cooperative itself.

Nevertheless, understanding cooperatives and their functions are clearly important to understanding the influence of the Fair Trade and organic markets on forested coffee ecosystems in Nicaragua. CECOCAFEN and ADDAC (as a proxy for ACOPAN) maintain the relationship with the organic and Fair Trade certifiers on behalf of ACOPAN and La Esperanza, and any programs or adjustments required to meet certification criteria are initiated at this level. Indeed, it is typically the cooperatives that initiate the certification process rather than the certifier. Moreover, the social and environmental programs initiated by the cooperatives (or a support organization like ADDAC) often go above and beyond certification requirements. These programs, such as the seed sharing program and the Experimenters group, transmit valuable environmental knowledge to farmers that will create a legacy that will last for years to come.

Chapter Five – Coffee Environments and Global Value Chains

In the previous chapter, farmers' relationships with and via their cooperatives, as well as with support NGOs such as ADDAC, were shown to be invaluable conduits for resources that, among other things, inform and enable farmers to positively affect their environments. While these organizations remain the primary influencers, the enterprise of growing and selling coffee itself can entail land-use behaviours mandated by forces originating far from the cooperative, particularly when selling to markets that have explicit environmental criteria. Price volatility, regulatory frameworks, industry standards, market access, and market power can all have an effect on how a coffee ecosystem is managed; from slightly altering the coffee plot to leading the farmer to abandon the crop altogether. These processes are best explained in reference to the literature on global value chains (GVC).[55]

The global value chain framework is used in this chapter to understand the financial context in which small-scale farmers sell their coffee and, in particular, why they choose to access the Fair Trade and organic coffee chains. Access to either requires certification by organizations external to the chain that legislate and monitor compliance with specific criteria. Of particular interest here are those criteria intended to affect particular changes within the coffee ecosystem. The certification criteria associated with these two value chains are presented within a larger conception of *chain governance*, which is a unique and central component of the GVC literature.

5.1 Structure of a GVC – What does it look like?

A GVC "consists of inter-organizational networks clustered around one commodity or product, linking households, enterprises, and states to one another within the world-economy", and moreover, "these networks are situationally specific, socially constructed, and locally integrated, underscoring the social embeddedness of economic organization" (Gereffi and Korzeniewicz 1994: 2). Essentially, it is a network of firms that are connected to one another through their involvement in the production and trade of a particular product, in this case coffee (Gereffi and Korzeniewicz 1994; Sturgeon 2001). Actors are treated as input-output structures through which the product passes from conception to end-use, with each actor controlling a different bundle of production processes or marketing functions. While this could include everything from seed design to recycling, with coffee this normally means cultivation to consumption (see Figure 5.1; Gibbon 2001b; Ponte 2002; Talbot 1997; Taylor 2005; Waridel 2002).

Beyond providing a map of the actors associated with a particular product, the GVC framework allows for some analysis of the relationships that exist between chain actors, including the degree of implicit control that some actors have over others, as well as the influence that non-chain actors (such as governments, certification bodies, etc) have on a GVC and its actors (Gereffi and Korzeniewicz 1994; Gereffi 2003). For instance, agency within the GVC framework is as much a function of how much competition a firm faces and its ability to reduce it, as it is the size of the firm's operations or the particular activities it performs. As well, it is common for chain actors to actively work to increase the competitive pressures facing their suppliers and buyers while simultaneously working to reduce their own (Kaplinsky 2000).

[55] The GVC literature was previously known as the Global Commodity Chains literature, but recently dropped "Commodity" for "Value" to acknowledge that it was applicable to products and services that were not commodities.

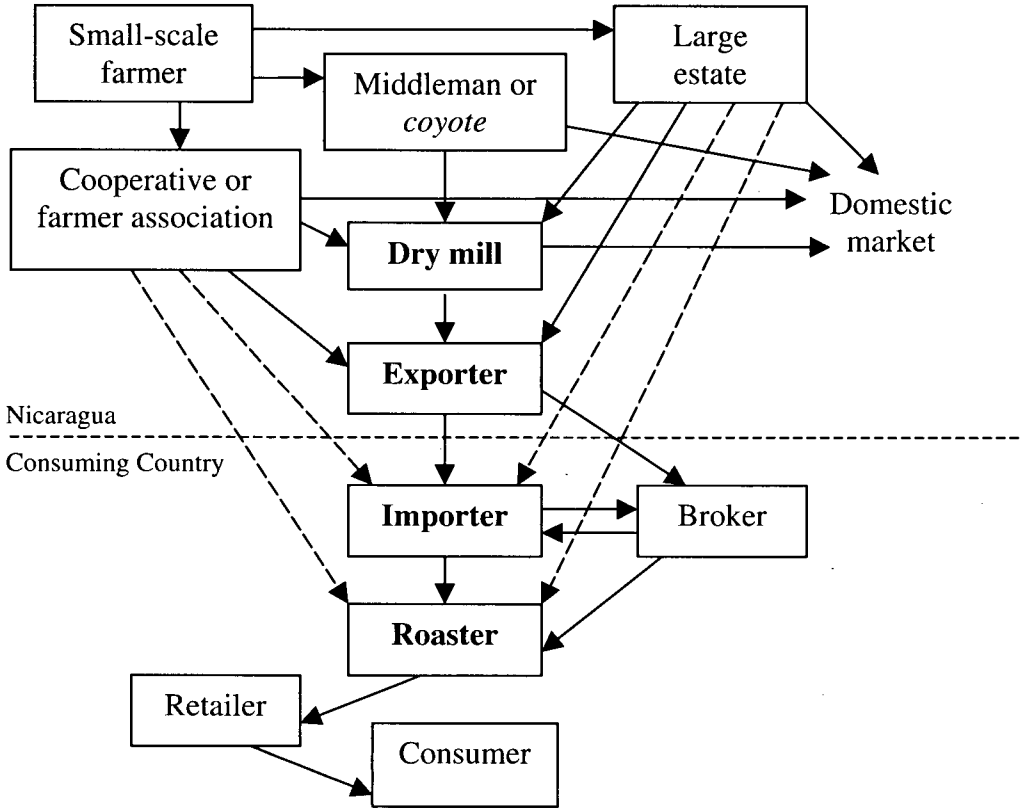

Figure 5.1: General structure of the Nicaraguan coffee value chain

Notes:

1. Items in bold are necessary process stages, meaning they cannot be bypassed. For example, a cooperative with a direct link to an importer must have dry milling and exporting capabilities.
2. Linkages represented by dashed lines are likely only to occur in the specialty markets.

5.1.1 The Nicaraguan side of the coffee GVC

Farmers with coffee plantations of less than 20 manzanas (14 hectares) are considered to be small-scale coffee farmers, and collectively represent 97.63 percent of Nicaragua's coffee farms and produce 47.89 percent of its coffee (see Table 5.1). These farmers predominantly rely on family labour to manage their plots, although those with farms towards the larger end of the spectrum may employ temporary labourers during the harvest (Bacon 2005). Employment of one or two permanent workers is not unheard of among the largest in this category, but does not appear to be the norm. According to interviews, the majority of small-scale coffee farmers in Nicaragua are able to process their coffee to the *pergamino* or parchment stage of production (see Figure 5.2).[56] This means these farmer control any value associated with cultivation of the coffee tree, harvesting the coffee cherries, separating the two beans from each cherry, fermenting

[56] There were some reports that some farmers in other regions sold their coffee still encased in the coffee berry, presumably at a much lower price. This could be the result of a lack of sufficient technology (de-pulping machine) or sufficient water (most likely). In other water-scarce regions, coffee is often left to dry before depulping, which loosens the mucosal layer without the need for washing, albeit with a negative impact on the quality of the coffee. This method is called the "dry method" and the coffee is referred to as *unwashed*; the one above is known as the "wet method" and produces *washed* coffee.

and washing away the sweet mucilage layer surrounding the beans, and drying them sufficiently to prevent mildew from forming. These activities are not included in Figure 5.1 because most small farms and all large farms in Nicaragua are capable of performing them.

Table 5.1: Typology of coffee producers, and farm and harvest data for Nicaragua

Farm size (mz)*	# of farms	Total area (mz)	2000/01 Production (qq oro)	Average productivity (qq/mz)**	Group productivity (total qq oro/ total mz)**	% of farms	% of area	% of production
Total	48,038	154,286	1,800,000	11.63	11.67	100.00%	100.00%	100.00%
< 5 mz	41,698	51,428.6	263,000	1.76	5.11	86.80%	33.25%	14.61%
5 < 10	3,636	34,285.7	175,000	2.63	5.10	7.57%	22.16%	9.72%
10 < 20	1,568	30,000	424,000	5.13	14.13	3.26%	19.67%	23.56%
20 < 40	732	20,000	284,000	7.70	14.20	1.52%	13.11%	15.78%
40 < 80	245	11,428.6	394,000	13.94	34.48	0.51%	7.09%	21.89%
80 <	159	7,142.86	260,000	20.91	36.40	0.33%	4.72%	14.44%

Source: CEPAL 2002

*Original area data presented in hectares. (1 manzana = 0.7 hectares)

**Average productivity statistics were based on studies prior to 2000/01 harvest. Group productivity figures were not included in CEPAL report, and are included here to facilitate comparison with the productivities of groups included in this study. (Qq. pergamino x 0.485 = qq. oro exportable (approx))

According to interviews, small-scale farmers in Nicaragua have few options and little power when marketing their coffee, particularly when they are unassociated. Individually they have no possibility of processing their coffee beyond the pergamino stage, and so must rely on intermediaries who can transform it into an exportable product. Normally this involves the use of middlemen, commonly known as *coyotes*, who purchase the coffee directly from the farmer and in some cases provide farmers with their only access to credit (see also Waridel 2002). Coyotes themselves vary according to the functions they perform and in some cases may be large coffee plantation owners, though this was not corroborated in interviews (Spoor 1995). They are also sometimes portrayed in the literature as agents who simply transport coffee to the next processing stage but who have little or no control over it, and who offer credit at enormous interest rates (Gresser and Tickell 2002; Waridel 2002). For example, researchers working in Mexico have documented cartel-like behaviour among some coyotes who reportedly carved a region into exclusive territories in order to create small monopsonies. Complete control over market access allowed each coyote to depress farm-gate prices well below what would occur in a competitive environment (Milford 2004; Waridel 2002). However, while these "transporter-type" coyotes are reputed to exist in Nicaragua (Bacon 2005), La Esperanza members reported selling their coffee to any of several purchasing agents employed by different large agro-export companies prior to joining the cooperative. These companies maintain satellite offices throughout the area, and have both dry mills exporting capabilities.

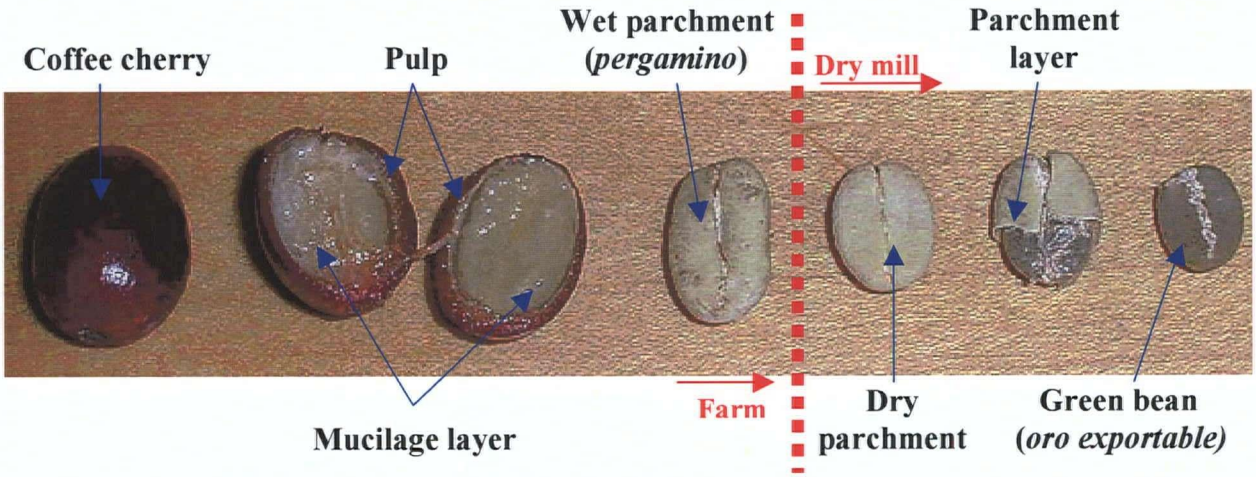

Figure 5.2: Processing stages from coffee cherry to green bean
(photo courtesy of John Vendeland)

Once the pergamino coffee reaches a dry mill, it must undergo several processes in order to be transformed into export-grade green coffee (*oro exportable*). The coffee is first dried beyond the point to which most farmers are capable (ideally in the sun on concrete patios, though the use of petroleum-based furnaces is common in the industry to the detriment of quality). After drying, the light-coloured shell known as the parchment (*pergamino*) is removed to reveal the green bean inside, which is then sorted according to size using large machines that can process thousands of pounds of coffee per day. After sorting, the coffee is spread on conveyor belts where workers (typically women) cull any defective beans. Defects can include beans broken during processing, misshapen beans, beans with a bad smell, or those infested with the eggs of the coffee borer beetle. International markets require a lower defect count than domestic markets, and even the beans destined for export will be subjected to varying degrees of scrutiny depending on whether it is meant for the specialty market or not.

Dry milling is an essential process to the coffee GVC, takes approximately two months, and cannot be bypassed. A cooperative could purchase a dry mill and thus control this node of the value chain (as CECOCAFEN purchased SolCafé), however the cost and expertise involved is considerable. Alternatively, a cooperative or large farm may be able to purchase dry milling services where such services exist. However, individual small-scale producers must sell to intermediaries because they lack the resources to contract dry milling services.

After the coffee has completed this stage it is ready to be exported, either by the owner of the dry mill, who may also possess exporting capabilities, or a separate exporting agent. The route taken by the coffee to reach the final consumer depends largely on the market in which it belongs (i.e. specialty versus commodity grade) and the roaster, who will transform the green beans to the consumable fragrant brown that will eventually be ground, brewed, and consumed.

5.2 A Recent History of Coffee

The Nicaraguan coffee value chain has undergone considerable change over the last twenty-five years. The significant changes that occurred from 1980-1989 were entirely domestic and the product of the Sandinista agricultural policies discussed in the previous chapter. However, subsequent changes to the coffee chain were the product of both international and domestic realities, and had an enormous impact on coffee producers. While these latter changes left farmers more exposed to the volatility of the market, they also created opportunities for some to capture a greater share of the value associated with downstream processes, and pursue higher value markets than they would have been able prior to 1989.

5.2.1 The Rise and Fall of the International Coffee Agreements

From 1962 until 1989, coffee was traded within a market managed by a series of successive regimes called International Coffee Agreements (ICA), which regulated coffee prices through export quotas for producing countries (Bohman et al. 1996; Gresser and Tickell 2002; Ponte 2002). The International Coffee Organization (ICO), whose membership is comprised of both producing and consuming countries, was the venue through which the ICAs were negotiated with the purpose of keeping coffee prices between US$1.20/lb and US$1.40/lb (ICO History). Producers agreed not to exceed their quotas unless demand pushed prices higher than the top of the price band, and ICAs were periodically renegotiated according to changes in the coffee market. Prices for coffee rarely dropped below the desired price band, and occasionally exceeded it (Gresser and Tickell 2002).

However, in 1989 several key member countries withdrew from the ICO, most notably the largest coffee consumer and producer nations (United States and Brazil respectively), effectively undermining its ability to manage the coffee market through export quotas (Bohman et al. 1996; Gresser and Tickell 2002). Ponte (2002) offers several explanations for the withdrawal of key member states, including a desire by some producing countries to be free of quota restraints as they pursued new programmes of export-led development, changing geopolitical realities, which included less concern over the Latin American left in the United States (hence little need to ensure stability in the countryside), and a reflection of the pervasive ethic of unfettered markets in top trade policy circles (see also, Bacon 2005).

Whatever the reasons, world prices immediately dropped following the breakdown of the quota management regime and continued on a downward slide, as they were no longer subject to negotiated agreements and producers were free to export more of their production than their quotas had previously allowed (Bacon 2005; CEPAL 2002; Osorio 2002; Ponte 2002; Topik 2002).[57]

[57] For example, the average monthly indicator price for Other Mild Arabicas, the group to which Nicaraguan coffee belongs, fell 30 percent between June and July of 1989. Actual drop was from 125.32 US cents/lb to 88.09. Price fluctuations over the same two-month period in the previous and subsequent four years never exceeded 6 US cents (see Appendix E for monthly price data).

Table 5.2: Production, Export and Price (Other Mild Arabicas only) Data (ICO Members and Nicaragua), 1983-2003

Years	Average Indicator Prices (Other Mild Arabicas)	Total Production (ICO Member Countries)	Total Export (ICO Member Countries)	Prices Paid to Grower (Nicaragua)	Total Production (Nicaragua)	Total Export (Nicaragua)
1983	n/a	89,263,000	66,258,206	126.1133333	812,000	1,100,852
1984	144.64	83,991,000	68,623,256	176.6125	851,000	709,112
1985	146.05	90,170,142	71,358,837	88.5225	709,000	704,443
1986	194.69	81,194,000	64,511,480	54.455	766,000	558,243
1987	113.62	107,914,000	71,951,340	82.0875	647,000	654,445
1988	137.60	89,461,000	65,815,827	41.90333333	645,000	549,127
1989	108.25	94,120,000	75,912,370	8.5425	689,000	611,048
1990	89.46	93,321,000	80,561,589	4.394444444	461,000	671,184
1991	84.98	101,552,000	75,776,723	44.14	708,000	392,053
1992	64.04	88,913,000	78,162,537	44.14	548,000	635,946
1993	70.76	90,366,000	74,972,056	*not available*	706,000	476,466
1994	150.04	95,154,000	70,487,350	*not available*	684,000	623,514
1995	151.15	85,250,000	67,572,526	*not available*	985,000	681,179
1996	122.21	101,865,000	77,548,875	*not available*	793,000	822,356
1997	189.06	95,872,000	80,263,653	*not available*	1,084,000	714,003
1998	135.23	106,164,000	80,079,606	*not available*	1,073,000	940,584
1999	103.90	115,087,000	85,777,352	*not available*	1,532,000	983,691
2000	87.07	112,679,000	89,429,556	*not available*	1,595,000	1,345,016
2001	62.28	109,675,000	90,378,655	*not available*	1,116,000	1,364,592
2002	61.54	121,948,000	88,471,880	*not available*	1,199,000	955,402
2003	63.99	100,691,251	85,793,736	*not available*	1,395,334	1,013,237

source: International Coffee Organization
Notes: All prices in US cents/lb; export and production figures in 60kg bags

Then in the 1994/95-harvest year, Brazilian coffee was hit hard by frosts, which cut its production by 46 percent from the previous year and had a significant effect on world prices (Gresser and Tickell 2002; Osorio 2002).[58] The loss of Brazilian coffee caused the price of *Arabica* coffee (higher quality; most common variety grown in Central America) to spike from approximately US$0.79 in January of 1994 to US$2.22 by September (Other Mild Arabicas). This spike was followed by a slow decline to US$1.06 in December 1995, and then a gradual increase leading up to another spike to US$2.67 by May 1997 that has been attributed to market speculation (Ponte 2002; EFTA 1998; ICO historical price data). While the breakdown of the quota management system created conditions that allowed producing countries to more easily ramp up production, it was the Brazilian frosts and subsequent speculative spike that provided the main impetus for a massive overproduction that was largely responsible for what the ICO has described as the lowest coffee prices in real terms in a century (Osorio 2002; Ponte 2002).

[58] Brazil is the single largest producer of coffee, and is responsible for more than 30 percent of global production.

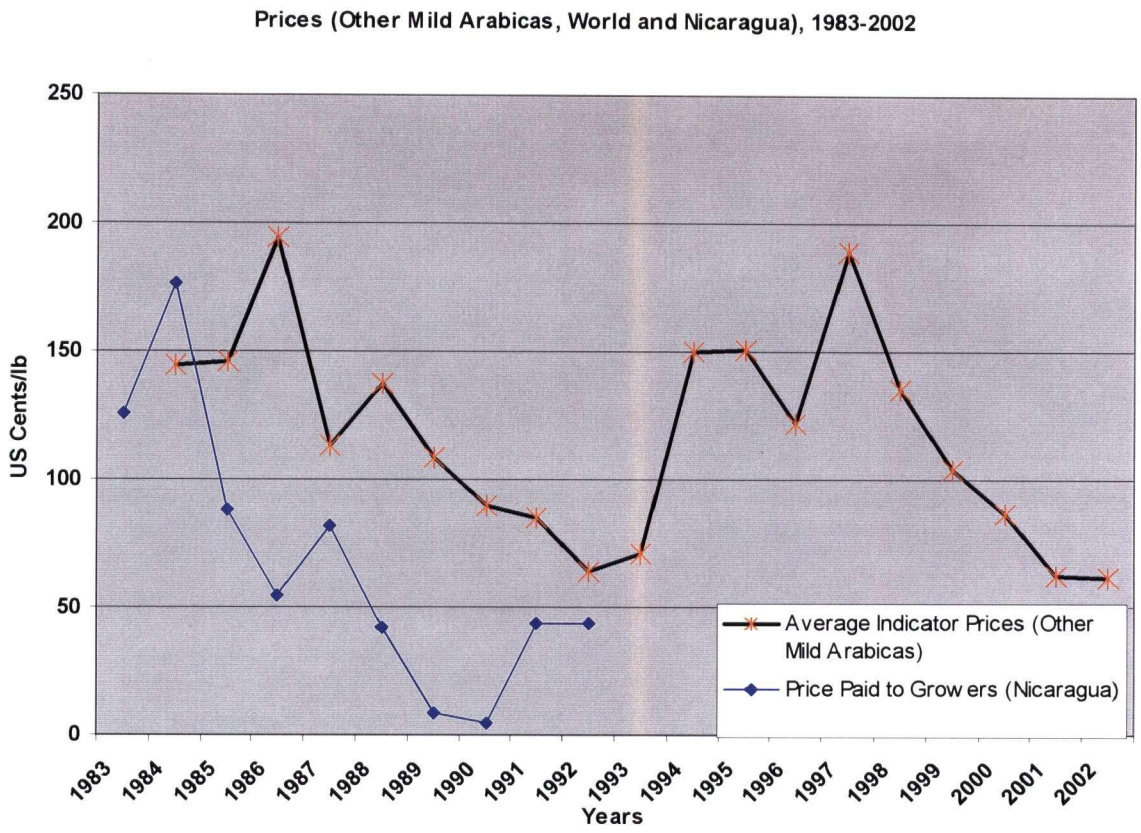

Figure 5.3: Prices (Other Mild Arabicas, World and Nicaragua), 1983-2002

The most dramatic example of this expansion occurred in Vietnam, where exports of coffee (*robusta*; lower grade variety) rose from about 1 million bags in 1989 to almost 14 million bags by 2001, which amounted to an increase of 1286 percent (see Appendix F).[59] Through this, Vietnam single-handedly increased global exported coffee by 16 percent (above 1990 levels), making it the second largest exporter of coffee in the world. Brazil also contributed significantly to world overproduction by moving its coffee farms to less frost-prone regions and intensifying industrialization of both its *robusta* and *arabica* production (Brando 2004; Gresser and Tickell 2002; Osorio 2002). The combined effect of these efforts increased Brazil's exports from 18 377 380 to 23 172 405 bags (26 percent increase) over the same period as the Vietnamese expansion (ICO historical price data; Gresser and Tickell 2002). Where the constriction of Brazilian coffee raised global prices, its and Vietnam's expansion had the opposite effect in a climate where overall world demand for coffee remained relatively static (Gresser and Tickell 2002; Osorio 2002).[60]

[59] A "bag" of coffee = 60kg.

[60] According to the chairman of the Vietnam Coffee and Cocoa Association, the country plans to cut total area planted with coffee (500 000 hectares) by 20 percent by 2005 due to the unexpectedly poor prices (caused in part by Vietnam's expansion) (BBC 2003).

5.2.2 Consolidation of Market Power

While excess supply of coffee put significant downward pressure on international prices, it was not the sole cause of their decline. Prices were also negatively affected by the consolidation of power among large multinational companies around key value chain nodes, and the introduction of new roasting technologies that effectively increased supply by allowing lower quality coffee beans to be used (Gresser and Tickell 2002; Ponte 2002; Talbot 1997; Topik 2002).

One of the key conditions that allowed for a successful quota management regime in the ICAs, was that the governments of many producing countries either controlled the coffee that was produced within their borders or had control over how much was exported. For example, the Sandinista government of Nicaragua maintained some control over coffee production by way of credit and extension programmes, and through their control over the cooperatives they had established following the Revolution (Spoor 1995). In addition, it established a national monopsony to which all coffee produced in the country was to be sold, and thus had total control over the marketing of Nicaraguan coffee as well (Colburn 1986; Spoor 1995). By contrast, Indonesia retained control through the selective issuing of export licenses, which in turn allowed them to regulate the amount of coffee leaving the country (Bohman et al: 1996). Control over coffee exports meant that producing countries had the power to both negotiate favourable terms for their coffee, and to ensure their ICA quotas were honoured (if they deemed it in their interests), hence prices could be maintained at a reasonably high level.[61]

However, conditions attached to bilateral and multilateral loans throughout the 1990s required recipient governments, including Nicaragua, to withdraw involvement in markets and more generally reduce their size (Close 1999; Spoor 1995). As discussed in the previous chapter, this meant the end of government-run credit and extension services in Nicaragua, and the dissolution of coffee marketing boards and the government monopsony. With state involvement in the coffee sector removed, dominance in the coffee industry shifted towards downstream actors (Ponte 2002; Talbot 1997).

For example, large international traders (exporter/importers who operate in several countries) began to consolidate their power by taking advantage of the favourable conditions presented by both the oversupply of coffee on the market and the absence of large "producer units" with which to bargain, a function that would previously have been performed by producer states. Taking advantage of the low prices these conditions created, larger traders began to build up their own inventories just as stocks in producing countries were diminishing (Ponte 2002; Talbot 1997). This would insure against future price spikes that would normally occur in response to interruptions of supply, and could allow them to collectively prolong periods of low producer prices, regardless of what occurred with supply or demand (Ponte 2002).[62] The market volatility of the 1990s also led several mid-sized traders to suffer heavy losses, leaving them unable to compete with larger traders. Consequently, these larger traders either bought mid-

[61] Interestingly, while this control facilitated higher international prices, these prices did not necessarily translate into higher prices for producers. In the case of Nicaragua, the government had a policy of paying producers in the grossly over-inflated national currency, while it received US dollars from international buyers. This allowed the government to retain an enormous share of the value of the coffee, and served as an important source of hard currency. In Indonesia, the government would distribute export licenses to friends and allies who in turn would sell coffee bought from local producers at domestic prices, which were well below prices in the international market (Bohman et al. 1996; Spoor 1995).

[62] The accumulation of coffee stocks within consuming countries has created a buffer that retards price increases that would otherwise occur in response to declining production (Gresser and Tickell 2002). This is perhaps in part why prices only increased by about US$0.03 in 2003 (to US$0.64) despite production falling 20 million bags from the previous year, putting it just below 1996 production levels when the average indicator price for Other Mild Arabicas was US$1.22 (ICO historical price data).

sized traders out or allowed them to go bankrupt, which further consolidated their power in the coffee value chain. By 1998, six companies controlled 50 percent of all internationally traded green coffee (Ponte 2002).

Large roasters also began to strengthen their position in the coffee chain during this period, and achieved even greater concentration than occurred among international traders (Talbot 1997; Topik 2002). Five companies (Philip Morris, Nestle, Sara Lee, Proctor & Gamble, and Tchibo) controlled 69 percent of the world's roasted and instant coffees by the end of 1998, with Philip Morris and Nestle alone in control of 49 percent of the total market (Ponte 2002). This strong position allowed roasters, whose profits were primarily derived through marketing and branding, to offload inventory management to international traders. In turn, this has led international traders to become more involved with upstream activities, including some integration of dry milling and estate production, to meet the changing demands of the large roasters. In order to reduce their dependence on international traders, some roasters also engage in direct sourcing from producer country-based exporters so as to create alternative supply channels for strategic origins.[63] As well, roasters developed alternative blend recipes that would allow them to substitute one origin for another without significantly affecting flavour, should supply of those origins become threatened (Ponte 2002). Lastly, roasters developed a new steam-based technology, which improved the flavour of roasted robusta and lower-grade arabicas beyond what is normally possible. This effectively increased available supply because it enabled the use of lower quality beans that previously would not have been usable, placing additional downward pressures on green coffee prices (Gresser and Tickell 2002).

Evidence of roasters' success in consolidating their power within the coffee value chain vis-à-vis other actors is perhaps best demonstrated by how the coffee dollar has shifted in geography since the fall of the ICA quota regime. From 1980/81-1989/90 producing countries captured roughly 20 percent of the total retail value of coffee, while 55 percent was retained in consuming countries. However from the end of this period until the price spike of 1994/95, producing countries' share had dropped to 13 percent, while the value retained in consuming countries surged to 78 percent (Talbot 1997). These significant gains were not only made at the expense of growers, millers, and exporters in producing countries, but also at the expense of international traders. Roasters were able to do this because they occupied a highly concentrated node (i.e. fewer firms) that was crucial in the coffee value chain (the process that makes coffee drinkable), which allowed them to maintain retail prices despite international prices for green beans having dropped by roughly 50 percent during the post-ICA period (ICO Historical Price Data; Ponte 2002; Talbot 1997).

5.2.3 Impacts on Nicaraguan Growers

Because a general survey of the socioeconomic effects of low international prices for coffee was not part of this study, it is difficult to know exactly how and to what extent Nicaraguan growers were affected as a whole. However, scattered reports and conversations with small growers and others connected to Nicaraguan coffee help provide some insight into the matter. For example, the United Nations' Food and Agriculture Organization (FAO) reported that coffee provided more than half of Nicaragua's agricultural export earnings prior to 2000, but since the drop in prices and resulting production losses, its value to the economy was halved by 2003 (FAO 2004). Moreover, poverty rates among farmers who remained in coffee over the period from

[63] An origin is a coffee that comes from a single source, usually a specific region or estate, but sometimes a country. Because coffees from different regions can have considerably different taste properties, it is important for roasters to have a stable supply of coffees that are key to their blends.

1998-2001 increased by 2 percent while poverty in rural households not associated with coffee declined by 6 percent. Incidences of respiratory illness, diarrhoea, skin diseases, and chronic malnutrition for children under 5 years of age in and around Matagalpa were also higher than the national averages, and were attributed to the state of the coffee sector there (Lewin et al. 2004; WFP 2002).

According to Bacon (2005), vulnerability to the coffee crisis varied according to location on the value chain as well as access to land, credit, employment, and social networks. Other important factors, some of which are implicit in his discussion, include size of farm and production methods used, access to alternative coffee value chains, importance of coffee relative to other livelihood activities, and involvement with more formalized social networks such as cooperatives and growers associations. For example, according to interviews in both La Esperanza and ACOPAN, no member of either organization had ever lost their farm because of low coffee prices, and all believed they would retain their farms for the foreseeable future. The higher prices available through their cooperatives, from organic and Fair Trade buyers in particular, were cited as the primary reason for their confidence. As was mentioned in Chapter Three, the diversified nature of small farm production mitigates the impact of low coffee prices as well.

Some interviewees also believed that even among small-scale farmers outside of the cooperatives, relatively few lost their land because of low coffee prices since it was virtually impossible for them to obtain credit. This meant that few carried debts when prices dropped and so fewer lost their farms because of insolvency. According to these farmers, limited credit for small-scale farmers had been available from large international trading companies acting as *coyotes*, but these sources were cut off by 2001.[64]

In contrast, larger farms (and by extension their workers) appear to be more financially vulnerable to low coffee prices than small farms for a combination of three factors: mode of production, availability of credit through banks, and the centrality of coffee to the farm. Production on larger estates normally entails considerable up-front financial costs that are not necessarily incurred on smaller farms. As discussed in Chapter Three and suggested by Table 5.1, large farms are more productive than their smaller counterparts, however achieving such productivity entails higher front-end costs (such as agrochemicals, labour, etc) that must sometimes be paid well before the farmer is able to sell the harvest (CEPAL 2002; Perfecto et al 1996). Large operators draw on credit that is available to them through banks in order to cover these costs and repay their debts once they sell their coffee, provided revenues are sufficient to do so. It has been estimated that production costs for green coffee on large Nicaraguan coffee farms vary from US$0.78-1.08/lb, and by the harvest of 2000/01, the international price for Nicaraguan coffee had already sunk to US$0.69/lb (Other Mild Arabicas less Nicaraguan differential (US$0.03/lb)), and remained below cost until the 2004/05 harvest period (Bacon 2005; ICO historical price data).

This discrepancy between production costs and international prices led to massive worker dislocation as large farms could no longer afford to pay their workers, leaving coffee labourers destitute on roadsides and in parks throughout Matagalpa and the rest of the country (Monsarrat 2002; WFP 2002). It has been estimated that by 2002 Nicaraguan coffee workers had already lost 4.5 million workdays as a direct result of the Coffee Crisis (CEPAL 2002). Complicating the issue was the closure of ten private banks and three state banks, in large part due to substantial outstanding debts in the coffee sector, which in turn led to foreclosures on large debtor farms (CECOCAFEN 2004). According to the United Nations' Economic Commission

[64] It should be noted that everyone who commented on this issue admitted that they did not personally know anyone who had actually lost their farms, and that they were either speculating or speaking from rumour.

for Latin America and the Caribbean (CEPAL 2002)[65], by 2002 some 500 to 3000 Nicaraguan coffee producers had either lost their farms or were in the process of losing them. Farmers, technicians and others in Matagalpa also described large operations abandoning coffee altogether in favour of other activities, notably cattle ranching, and it is likely that more farms have gone bankrupt since the CEPAL report as well.

Although most small farmers were not at risk of going bankrupt because of the Coffee Crisis, low coffee prices have led to other hardships. Where it is the primary cash generating activity, such a drop in coffee prices represents a considerable blow to overall family income and requires difficult decisions as farmers struggle to find areas where they can cut back on spending. Two of the more common areas are medicines and school fees for children, where worsening health among farmers' families and a 5 percent drop in primary school enrolment in Nicaraguan coffee producing areas were reported during this period, despite enrolment increasing by an average of 10 percent in other rural areas (Bacon 2005; Lewin et al. 2004). As well, CECOCAFEN managers reported a period of massive cooperative attrition during the Coffee Crisis and some of the 1990s (CECOCAFEN 2004).

5.3 Alternative Value Chains: Specialty Coffee

The majority of coffee traded in the world is what is referred to here as "commodity grade coffee", which means coffees that are traded in large volumes and not especially well-differentiated from one another. The prices listed in Table 5.2 are yearly price averages for the international trade of commodity grade coffees (in this case, the Other Mild Arabicas group). However, since the 1980s and especially throughout the 1990s, "specialty" or "gourmet" coffee has been making significant inroads in the coffee market, and in 2001 involved an estimated 17 percent of total US coffee imports by volume and 40 percent of the retail value (Bacon 2005, originally from Giovannucci 2001). What distinguishes specialty coffees from their commodity-grade counterparts is a reputation for higher quality and invariably higher retail prices. As well, specialty roasters are more inclined to differentiate coffee according to region, estate, and possibly even plant type in order to take advantage of variations in taste that can occur even within a semi-local context. Conversely, roasters of commodity grade coffees normally render such variations invisible by differentiating only by country when developing their blend recipes (Ponte 2004; Ponte and Gibbon 2005).

The specialty coffee value chain is also slightly different that that for commodity grade coffee. Referring back to Figure 5.1, specialty roasters and certainly most specialty importers/traders tend to develop closer relationships with producers and dry-millers in order to both pursue and develop the highest quality coffees (Ponte and Gibbon 2005). According to informal interviews with roasters and importers in both Matagalpa and Canada, it is not unusual for medium-sized specialty coffee roasters to purchase directly from estates or cooperatives, though purchasing through importers is much more common. Nevertheless, the potential benefits to producers that come with participation in this chain are considerable. While demand for specialty coffee is considerably less than demand for commodity grade, so too is the supply as the vast majority of coffee produced in the world is not of sufficient quality, including most produced in Vietnam and Brazil (Gresser and Tickell 2002; Osorio 2004). Moreover, the emphasis on distinctive flavour characteristics of different coffees produced in different regions further reduces the competitive pressures on producers because their coffee is less substitutable with coffee produced elsewhere than is the case in the conventional market (Ponte and Gibbon

[65] Comisión Económica Para América Latina y el Caribe (CEPAL)

2005). As well, specialty roasters require a consistent supply and quality of coffee, and are often willing to pay considerable sums of money to obtain it.

For example, the auction price for the 2003 winner of the Cup of Excellence Nicaragua competition, an annual event that seeks to identify and market the highest quality coffees, was US$7.05/lb for a lot of 6600lbs at a total value of US$46 530.00 (Cup of Excellence 2003). To contrast this with the conventional market, the average ICO indicator price for Other Mild Arabicas in the same year was US$0.64/lb, which would be traded in lots of 37 500lbs for a total value of US$24 000 (ICO historical price data; Infinity Trading Corporation 2001). While average prices paid for gourmet coffee are not normally as high as the auction prices for the best coffees in the Cup of Excellence competition, specialty roasters do pay more than do roasters of inferior coffees (Bacon 2005). Moreover, the desire for consistency of particular flavour and aroma characteristics favour more enduring buying relationships and therefore more stable demand for a producer's coffee.

However, while the prices paid by specialty roasters for green coffee are higher than those paid by commodity grade roasters, the premiums do not necessarily affect the prices actually paid to the grower. The determining factor is the number of intermediaries between the roaster and the grower, and the relationships between them (see Figure 5.1).

For instance, a medium or small-sized roaster may purchase all of his or her coffee from a large importer, who will price coffees according to flavour qualities, procurement costs for the importer, nature of the relationship between the roaster and importer (including the relative importance of the roaster's patronage to the importer), demand for a particular coffee, and the importer's supply of it. On the other side, an importer negotiates prices according to the relative bargaining power of the exporter, estate, or cooperative from which he or she is buying, including how aware the seller is of the quality/value of the coffee in question, how easily the coffee can be substituted with one produced by someone else (product competition), the supply of the coffee relative to the demand for it, and the price the coffee would go for in the conventional market. If the importer buys coffee from an exporter, then the exporter will buy from the next actor up the value chain according to the same considerations. Hence price is primarily a function of the competitive pressures facing buyers and sellers, the extent to which each party recognizes how those pressures affect the other, and the perception of each regarding the value of the qualities embedded in the product itself (Gereffi 2003; Humphrey and Schmitz 2001). Generally, actors upstream of the importer are at a disadvantage, since competition normally increases whilst knowledge of a coffee's worth decreases the further up the chain one goes. Consequently, actors downstream of the grower can (and often do) capture any quality premium paid by the specialty roaster, leaving the grower completely unaware that such a premium ever existed (Kaplinsky 2000).

For example, several new members of La Esperanza reported receiving commodity-grade prices from international traders prior to joining the cooperative, despite their coffee being of sufficient quality to be channelled through the specialty market after they joined. Whether the international trader captured a quality premium or simply sold the coffee through the conventional value chain along with inferior beans is unknown, however the issue remains the same; individual small-scale farmers as a whole are unable to access the premiums available for specialty coffee. On the other hand, farmers who are able to shorten the distance between themselves and roasters on the value chain, and who manage to redefine competitive pressures (i.e. form cooperatives/producer associations, improve quality, increase demand for their coffee (brand and market)), find themselves in a better position to capture a greater share of the value of their coffee (CECOCAFEN 2003; Kaplinsky 2000; Morgan 2000; Ponte 2004).

5.3.1 Rent or Own: Upgrading on the Coffee GVC Through Cooperation

For small-scale farmers it appears that the first step necessary to shortening the coffee value chain is to form or join some form of cooperative, of which the benefits of doing so were described more fully in the previous chapter. From a GVC perspective, cooperatives enable small-scale farmers to invest in initiatives that make their coffee more appealing to downstream buyers, such as those related to quality improvements, improving and expanding services, or simply reducing the logistical costs a buyer would face if buying form individual farmers directly.

As well, the formation of cooperatives holds considerable value with respect to reducing regional competition between growers. To some extent a cooperative is an agreement of non-competition between producers, and the more producers that are included, the more regional competition between farmers is reduced, thereby improving their bargaining position (Kaplinsky 2000; Milford 2004). For example, presuming small-scale could even access the specialty coffee chain, a farmer on his or her own would face significant competition from similar growers both nationally and internationally, particularly if the flavour characteristics of the foreign coffee were similar to the grower's own. However, if all of the farmers in a region join cooperatives, what were thousands of alternative suppliers for downstream buyers may be reduced to a few. This not only enhances the bargaining power of these farmers vis-à-vis said buyers, it can also improve prices for non-members as the cooperatives increasingly divert their coffee supply away from local markets and *coyotes* (Milford 2004).

The step following the formation of a cooperative depends entirely on the opportunities and resources available to the coop, as well its purpose and underlying direction. For example, as discussed in Chapter Four, La Esperanza formed CECOCAFEN with several other cooperatives and UCA in order to obtain to improve their overall bargaining power and access higher-value markets. Because CECOCAFEN only operates in coffee markets, it made sense to vertically integrate downstream processes in order to allow more direct relationships with buyers and capture a greater share of their coffees' value. Therefore, CECOCAFEN obtained an exporting licence, acquired SolCafé, and began marketing its coffee internationally. In Figure 5.4 we see that CECOCAFEN has integrated all processes in the value chain that would normally occur in a producing country, thereby capturing any value added through those processes and allowing them to negotiate directly with international buyers.[66]

CECOCAFEN's integration of downstream processes and its policies regarding them has also provided non-members with opportunities to shorten their own value chains without having to integrate these processes themselves. Rather than act as an intermediary in others' chains, CECOCAFEN allows non-members to purchase milling and export services at preset rates. This provides non-members with a *virtual integration* of downstream processes, since they can bypass one or more downstream actors without having to actually integrate the processes that those actors control into their own operations. With these services, non-members effectively shorten their value chains, and can potentially secure a greater share of the value of their coffee. ACOPAN provides an excellent example of a producer group that has been able to improve its position on the coffee value chain through virtual integration. As discussed in the previous chapter, ACOPAN was formed as part of a larger project run by ADDAC designed to restore the environment of the Nicaraguan Humid Zone. As a result, ADDAC has provided ACOPAN members with a range of services of more value in the local context than perhaps even CECOCAFEN has provided its own members. For example, farmers can use credit obtained

[66] CECOCAFEN is listed as the exporter in this diagram because it holds the exporting licence. However, its operations include everything within the coop boundaries.

through the ADDAC system for purposes unrelated to coffee, ADDAC technicians provide advice and training regarding soil, water, animals, and any crop, and members are connected to ADDAC's multi-community seed-sharing programme.

However, while ADDAC's more local focus has resulted in ACOPAN members enjoying greater environmental and economic diversity than La Esperanza members, it appears to have come at the expense of achieving as strategic of a position as La Esperanza (via CECOCAFEN) on its value chains. ACOPAN has been able to cultivate direct relationships with buyers from Canada at very favourable terms through logistics, transportation, and communications services provided by ADDAC, but these direct trading relationships could not exist without the purchasable milling offered by SolCafé/CECOCAFEN, and the export services of another coop. Nevertheless, the availability of these services has enabled ACOPAN to shorten its value chains without needing to develop the internal capacity necessary to integrate the downstream processes normally required to do so.

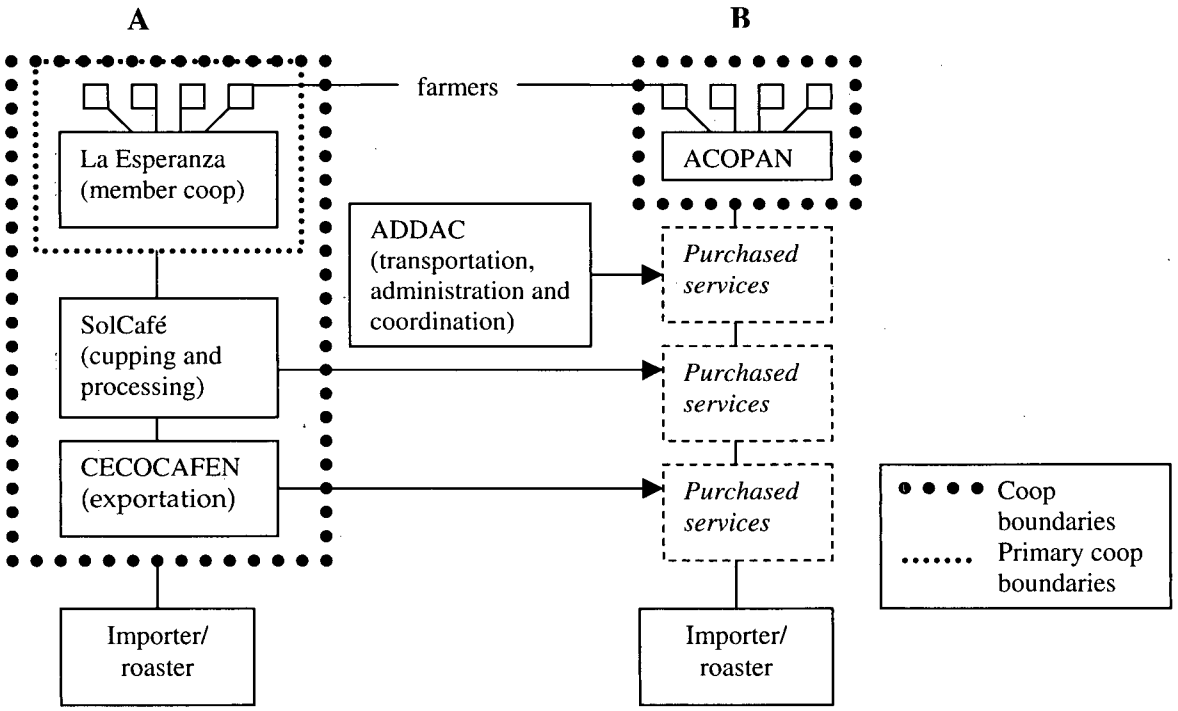

Figure 5.4: Vertical integration versus *virtual* integration

Notes:

Column A describes how coffee flows within and from CECOCAFEN, as a vertically integrated firm occupying several nodes of the coffee value chain.

Column B describes how ACOPAN can retain control over its coffee until the point of exportation by purchasing the services necessary to do so. Normally vertical integration of downstream processes would be required to retain this level of control.

5.4 Alternative Value Chains: Fair Trade and Organic

Small-scale farmers in Nicaragua who do not belong to cooperatives having achieved either actual or virtual integration to the point of exportation appear to be effectively shut out of the Fair Trade and organic value chains in Nicaragua. In the case of Fair Trade, cooperatives must be capable of producing an exportable product as a condition of certification (FLO 2004). In the case of organic coffee, producer groups simply require sufficient vertical integration to access international organic buyers.[67] Thus, as with specialty coffee, farmers will need to have some control over downstream processes if they are to capture any of the additional value located in these chains.

Indeed, for the most part Fair Trade and organic coffees seem to occupy space that was created by the success of the specialty market, and their value chains are only slightly modified versions of the specialty chain. Because Fair Trade and organic coffees retail at equivalent prices to specialty coffees, quality is important in order to capture greater market share. Therefore, beyond any requirements mandated by organic or Fair Trade certification, producers must be able to provide roasters or importers with a reliable supply of high quality coffee. Those producers who are able to meet these conditions are more likely to receive higher prices for their coffee than if they were to sell exclusively to the conventional or domestic markets, in some cases by several times (see Tables 5.3 and 5.4).

Table 5.3: Average prices reported at the farm gate for the 2000-1 harvest

Where did you sell your coffee?	Price paid per pound of green coffee (oro exportable)*	How long before you were fully paid?	How many farmers sold to each market?
Coop - direct to roaster	US$ 1.09 (0.04)/lb	33 (6.1) days	11 farmers
Coop - Fair Trade**	US$ 0.84 (0.07)/lb	41 (86.6) days	36 farmers
Coop - organic**	US$ 0.63 (0.11)/lb	73 (78.4) days	61 farmers
Coop – conventional	US$ 0.41 (0.04)/lb	46 (62.9) days	84 farmers
Agro export company	US$ 0.39 (0.04)/lb	24 (50.3) days	51 farmers
Local middleman	US$ 0.37 (0.02)/lb	9 (27.3) days	72 farmers

Source: Bacon 2005. Based on participatory farmer survey conducted from July to August 2001
*Numbers in parenthesis are standard deviations
**No price given for coffee with both organic and Fair Trade certification

It was difficult to establish exactly how much money farmers would receive for their coffee from the different markets, as many farmers and other sources did not seem to know and responses from others often did not agree. Variability across respondents could be attributable to several factors, including the time of year when the coffee was sold, whether the figure was for money received by the farmer or cooperative, and how the particular cooperative established prices it paid its members (e.g. created an average price for entire coop, kept prices from different markets separate, created "probationary prices" for new members, etc.). Consequently, the average price data provided by Bacon (2005) are considered to be more correct than my own, in large part because they were derived from a much larger sampling population. However,

[67] Interviews at ADDAC and CECOCAFEN revealed that a local brokerage for organic coffee existed, but that it is also relatively small.

supplementary data has been provided when it is absent from the Bacon (2005) data, or where my own is confirmed and considerably different. Discrepancies are most likely the product of different policies among cooperatives. However it should be noted that at time of research, the "probationary price" (farm-gate) for new members of La Esperanza was $0.37/lb, which was 6.5 cents higher than what producers reported they would receive from local agro-export company purchasing agents at the time. This would put agro-export prices for the 2003/04 harvest at 8 cents less than 2000/01 price reported by Bacon (2005), despite average international prices for Other Mild Arabicas being only 1.5 less for the same periods (ICO: historical price data).

Table 5.4: Supplementary price data 2003-04*

ACOPAN - direct to importer/roaster	US$ 1.27/lb
La Esperanza - Fair Trade/organic	US$ 1.12/lb
La Esperanza - Fair Trade	US$ 1.02/lb
Coop - organic (ACOPAN)**	US$ 0.75/lb
Domestic market***	US$ 0.26/lb

*Farm-gate prices. (Actual prices less costs of transportation, processing, coop fees, certification and exportation (where applicable)).

**ACOPAN had not yet sold its surplus organic coffee through CECOCAFEN, for which prices were expected to be higher.

***Price does not include costs listed above, though said costs are lower for domestic market.

Similar difficulties were encountered when attempting to establish costs of production, as it was difficult to determine what was and was not included in cost calculations. For example, some farmers value their own labour and include it in their costs whereas others do not. However there was total agreement on dry milling and exporting costs (see Table 5.5). Costs additional to those associated with farm labour, dry milling, and exportation include transportation, certification (if applicable), and cooperative fees.

La Esperanza calculated its total costs to produce exportable organic green beans to be US$68/qq and actual farm production costs at US$39/qq, though it is not known how the cooperative arrived at this number. This figure is in line with other estimates for Nicaragua though, which include a range from US$49-79/qq for green beans from Matagalpa specifically (Bacon 2005), and an average national estimate of US$72.18/qq for farmers with less than 20mz of coffee (CEPAL 2002).

Assuming the *pergamino* cost provided by members of La Esperanza is correct, then prices for the domestic and conventional markets did indeed drop below small-scale farmers' costs of production, which makes access to alternative value chains such as organic and Fair Trade all the more important. Indeed, the purpose of including the costs, prices, and requirements of the different value chains here is to provide a clear understanding of why producers seek to participate in the Fair Trade and organic chains, and why they are willing to submit to certification criteria required to do so.

Table 5.5: SolCafé /CECOCAFEN dry milling and exportation fees (US$)

CECOCAFEN Members			
Destination	Dry Milling	Exportation	Total
Fair Trade and specialty market	$ 7.00	$ 10.00	$ 17.00
Conventional market	$ 6.50	$ 8.50	$ 15.00
Organic market	$ 9.00	$ 10.00	$ 19.00
Non-members			
Conventional market	$ 6.00	$ 9.00	$ 15.00
Organic market	$ 9.00	$ 10.00	$ 19.00

Source: CECOCAFEN document, dated January 19, 2004

Higher prices aside, the organic and Fair Trade value chains are structurally similar to the specialty coffee chain, except that within the Fair Trade chain, importers or roasters are expected to engage certified cooperatives directly. Thus, there are no intermediaries in Nicaragua and there is little room for brokers in the chain. For the producers, this means they must have either integrated all processes to the point of export or else be in a position to purchase those services as ACOPAN does, in addition to any extra requirements for certification (FLO 2002). All other differences between Fair Trade, organic and specialty coffee chains relate to chain governance rather than structure.

5.5 Governance in Coffee Value Chains

While firms located on a value chain may be legally independent of one another, some chains involve different degrees of coordination between actors in order for them to function properly (Gereffi 2003; Gereffi and Korzeniewicz 1994; Gibbon 2001b, Humphrey and Schmitz 2001). One of the most important features of the Global Value Chain framework is the concept of chain governance, which normally refers to efforts taken by "lead firms" to coordinate activities and divide labour among other actors within the chain. How much inter-firm coordination is required can be a function of several factors, including: the nature of the product and the processes involved in transforming it to its final state, the production and logistical capabilities of chain actors, and the requirements of lead firms (Gereffi 2003; Humphrey and Schmitz 2001). The term "lead firm" refers to those actors who are able to affect the activities of other firms on the chain, and the general structure of the chain itself. Thus, large roasters act as lead firms when they offloaded responsibility for inventories to international traders, and the practice of maintaining limited trade relationships with exporters who have access to key origins is a strategy roasters use to maintain their position of dominance over traders (Ponte 2002; Ponte 2004).

Humphrey and Schmitz (2001) offer five clear reasons why we should pay attention to how a value chain is governed and by who. To begin with, lead firm preferences can determine who is allowed to participate in a chain and who is shut out. For example, large supermarket chains in the UK changed their sourcing strategies in order to become compliant with new governmental regulations. Preferred suppliers were not necessarily the most efficient, but rather were those that allowed for sufficient transparency for supermarkets to demonstrate their responsiveness to changing consumer, governmental, and non-governmental expectations regarding labour, health, safety, and environmental performance. This favoured sourcing from large farms for African produce, and effectively barred small-scale producers from the value

chains in which they had previously been a part (Dolan and Humphrey 2000). Requirements for organic certification similarly exclude farmers unable to afford or demonstrate compliance with organic criteria, such as individual small-scale farmers, as do requirements for Fair Trade certification, such as the need for producers to be part of a cooperative. Thus, governance is a prime determinate of *market access*.

Chain governance activities can also affect the *development of supplier capabilities*, as lead firms generally prefer to maintain a good supply base without the need for frequent (and costly) intervention in suppliers' operations. Regardless of whether the result of changing demands on the part of lead firms or bringing new chain participants up to speed on chain requirements, lead firms have an interest in developing their suppliers' abilities to meet their needs. Suppliers in this situation soon find themselves more competent at the tasks they are meant to perform and with a better sense of the value chain itself, despite any temporary loss of autonomy. These additional skills and capabilities can often in turn be used to the supplier's advantage in dealings with other firms, or may provide the knowledge necessary to successfully upgrade on the GVC. This certainly occurs in the specialty coffee chains, where roasters and importers (particularly those in the Fair Trade chain) advise CECOCAFEN on marketing strategies, and have assisted the cooperative in developing quality controls (as was discussed last chapter regarding the cupping lab).

On the other hand, as a lead firm develops the capabilities of new suppliers, it can be to the detriment of existing suppliers who now face increased competitive pressures. Lead firms by definition control chain activities characterized by high barriers to entry and less competitive pressure. Traditionally this has meant activities requiring a high level of technical competency or substantial capital, such as manufacturing. However, the value of these traits has been eroded as Southern operators have developed their manufacturing capabilities, which is why lead firms (often located in Northern countries) often abandon these activities in favour of research and development, design, marketing, and brand management. These activities are somewhat sheltered from competitive pressures because of intellectual property protections (Kaplinsky 2000). Hence, governance activities can affect the *distribution of gains* among chain actors (Humphrey and Schmitz 2001). For example, whether the value captured by CECOCAFEN through its quality investments will be threatened in the future by a larger overall expansion of high quality coffee supply is unknown. However, what is known is that producing countries were advised by several organizations to mitigate the low prices of the Coffee Crisis by improving the quality of their coffee, and some, notably Brazil, have begun to do so (Brando 2004; Osorio 2003; Gresser and Tickell 2002)

Fourth, an understanding of chain governance lends itself to identifying *leverage points for policy initiatives*, particularly in situations where lead firms are subject to the regulations of an external body. For example, precisely because lead firms are disproportionately located in Northern countries, Northern governments and NGOs are increasingly recognizing that environmental and labour rights objectives can be met by setting policy directed at lead firms. Put another way, if we are concerned with the environmental and labour practices of an unknown supplier of company "x", then it makes sense to, "hold x responsible precisely because x will have worked with the supplier, discussing product design, manufacturing (or growing) processes, quality systems, and can exercise pressure to change them" (Humphrey and Schmitz 2001: 3). The City of Vancouver's recent decision to require that all City suppliers of apparel be in compliance with International Labour Organization (ILO) core conventions and that all agricultural products be Fair Trade certified where possible is an example of policy grounded in chain governance (Corrigan 2005).

Lastly, Humphrey and Schmitz (2001) suggest that bilateral and multilateral agencies may be able to create a *funnel for technical assistance* by linking their initiatives to lead firm

activities, and that some agencies have begun experimenting with the approach. Specifically, these agencies may be able to offer more targeted and appropriate assistance when equipped with a better understanding of how the relevant value chains function. As described in the previous chapter, CECOCAFEN's cupping lab is a clear example of this potential, as it was created as part of a project initiated by a roaster based in the United States and funded by the US Agency for International Development (USAID).

However, it should be noted that governance activities are not the sole purview of lead firms. Indeed, non-governmental organizations (NGOs), governments, or any other body capable of imposing standards on chain actors can engage in chain governance. As well, lesser firms (re: not lead firms) may be able to exert some control over the operations of even less powerful actors than themselves. Raphael Kaplinsky (2000) appears to be one of the first to acknowledge that actors other than lead firms can engage in governance activities, including those external to the GVC. He also usefully differentiates between different types of governance activities by categorizing them as *legislative*, *judicial*, or *executive*.

As indicated in Table 5.6, *legislative governance* refers to the setting of standards to which some or all chain actors must adhere, *judicial governance* refers to activities involved with monitoring adherence to applicable standards, and *executive governance* refers to activities intended to develop actors' capacity to meet legislative standards. Using these categories allows us to easily incorporate the activities of actors external to the coffee value chains into a larger concept of chain governance, as will be demonstrated in the next section.

Table 5.6: Examples of legislative, judicial and executive value chain governance

	Exercised by parties internal to chain	**Exercised by parties external to chain**
Legislative governance	• Setting standards for suppliers in relation to on-time deliveries, frequency of deliveries and quality	• Environmental standards • Child labour standards
Judicial governance	• Monitoring the performance of suppliers meeting these standards	• Monitoring of labour standards by NGOs • Specialized firms monitoring conformance to ISO standards
Executive governance	• Supply chain management assisting suppliers to meet these standards • Producer associations assisting members to meet these standards	• Specialized service providers • Government industrial policy support

Reproduced from Kaplinsky 2000: 13

5.6. Certification Standards and Coffee Ecosystems

Fair Trade and organic environmental standards are examples of legislative governance exercised by agents external to their respective coffee chains and, at least with the organic market, represent important entry barriers. As well, where these standards effect desirable changes in coffee farm management or support positive pre-existing features of a coffee ecosystem (i.e. greater biodiversity and structural complexity), the Fair Trade or organic value chains can be useful mechanisms for policy initiatives with environmental objectives. The value of Fair Trade and organic environmental certification criteria must also be seen within the context of the larger specialty and commodity grade coffee chains, in which there are no such criteria.

5.6.1 Fair Trade

The Fair Trade value chain is partially governed by two levels of external actors to which chain actors voluntarily submit (Ponte 2004). The first level involves only one organization, the Fairtrade Labeling Organizations (FLO) International, which primarily concerns itself with the certification of producer groups, and the setting and monitoring of standards with which licensees must comply. Into the other category fall the twenty National Initiatives (NI), which are generally responsible for the certification of firms located in the consuming countries in which the NI are based. NI are also responsible for setting and monitoring the standards to which these firms must adhere. With respect to coffee, these organizations collectively monitor the entire chain from producer to roaster, though the division of labour between FLO and the NI vary by country.

For example, TransFair USA monitors the activities of all actors in the United States participating in the Fair Trade coffee chain, from ensuring that US-based importers are buying from FLO certified cooperatives according to FLO-set standards to monitoring the activities of its certified roasters. Preferring to rely on the FLO's trade expertise, TransFair Canada concentrates on how roasters use the Fair Trade trademark and more generally market Fair Trade products, leaving monitoring of Canadian importers to FLO. In situations where roasters source directly from Fair Trade certified cooperatives, FLO will certify and monitor importing activities and TransFair Canada will certify and monitor roasting and marketing activities. The entire Fair Trade system is predicated on the importance of Fair Trade standards to consumers, and the ability of Fair Trade actors and certifiers to transmit compliance with those standards to them. Thus, of central importance is preserving the integrity of the Fair Trade trademark, including FLO/NI control over its meaning and how licensees apply it to their products.

Participation in the Fair Trade coffee chain requires that actors meet various social, business, and environmental criteria set by FLO and/or TransFair, in addition to any other requirements (quality related, logistical, etc) associated with the greater specialty chain in which it operates (FLO 2000; FLO 2004). Beyond particular social and environmental objectives, these criteria also establish barriers to entry to the Fair Trade coffee chain. For example, coffee can only be sourced from organizations of small-scale farmers, the majority of whom must produce Fair Trade products and supply more than 50 percent of the organizations total output of Fair Trade products (FLO 2004). As well, in practice trading relationships between coffee importers or even roasters and producer cooperatives are more direct and enduring, with cooperatives often having achieved actual or virtual integration of dry milling and exporting

functions.[68] Consequently, the Fair Trade coffee chain is normally quite short, especially when compared to the conventional chain (see Figure 5.5).

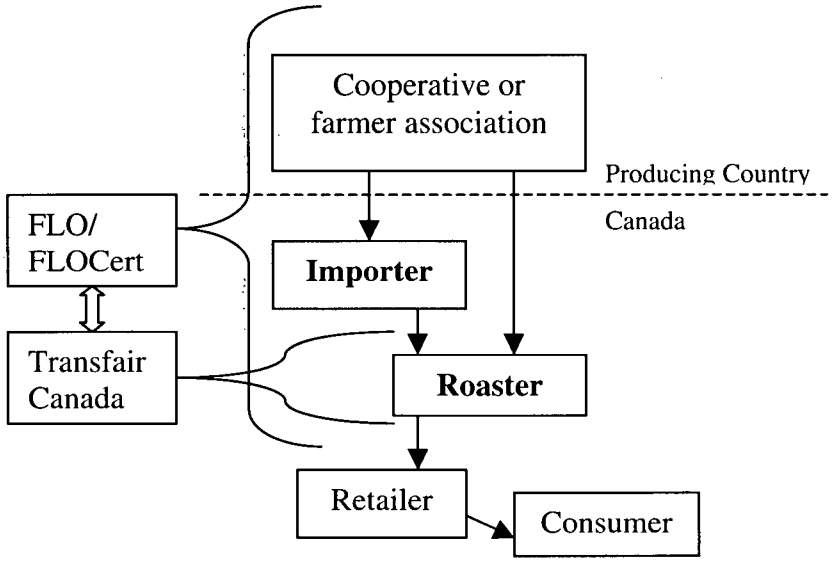

Figure 5.5: Monitoring the Fair Trade Coffee Value Chain (Canada)

Referring back to Kaplinsky, both FLO and TransFair are involved in legislative and judicial governance. However, while both operate and would be classified as agents external to the value chain, a curious feature of both is that licensees (actors internal to the chain) are involved with setting the standards to which they will ultimately be held accountable. For example, Fair Trade traders (importers/exporters) and producer organizations elect representatives to the FLO Board of Directors, Standards and Policy Committee, and Certification Committee every three years. Since these groups set much of the criteria associated with certification, legislative governance in the Fair Trade coffee chain (with respect to FLO criteria) is only quasi-external. Judicial governance regarding FLO criteria occurs within a similar structure, except actual monitoring and site inspections are conducted through a network of independent inspectors who report back to FLO Certification Ltd. (FLO Cert), which itself has some autonomy from FLO. FLO Cert then compiles the information produced from the independent field visits for review by the Certification Committee (FLO 2000). Lastly, FLO actively engages in executive governance with respect to developing producer organizations' business and production capabilities, and also requires that certified importers and roasters engage in such activities (FLO website: www.fairtrade.net). For example, FLO requires that importers enter into contracts (with FLO) that commit them, "to facilitate the development of FLO Certified Producers", and that this support can be, "on [the importers'] own initiative or at the request of the FLO Producer Support Network or a FLO mandated NGO" (Young 2002: 15).

With respect to environmental criteria, FLO requires that producers, "live up to national and international legislation regarding the use of pesticides, handling pesticides (storing, filling,

[68] There have been cases where cooperatives have opportunity for neither actual of virtual integration, and are forced to sell to private intermediaries (such as exporters). In these cases, FLO and the intermediary will draft a contract that outlines various conditions, including the price paid to the cooperative. FLO/TransFair does not prefer this chain.

cleaning, administration, etc.), the protection of natural waters, virgin forest and other ecosystems of high ecological value, erosion and waste management" (FLO 2002: 5). FLO also proscribes the use of chemicals listed by the World Health Organization as class 1 a+b, the Pesticide Action Network's "dirty dozen", or those appearing on the FAO/United Nations Environment Programme's Prior Informed Consent Procedure List. In addition, FLO expects producer organizations to "encourage [their] members to implement a system of Integrated Crop Management [ICM]" (FLO 2002: 5). The definition of ICM is vague, and appears to be little more than incorporating social, environmental, and economic considerations into land-use decisions, based on objectives set by the producers themselves or their organizations. Though such decisions are in the hands of the producers, FLO clearly favours the gradual replacement of synthetic agrochemicals and conventional farm management techniques with their organic counterparts. FLO both encourages and assists cooperatives wishing to embark on this process, including eventual organic certification if the producers so desire (FLO 2000).

While approximately half of the members of La Esperanza were certified organic or in transition to become so, interviews and informal discussions with farmers elicited no connection between FLO environmental criteria or preferences and farmers' decisions to seek organic certification. Moreover, no more than 10 percent of all cooperative members used synthetic chemicals on their farms, and none reported a significant change in chemical use since joining the cooperative or FLO certification (whichever was more recent). Of those members identified as currently using synthetic chemicals, only three were found to be using anything more than urea fertilizer pellets. One of these three used several different (non-proscribed) fertilizers, pesticides, fungicides, and herbicides, the second used small applications of insecticide to combat leaf cutting ants, and the third reported using gasoline to combat large nests of the same type of ant. The banks of watercourses running through members' farms were forested, reportedly in accordance with national laws, but generally the trees in these areas predated Fair Trade certification, and so could not be attributed to it. Indeed, interviews and discussions with farmers could not produce one link between FLO environmental criteria and members' land-use practices. In fact, no member reported FLO inspectors having ever visited their farms during an annual visit, though some believed other members had had their farms visited at some time. Moreover, interviewees' perceptions of land-use practices of non-members suggest that few small-scale coffee producers in Nicaragua operate below the environmental criteria set out by FLO, and that some degree of forested canopy was the norm on small-scale coffee farms. While it is conceivable (even likely) that CECOCAFEN's relationship with FLO has influenced its extension programmes and general drive towards organic certification, such a link could not be elicited through interviews with cooperative managers.

One environmentally significant link between the Fair Trade market and farmers' land use practices was encountered in La Esperanza and was completely unexpected. FLO requires that certified importers pay cooperatives a minimum of US$1.26/lb for non-organic and US$1.41/lb for organic green beans channelled through the Fair Trade coffee chain. The price paid for the former must always be at least US$0.05/lb higher than the price established on the New York futures market ("C" price), and the price paid for the latter must always be US$0.15/lb higher than the price for non-organic Fair Trade coffee. Referring back to Table 5.4, this meant an additional US$0.10 to the farmer for every pound of organic coffee sold through the Fair Trade coffee chain. While this premium for organic coffee predictably acted as an incentive for La Esperanza members to seek organic certification for their farms, farmers did not weigh the costs and benefits of certification the same way.

In one case, a husband and wife had come to different conclusions regarding the value of organic certification. The husband had been one of the first in the cooperative to receive his organic certification, and was a major proponent of having the entire cooperative certified

organic. His wife, on the other hand, was not convinced that organic certification was in her best interests. Although she had not yet used synthetic chemicals, she believed she could double her coffee production if she used urea fertilizer on her farm. She reasoned that she would be better off with double the production at US$1.02/lb through the Fair Trade market than she would be with the US$1.12/lb she would receive for organic (Fair Trade) coffee at her current production levels, but she had not yet made her final decision on the matter. When presented with this argument, her husband agreed that she would produce more coffee using chemicals, but said that he could sell 100 percent of his coffee at Fair Trade (organic) prices whereas Fair Trade buyers only purchased about 50 percent of the cooperatives non-organic coffee. Moreover, organic farmers could still sell surplus production to the same coffee markets available to non-organic markets, but the reverse was not the case. While discussion of the relative advantages and disadvantages of organic certification frequently occurred in subsequent interviews and conversations, on the whole La Esperanza members appeared to be moving towards organic certification.

Thus, while FLO environmental criteria did not have any obvious influence over farmers' land-use decisions, the combination of a fixed price premium and the Fair Trade market preference for organic over non-organic coffee appears to have created sufficient incentive for most farmers in La Esperanza to seek organic certification. If this is a general phenomenon, then as more producers decide to have their farms certified organic, organic environmental criteria become the de facto environmental criteria of the Fair Trade market.

5.6.2 Organic

As with Fair Trade, the organic coffee chain is partially governed by actors external to the chain that are engaged in various governance activities. However, whereas responsibility for Fair Trade standards lies in the hands of fairly integrated organizations connected through FLO, responsibility for organic standards fall to a range of independent and sometimes competing organizations. For example, while La Esperanza must be subject to criteria set and monitored by FLO in order to participate in the Fair Trade chain, ACOPAN was able switch from the Organic Crop Improvement Association (OCIA) to BioLatina for all of its organic certification and monitoring needs. The same is true on the other end of the value chains; Fair Trade roasters must submit to TransFair Canada, but may pay one of several organizations for organic certification and monitoring services.

This difference may be in part because Fair Trade is primarily concerned with the relations between producers and importers (such as whether minimum prices were paid, whether pre-financing was provided, duration of trade relationships, etc), and organics is more concerned with the processes applied to produce or transform a product (prohibitions on agrochemicals, soil building activities, contamination through products such as hand creams, etc) (Bacon 2005). Simply put, Fair Trade is primarily concerned with what occurs on the lines between the boxes on the coffee value chain diagram (Figure 5.1 or 5.5), and organics focuses on what occurs within the boxes. Since such relations between actors are much more difficult to codify and transmit than are production processes, it is in the interests of a consistent and meaningful standard that Fair Trade be monitored by either one organization or organizations that are fairly well integrated. As with Fair Trade, compliance with organic standards is transmitted via trademarks registered to the certifiers.

Any producer or producer group may be certified organic, regardless of farm size or organization. Provided a farmer can meet production, handling, and transport criteria, possesses the capacity to demonstrate compliance, and can afford certification fees, he or she may be

certified. As well, the organic value chain may (or may not) have more intermediaries between roasters and producers because of the irrelevance of relations between chain actors to organic criteria. Prices for organic coffees operate much the same way as prices for normal specialty coffees do, and may vary according to supply and demand, quality, and power asymmetry between buyer and seller, but are always at a premium. Unlike what occurs in the Fair Trade value chain, organic certifiers do not appear to engage in any form of executive governance. Both ACOPAN and La Esperanza reported receiving no assistance from OCIA or BioLatina to facilitate their conformity with organic standards, and neither cooperative received any form of institutional support from either certifier. Downstream actors were also not expected to provide this type of assistance as part of their own certification, which was performed instead by CECOCAFEN and ADDAC. Thus OCIA and BioLatina were solely involved in legislative and judicial governance, but only for the parts of the chain for which chain actors had contracted them. In this case, producers/cooperative, dry mill, and exporter.

As expected, environmental standards for participation in the organic coffee chain are much more stringent than they are for Fair Trade. Producers are expected to develop an organic production and management plan that must address, "plans for soil building and conservation, shade management, reforestation and/or restoration, crop protection (weed, insect, and disease management), vegetation management (including shade, if any), and a means for compliance with OCIA International Standards" (OCIA 2004: 34).[69] This plan is filed with the certifier, who monitors producers' implementation progress via biannual inspections (one scheduled and one not scheduled). As well, producers are expected to file a map of their farm, outlining what crops are grown where, and an ongoing schedule of work performed on the farm to the certifier. Standards are applied to a range of farming activities, including: prohibitions on the use of synthetic chemicals and genetically modified organisms, creation of buffer zones, soil building and conservation strategies, harvest and post-harvest activities (including wet milling), weed, insect and disease management, and to encourage biodiversity. Of specific importance to the preservation or development of forested coffee ecosystems within the basic criteria for coffee, OCIA requires:

4.9.2.b. As part of the organic management, reforestation and/or restoration plans must be developed to maintain sustainability of the coffee ecosystem.

4.9.3.b. Live barriers of trees and/or shrubs shall be maintained along roadways and sources of contamination.

4.9.7.a. A shade management plan that takes into account ecological conditions, the production system, and sustainability must be developed to maintain optimum ecological conditions and enhance biodiversity.

4.9.7.b. A diversity of tree species is encouraged when the soil and climatic conditions allow it.

4.9.7.c. The management system must attempt to establish and maintain conditions for both organic crop production and habitat for indigenous animals.

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[69] Only OCIA standards are cited here, despite ACOPAN and La Esperanza (members) both being certified by BioLatina, because a copy of BioLatina certification criteria could not be obtained. This should not pose a problem since, 1. both were certified by OCIA until recently (ACOPAN received OCIA certification during fieldwork), and 2., both OCIA and BioLatina are accredited certifiers under the National Organic Program of the US Department of Agriculture (USDA), the International Federation of Organic Agriculture Movements (IFOAM), and comply with the minimum organic standards under European as outlined in EEC Regulation 2092/91.

4.9.7.e. The coffee culture system must support populations of migratory and domestic birds that are common to the natural, non-agricultural parcels of forested land of the region or country. (OCIA 2004: 34-37)

In addition to the basic criteria, producers may seek supplementary certification for "shade-grown" (organic) coffee by meeting much more stringent criteria regarding shade management. These additional criteria include a minimum of 40 percent canopy in the coffee plot, at least 80 percent of canopy comprised of leguminous trees, allowance for fruit and other trees of economic importance, and a plan to further develop the forested ecosystem (OCIA 2004: 37-38). ACOPAN had shade-grown organic certification from OCIA, but it is not known whether BioLatina offers this additional certification. However, ACOPAN members and ADDAC agronomists both reported that there was no difference in requirements between the two organizations. It is not known whether the organic farms at La Esperanza have ever had shade-grown certification in addition to basic organic certification.

Despite more stringent environmental criteria, it was difficult to determine exactly how organic certification translated into healthier and more forested ecosystems when compared to those farms that were only certified for the Fair Trade market. As discussed in Chapter Three, farms in Pancasán tended to have thicker shade canopies secondary vegetation than did La Esperanza farms, however this could not be attributed to organic certification criteria. As well, three non-organic farms in El Coyolár (two of which used agrochemicals) were more forested than any other farm observed there, including farms that were certified organic. Nevertheless, organic farmers from La Esperanza believed that participation in the cooperative's organic program improved both their land-use management practices and the health of their farming ecosystems, although this could not be connected through observation or interviews to tree density, diversity, or canopy cover.

When asked whether he thought organic certification just meant farmers in Pancasán are paid more for things they would be doing anyway, one ADDAC agronomist said he did not think that was the case. While he gave no specific examples, he said that certification had been important for developing the ecosystem, and implied that the criteria had provided goals for ACOPAN and ADDAC to work towards. Nevertheless, it was impossible to identify which practices or features of the environment were the result of certification criteria, and which were solely the result of ADDAC's own initiative. This is largely because ADDAC was the agent involved with training ACOPAN farmers in organic production, including what was necessary for them to obtain organic certification (external executive governance). Farmers reported that organic inspectors provided them with no information or suggestions regarding their farm activities, and thus could not identify which of their practices resulted from the requirements of the organic market (via ADDAC), and those that just came from ADDAC. Interviewees within ADDAC could also provide no clear examples.

Regardless of whether or not certification criteria are responsible for improvements in land-use practices in Pancasán, participation in the organic chain has effectively placed a "floor" beneath organic methods that may have already been in place. That is, where certification criteria do not significantly alter existing land use practices, the higher prices of the organic coffee chain creates a financial disincentive to farmers who might otherwise abandon those practices in favour of easier or cheaper methods.

5.7 Chapter Summary

In terms of supporting forested ecosystems on small Nicaraguan coffee farms, the effectiveness of the explicit environmental criteria associated with the Fair Trade and organic value chains seems to be mixed.

Certainly, the organic environmental criteria are far more stringent than are the Fair Trade environmental criteria, especially when the criteria for supplementary shade-grown certification are taken into account. While it was beyond the ability of this study to conclusively demonstrate that these standards translate into more forested ecosystems, there is every reason to expect that they would. Expectations for a shade-management plan for each certified farm and frequent visits by qualified inspectors suggest that sufficient legislative and judicial governance measures are in place to ensure forested ecosystems are not lost to more productive "full-sun" methods. Even in situations where producers already manage healthy forested ecosystems using organic methods, as was the case in Pancasán, the price premiums available through the organic value chain create a financial incentive for farmers to continue doing so.

On the other hand, Fair Trade environmental criteria appear to have no effect on how Nicaraguan farmers manage their farms. FLO has no explicit criteria regarding the forested ecosystems normally found on small coffee farms in Latin America, and the standards it does apply to producers are few, vague, and appear to operate below most small-scale producers' existing land-use behaviours.

Moreover, specific examples of FLO's preference for organic farming methods translating into assistance to cooperatives wanting to adopt such methods or obtain organic certification could not be clearly identified. Nevertheless, CECOCAFEN managers credited much of the cooperative's development to actors within the Fair Trade value chain, and it was CECOCAFEN agronomists who implemented the coop's organic conversion program. If FLO or Fair Trade buyers have indeed facilitated CECOCAFEN's organic program, then their significance to forested ecosystems through organic certification is the result of both legislative governance over importers (in the case of FLO), and executive governance activities among producers (in the case of both FLO and Fair Trade buyers).

Perhaps the most tangible evidence of Fair Trade affecting coffee ecosystems was found in the relationship between the fixed Fair Trade premium for organic coffee and the preference for certified organic coffee among Fair Trade consumers. Although its influence is mitigated by the manner in which a cooperative chooses to pay its members, in La Esperanza it has created a situation in which most Fair Trade certified producers are drawn towards organic certification. If this phenomenon can be generalized beyond La Esperanza, then one of the most important environmental effects of farmers accessing the Fair Trade coffee chain is the spread of organic production methods.

Of course, it is the higher prices associated with these chains that leads producers to voluntarily submit to the governance of organic and Fair Trade certifiers, particularly within the context of low prices in other coffee chains. Despite the unavailability of credit (and thus foreclosure) for most small-scale farmers, these prices also encourage and enable them to continue producing coffee within their forested ecosystems, when they might otherwise reduce the size of their coffee plots.

The importance of the Fair Trade and organic chains must therefore be seen within the broader context of all other coffee chains accessible by small-scale producers. Excessive competitive pressures facing producers in the commodity grade and domestic chains combined with lesser competition among downstream actors, creates severe power imbalances that prevent small-scale producers from capturing much of the value of their coffee. Certification criteria, and to some extent quality expectations, serve to reduce the competitive pressures faced by

producers within the Fair Trade and organic chains, thereby improving producers' bargaining power. Likewise, the act of cooperation among coffee producers reduces the competition they face from each other, and strengthens their position when negotiating with buyers. Lastly, the additional criteria applied to Fair Trade importers, particularly those related to producer development, further improve producers' capabilities to operate on multiple value chains, and maximize the benefits of each. However, once again, this is only possible for small-scale coffee farmers when they belong to a cooperative with sufficient integration (or virtual integration) to produce an exportable product.

Chapter Six - Conclusions

This study was conducted in order to understand how the Fair Trade and organic markets connect to the forested ecosystems that were known to exist on small-scale coffee farms in Nicaragua. Of particular interest was the role of producer cooperatives, and local partner organizations like ADDAC, in mediating the relationship between these markets and producers' ecosystems, as well as generally furthering the social and environmental values underpinning Fair Trade and organic products. Specifically, it was hypothesized that participation in both the organic and Fair Trade markets would lead to the preservation and development of cooperatives, which would both improve the general welfare of small-scale coffee farmers and promote resource management practices that result in a higher degree of ecological integrity than would otherwise exist.

While several assumptions regarding the impact and relationship of the Fair Trade and organic markets to coffee ecosystems were incorrect, this study supports the overall validity of the hypothesis. That is, the resources that were obtained by the cooperatives through their participation in the Fair Trade and organic value chains enabled them to further improve the welfare of their members and the health of the ecosystems they managed. These resources came in the form of price premiums, market information, and opportunities to strengthen and expand their national and international networks. As well, the certification criteria associated with the Fair Trade and organic value chains were found to influence farmers' land-use decisions and in so doing affect coffee ecosystems, albeit often in unexpected ways. The manner in which these value chains, producer cooperatives, farmers, and forested coffee ecosystems interact is best explained in reference to the four research questions that were posed in the introduction.

6.1 Answering the Research Questions

6.1.1 Question 1

To what extent do Fair Trade and organic price premiums enable farmers to continue producing coffee within forested ecosystems?

As was discussed in Chapter Five, the notion that price premiums would protect forested coffee ecosystems by shielding small-scale farmers from bankruptcy appears to be false. While the literature, observed farms, and farmers' perceptions do agree that coffee grown on small-scale farms more typically occurs within a forested ecosystem, the fieldwork for this study suggests that most of these ecosystems in Nicaragua were not in any real danger from the Coffee Crisis, including those who only sold to conventional and domestic markets. Because small-scale farmers typically have little to no access to credit, few such farms were at risk of foreclosure when prices for coffee fell below production costs. Conversely, this is precisely why larger farms are more at risk of foreclosure than small farms. Access to credit combined with considerable up-front costs and lower than expected harvest prices left large farms with debts that could not be repaid.

This is not to suggest small-scale farmers were not at risk from the Coffee Crisis, or that large farms were more vulnerable. Beyond those small-scale farmers who actually lost their farms to debts owed to international trading companies, it has been well documented that such farmers and their families suffered considerable hardships because of the Coffee Crisis, particularly by way of reduced access to medicines, education, and goods produced off-farm.

Large farms were simply more vulnerable to farm foreclosure than were their smaller counterparts.

Although it cannot be concluded that Fair Trade and organic price premiums protect small, forested coffee farms from bankruptcy, it is possible that they helped cooperatives survive. Cooperatives are capable of acquiring debt, which can lead to insolvency. Access to Fair Trade and organic premiums, as well as the higher prices that can be found on the specialty chain, helped keep CECOCAFEN viable during a period of high attrition for Nicaraguan cooperatives. These premiums were rarely available to large farms (never in the case of Fair Trade) because of certification criteria (external legislative governance), or quality standards in the case of the specialty chain (internal legislative governance). While it is too early to determine, governance of these chains may have provided a significant, if largely overlooked, benefit to cooperatives by placing them in a strategic position where they could fill the void created by the loss of large farm production through bankruptcy.

Irrespective of whether or not small farms face bankruptcy, Fair Trade and organic premiums also do not appear to protect existing forested ecosystems from being completely substituted for non-forested agroecosystems during periods of persistently low prices. Small-scale farmers seem to be relatively price insensitive with respect to increasing or decreasing their production and size of their coffee plots. Therefore, it is not reasonable to assume that forested coffee ecosystems on small farms are ever at risk of being replaced, regardless of access to the Fair Trade and organic coffee chains.

The clearest example of a link between price premiums and forested ecosystems is provided by the differential pricing for organic versus non-organic coffee within the Fair Trade chain. This differential combined with a preference for organic coffee among Fair Trade buyers created a definite incentive for La Esperanza farmers to seek organic certification. Although it would largely depend on the pricing policy of a given cooperative (i.e. whether there was one average price for all members, or member price varied by selling price), this would be especially significant if it was a general phenomenon.

As for the concern that Fair Trade and organic premiums would lead to overproduction that would eventually undermine any incentive for farmers to submit to the governance of organic and Fair Trade certifiers, it is more likely that the opposite is the case. As discussed in Chapter Three, the adoption of organic techniques usually leads to loss of or limit on production through prohibitions on chemical fertilizers. Production on small farms is additionally limited by farmers' self-imposed "coffee thresholds", the high cost of converting land to coffee production (the fastest rate observed was 1mz/year), and availability of nearby land (since new farmland must be close to the home in order to be accessible). Because of these limitations on small-scale production, the supply of Fair Trade and organic coffee would more likely expand through the entry of additional producers into these chains, rather than existing producers increasing production. Thus, there will likely be little change in total coffee production resulting from Fair Trade and organic premiums, but there might be an increase in the number of farmers associated with producer cooperatives and subject to organic environmental criteria.

6.1.2 Question 2

To what extent do the environmental standards associated with Fair Trade and organic certification affect farmers' land-use practices?

Absolutely no change to the farming ecosystem or farmers' land-use practices attributable to Fair Trade environmental criteria was observed on farms or identified through interviews. This was

expected since FLO has no provisions regarding forested ecosystems, save for compliance with national and international law on the preservation of "virgin forests". All other criteria are to be met on farmers' timetables and are not evidently monitored. As well, data from interviews suggest small-scale farmers throughout Nicaragua operate well above most of the Fair Trade environmental standards anyway.

Organic environmental standards were expected to produce noticeable differences between organic and non-organic ecosystems, but this was also not the case. This was largely because differences between farm ecosystems could be attributable to a host of factors unrelated to organic certification, including the age of the coffee plot, climactic differences, soil moisture, and seasonality of vegetation. Other features that might have indicated the influence of organic standards on land-use behaviours, such as contour planting, compost pits, terraces, etc., were similarly unhelpful because, due to the influence of cooperative agronomists, they were present on non-organic farms as well. Lastly, interviews could elicit no concrete examples of organic criteria leading to noticeable changes in coffee ecosystems, primarily because farmers could not determine whether a particular practice originated from organic criteria or CECOCAFEN or ADDAC agronomists. Nevertheless, farmers, agronomists, and cooperative managers all seemed to be of the opinion that organic production improved the coffee ecosystem. That this could not be corroborated with direct observation is the result of methodological limitations and the scope of work for this thesis.

6.1.3 Question 3

What is the significance of the cooperatives as intermediaries between ecosystem managers (farmers) and the Fair Trade and organic markets?

Cooperatives, and support organizations like ADDAC, are responsible for designing and implementing programs to make their members compliant with certification criteria. That is, benefits to the environment in Pancasán and El Coyolár that are attributable to the Fair Trade or organic market are also attributable to the cooperatives and ADDAC precisely because some of these benefits were in place well before the emergence of organic and Fair Trade markets. As well, were it not for the considerable investments in social capital that are embodied by the cooperatives, the Fair Trade and, to some extent, the organic coffee market would not exist in Nicaragua. The organization and mobilization of the peasantry in the 1980s coupled with subsequent state divestments from the coffee sector, enabled cooperatives like CECOCAFEN to achieve sufficient vertical integration to access the Fair Trade and organic coffee chains in the first place. Thus, not only are the cooperatives intermediaries between farmers' ecosystems and these high-value coffee chains, they are the reason such a relationship exists at all. Without the cooperatives, the Fair Trade and organic value chains would likely have little or no influence on how forested ecosystems on small Nicaraguan coffee farms are managed.

In addition, however, while the Fair Trade and organic markets certainly rely on pre-existing social capital, they have also been instrumental in farmers accumulating *more* capital. Due to the higher prices available through these markets, the cooperatives have been able to expand their human and social capital as manifest in the attraction of new members so the acquisition of more resources and better services. Participation in the Fair Trade and organic value chains has also expanded and strengthened the cooperatives' international and domestic networks, which has provided access to more resources for their members. Acquisition of a cupping lab through a project initiated by one of its Fair Trade buyers is certainly indicative of the value these international networks have had for CECOCAFEN. As well, CECOCAFEN,

ADDAC, ACOPAN, and La Esperanza have had more reason and opportunity to interact and develop relationships with each other because of their participation in the organic value chain. This interaction has created opportunities for ACOPAN to sell its organic coffee for a better price through CECOCAFEN, which is better positioned on its value chains, and such interactions are also responsible for La Esperanza first becoming involved with organic production. This process of strengthening relationships through increased interaction and the extension of networks continues to be productive on the national and international level.

6.1.4 Question 4

What is the significance of coffee cooperatives to their members and the ecosystems they manage?

As mentioned above, any value that the organic and Fair Trade value chains hold for farmers and their ecosystems is at least in part a function of their membership in a cooperative. Indeed, cooperatives are a prerequisite for these chains to have any value to farmers and ecosystems because cooperatives are the necessary vehicles for small-scale farmers to access these chains.

However, the value of cooperatives is not restricted to their role as intermediaries between their members and the Fair Trade and organic markets. As discussed in Chapter Four, ACOPAN and La Esperanza were originally established to improve prices, share costs, and build the capacity of small-scale producers. Indeed, participation in the Fair Trade and organic value chains, which came several years after the establishment of these cooperatives, is only part of a larger strategy to fulfill this mandate. Membership in a cooperative reduces the vulnerability of small-scale farmers because consistently higher prices and access to more than one value chain reduces the danger they would otherwise face in conventional markets. Meanwhile, cost-sharing and credit systems enable cooperative members to collectively assume risk thereby reducing the risk faced by individual members.

Conversely, farmers not belonging to cooperatives have few options in terms of where they can sell their coffee and are relatively powerless in their relationships with buyers. Without access to these productive networks, there is no possibility of them ever accessing the Fair Trade, organic, or specialty coffee chains. They are also more vulnerable to price shocks since more powerful downstream actors can transfer their losses from low prices to these farmers as easily as they can capture gains from high prices.

Value to farmers and ecosystem increases immeasurably when cooperatives become as large as CECOCAFEN or are able to connect with organizations such as ADDAC. It is here that extension programs are developed, agronomists are hired, large capital is accumulated, networks become international, and coffee can be marketed directly to buyers much further down the value chain. Indeed, the cooperatives are where the most profound work of social and environmental significance to small-scale coffee farmers is accomplished. Whether through major capital acquisitions such as cupping lab or dry mill, or more humble achievements like the Experimenters and seed-sharing program, cooperatives clearly demonstrate that opportunity is often borne through association.

6.2 Implications of this Study

That cooperatives are so vitally important to the success of Fair Trade and, to a lesser extent, organic objectives seems to go largely unnoticed in Canada and abroad. Indeed, Fair Trade and

organic coffee consumers frequently take credit for a range of social and environmental goods for simply drinking a cup of coffee, when in reality these benefits result from initiatives taken by cooperatives. I have personally been asked to calculate how many families a person saves when they buy Fair Trade coffee for a year, and have seen and written countless presentations, articles, and educational materials that link the act of consumption with lush ecosystems, school programs, health and water projects, and happy, thankful farmers. Perhaps crediting the consumer sells more coffee, but it does a terrible disservice to the farmer who, by way of his or her cooperative, is actually responsible for those benefits. I became increasingly aware of this phenomenon as the study progressed, and was made all the more aware when a member of La Esperanza, unsolicited by me, complained that he had observed it during a speaking tour in Italy. Make no mistake; consumers are vital to meeting Fair Trade and organic objectives. But their purchases provide only some of the cash; they do not do the work. My hope is that this thesis helps shift some of the credit back to the cooperatives, where it belongs.

More generally, the ideas and data presented in Chapter Four suggest that more attention should be paid to the social and historical processes that are responsible for producer cooperatives. While cooperatives with sufficient integration to directly link with Fair Trade and organic buyers are common in Nicaragua, this is not the case in other countries. Particularly farmers in Africa, but also in Asia and other Latin American countries (notably Guatemala) seem to face greater challenges when seeking to access these higher value coffee chains. Greater flexibility may be required of organic and Fair Trade certifiers if these producers are to ever access these markets, as might greater effort on the part of funding agencies and non-governmental organizations to address regional power imbalances within producers' value chains.

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Appendix A: Interview Script (Coffee Farmers)

1. **Demographics** (age, family size/composition, positions held in cooperative, # of siblings, # of family members in cooperative, etc.)

2. **I'm interested in learning about your life as a farmer, could you tell me about it?**
   a) Where did you learn to farm?
   b) When and under what circumstances did you acquire your farm?
   c) Have the cooperative, other farmers, the organic/Fair Trade certifier, development organizations, or government influenced your farming techniques at all?

3. **Tell me about your farm.**
   a) How big is it? Has it grown in size or gotten smaller? Why?
   b) What do you grow here?
   c) What chemicals do you use here? Why (not)? How much ($ and qty.)
   d) Why are there trees on your farm, and why are crops sometimes grown together or with plants you don't eat or sell?
   e) What animals do you have and why? (i.e. just for food, or for other purposes)

4. **(Dependence on coffee) How important is coffee to you? Explain.**
   a) About how may coffee trees do you have?
   b) Have you been planting more or reduced the number (each year over the last 10)? (If yes) how was space created (i.e. Where did you plant them?)
   c) How much do you process your coffee on the farm? In the cooperative? Has this changed over the years?
   d) What other crops/economic activities are pursued? When and why did that begin?

5. **Is coffee farming a good business to be in?**
   a) Who do you sell your coffee to, and what prices can you get? How much goes to the cooperative? How much does it cost you to produce?
   b) When you sell your coffee through the cooperative, do you get a better price than you would on your own? Why (not)?
   c) Have prices changed much over the last 15 years?
   d) When were the best and worst times to be a coffee farmer? Why?

6. **(Future in coffee) Do you think you will always grow coffee?**
   a) Would you like your children (sons/daughters) to become coffee farmers too? Why (not)? What do you think they will become?
   b) If they become farmers, what and where do you think they would farm? (i.e. on your farm, buy someone else's farm, convert land to farm)

c) Would you ever consider growing less coffee, or abandoning it all together? What circumstances might lead you to do this? What would you do instead? (i.e. grow something else, raise livestock, leave farming altogether)?

7. I would like to know more about the cooperative, what can you tell me about it?

a) Why are you a member?
b) How does it work (i.e. decisions, function, structure)?
c) Have you benefited or been harmed in any way because of your membership in the cooperative? Explain.
d) How do you feel about the direction of the cooperative? The leadership? The other members?
e) How do you feel about the cooperative, positively, negatively, neutral? Would you like to change anything about it?

8. (Commodity chain communication – grouped questions as follows:)

i. How often does the (community level) cooperative meet, and what sorts of things are discussed?
ii. How often do you hear from CECOCAFEN, and what do they usually talk about?
iii. Do you ever communicate with people who buy your coffee (foreign or domestic; businesses or consumers)? About what?
iv. How do you communicate with these groups, and are you able to bring your concerns or ideas to them?
v. Do you think your concerns or ideas can influence their decisions?

9. What can you tell me about Fair Trade/organic certification?

a) How do you benefit from certification (i.e. better prices, technology, market information), and is anything expected of you for it (i.e. payment, meet criteria)?
b) How much coffee does the cooperative sell to this market? Total coffee produced?
c) Could you describe the process of certification, and did you have to do anything to become certified (i.e. alter farming techniques)?
d) Does the certifier ever inspect your farm or the cooperative, and if so, how do you ensure that everyone meets certification criteria?
e) Do you have any kind communication with the certifier? About what?
f) Do you feel the certifier hears your concerns and ideas, and takes them into consideration?

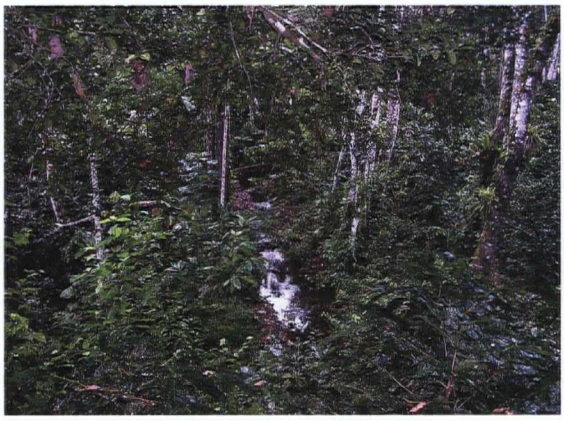
10. Tell me about the "coffee crisis".

a) Who does it affect and how?
b) How has it affected you, and has it caused you to change your activities in anyway?
c) Do you know anyone who has lost his or her farm because of low coffee prices? What happened to the family? The farm?
d) Do you know why prices fluctuate, and how do you protect yourself against it (i.e. How have you kept your farm?)

11. Is there anything else that you would like to talk about that you think is important?

Appendix B: Coffee Ecosystems

A1: Commercial polyculture, Pancasán



A2: Commercial polyculture, Pancasán

A3: Commercial polyculture, El Coyolár

A4: Full sun, Hawaii
Photo courtesy of John Vendeland

A5: Full sun, Brazil
Photo courtesy of John Vendeland

A6: Full sun, Hawaii
Photo courtesy of John Vendeland

Notes, A1-A6:

Photos **A1-A3** provide visual examples of some of the more forested farms included in this study. Because these are not original forests, they are considered "commercial polyculture". However the richness of these ecosystems (in terms of biodiversity, tree height, etc.) more closely matches their "traditional polyculture" category. Photos **A4-A6** depict full sun operations.

A7: Shaded monoculture, El Coyolár

A8: Shaded monoculture, location unknown
Photo courtesy of John Vendeland

A9: New cafetál (approx. 3 years), El Coyolár

A10: New cafetál (approx. 0 years), El Coyolár

A11: Border between ACOPAN cafetál and neighbouring (non-member) pasture, Pancasán

Notes, A7-A11:

A7-A8 provide examples of Moguel and Toledo's "shaded monoculture" category, although the trees in **A8** are sparse enough that it could be classified as "full sun". **A7** shows part of a large farm neighbouring the farm of a La Esperanza member. The single species of shade tree (guava) has been selected to improve soil fertility through nitrogen-fixing bacteria in its roots.
A9 demonstrates that small-scale farms are not always as forested as those shown in A1-A3. However, **A9** was a new cafetál (3 years) that had been planted in a field that formerly resembled that shown in **A10**, and the farmer was in the process of building the forest (there were thousands of 1m tall saplings throughout this plot). **A10** was being prepared for coffee reforestation as well.
A11: Demonstrates the stark difference, in terms of biodiversity and structural composition, between two common agroecosystems in the area.

Other crops and foodstuffs produced on the small-scale coffee farm:

A12: Bean fields, El Coyolár

A13: Cornfield, Pancasán

A14: Bananas, Pancasán

A15: Cacao, Pancasán

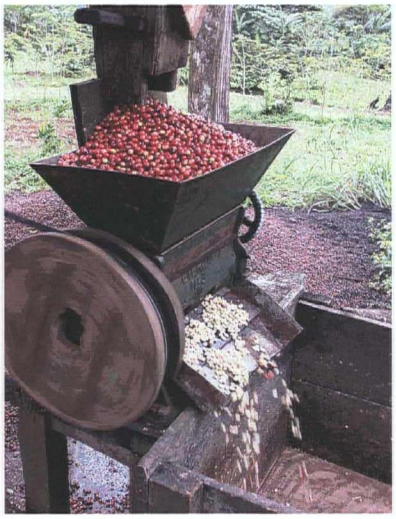
A16: Malanga, Pancasan

A17: Aquaculture (fish, ducks, and turtles)

A18: Dairy cattle

Appendix C: Technology

B1: Wet Mill housing



B2: Wet Mill
(*Photo by Alberto, CECOCAFEN*)

B3: Pulp composting pit

B4: Honey water catchments pool and washing trough

B5: Drying racks

Notes, B1-B5:

Coffee cherries are poured into the second-story hopper of the housing (**B1**), which feeds into the hand-powered mill (**B2**). The mill separates the pulp from the two coffee beans inside each cherry (pictured to the right in **B2**). The pulp is composted (**B3**) and later used as fertilizer. The beans are fermented in a sack for 24 hours to loosen the sweet membrane that surrounds it, which is subsequently washed off in a trough (pictured to the right in **B4**). The wastewater, known as honey water, is collected in catchments pools (**B4**) to prevent it from polluting natural watercourses. The washed beans are then spread onto drying racks (**B5**, currently covered) where they are dried in the sun and culled of defects before they are sent to a dry mill for further processing.

In early 2002, only two members of ACOPAN had an efficient wet mill housing like the one featured in B1. By 2004, all 33 members had received design specifications and credit to build one through ADDAC/ACOPAN. Farmers learned of the importance of collecting coffee pulp and honey water, as well their beneficial uses, through the cooperatives. The drying racks are also used to dry other farm products, including seeds.

B6: *Lombricultura* (worm culture)

B7: Conserving soils through erosion barriers

B8: Conserving soils by creating terraces

B9: Biogas

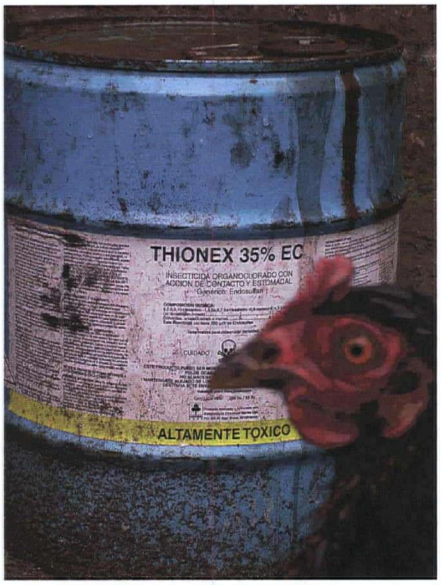
Notes, B6-B9:

B6 shows the worms that are an integral part of *lombricultura*. The worms are kept in pens in which manure, milk, molasses and ash are put, the combination of which reputedly creates excellent fertilizer and "starter soil" for seedlings. Liquid waste from the pens is also used for a variety of applications, including combating various coffee tree illnesses. The worms originally come from California, but ACOPAN first obtained them from a trip to Honduras that was organized through ADDAC. The worms that were brought back went to one farm, and were eventually given to all other members of the cooperative as they multiplied. All members of La Esperanza also apparently have boxes with the same Californian worms. While the technology was shared throughout the cooperative, no one was certain how the cooperative originally obtained the worms. One likely explanation is that farmers connected to both ADDAC and La Esperanza introduced them to the latter.

B7 and **B8** show two strategies of soil conservation practiced on different farms in Pancasán and in compliance with organic certification criteria. The ACOPAN farmers learned these methods from ADDAC; members of La Esperanza learned them from either CECOCAFEN or ADDAC agronomists.

B9 shows a relatively new project that was being tested in Pancasán by ADDAC. The system allows farmers to transform manure into cooking fuel (methane) that is accessible to a gas burner located in the house via a plastic pipe. The system, which provided "fire-on-demand", could potentially free women from the need to stay near the home to "keep the home fires burning", but most women that had the system seemed to prefer their wood-fuelled ovens.

B10: Chemicals and fumigators



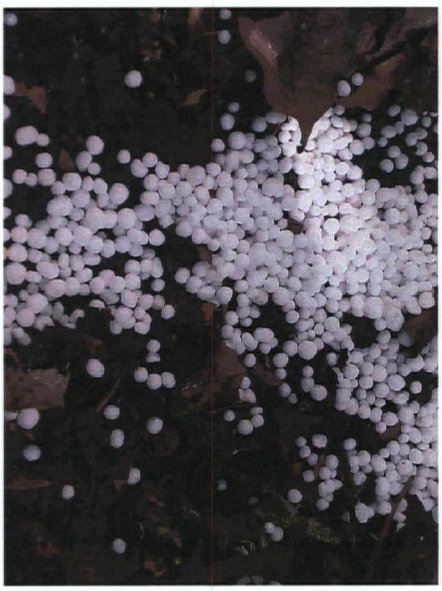
B11: Chemical close-up. To combat "broca", the coffee berry borer beetle

Notes on B10-B13:

B10 and **B11** show chemicals that were being used by one farmer to fertilize his crops and combat various illnesses and pests. This particular farmer was contemplating organic certification on the advice he had received through the cooperative, but had not yet made a decision. Organic farmers also use the same backpack fumigators featured in the background of **B10** by to apply organic treatments.

B12 and **B13** show how urea fertilizer is applied to the base of coffee trees. Farmers reported that they could roughly double their harvests if they used urea. The farm featured in these photos was heavily forested and located well above 1000 metres above sea level.

B12: Applying urea fertilizer to coffee



B13: Urea fertilizer

Appendix D: Farm and Harvest Data

(summaries below each table)

ACOPAN (n=32)	Size of coffee plot (mz)	Size of farm (mz)	Coffee plot as % of total farm area	2001/02 Production (qq. perg. (pergamino))	2001/02 Productivity (qq. perg./mz)	2003/04 Production (qq. perg.)	2003/04 Productivity (qq. perg/mz)
ACOPAN	1.5	5	30.0%	10	6.7		
n=32	6	30	20.0%	45	7.5		
(Does not include member in transition)	0.25	1	25.0%	0.6	2.4		
	3	25	12.0%	75	25.0		
	5	20	25.0%	45	9.0		
	3	20	15.0%	30	10.0		
	10	28	35.7%	75	7.5		
	6	16	37.5%	40	6.7		
	2	60	3.3%	50	25.0		
	3	5	60.0%	30	10.0		
	4	30	13.3%	20	5.0		
	2	7	28.6%	10	5.0		
	2	4	50.0%	8	4.0		
	1.5	12	12.5%	4	2.7		
	3.5	35	10.0%	25	7.1		
*	2	28	7.1%	25	12.5		
	1	12	8.3%	15	15.0		
	15	50	30.0%	127	8.5		
	3	25	12.0%	35	11.7		
	4	5.5	72.7%	45	11.3		
	3	13	23.1%	35	11.7		
	4	22	18.2%	45	11.3		
	3.5	13	26.9%	8	2.3		
	2.5	30	8.3%	28	11.2		

	1	25	4.0%	18	18.0		
	1.5	9	16.7%	18	12.0		
	5.5	15	36.7%	80	14.5		
	2.5	10	25.0%	35	14.0		
	1.5	30	5.0%	25	16.7		
	4	28	14.3%	45	11.3		
	6	12	50.0%	40	6.7		
	4	30	13.3%	25	6.3		
Total (group)	116.75	655.5	17.8%	1116.6	9.6	1304	11.17
Average (by farm)	3.6	20.5	23.4%	34.9	10.3	*not available*	
Median	3	20	19.1%	30	10.0		
Smallest	0.25	1	3.3%	0.6	2.3		
Largest	15	60	72.7%	127	25.0		

Source: ACOPAN documents, 2003

La Esperanza (n=38)*	Size of coffee plot (mz)	Size of farm (mz)	Coffee plot as % of total farm area	2002/03 Production (qq. perg.)	2002/03 Productivity (qq. perg./mz)	2003/04 Production (qq. perg.)	2003/04 Productivity (qq. perg./mz
La Esperanza	6	40	15.0%	65	10.8	60	10.0
n=38	2	3	66.7%	15	7.5	20	10.0
Actual membership is currently near 62	3	5	60.0%	60	20.0	50	16.7
	3	10	30.0%	20	6.7	20	6.7
	8	16	50.0%	180	22.5	120	15.0
	2	9	22.2%	10	5.0	10	5.0
	8	20	40.0%	160	20.0	100	12.5
	10	60	16.7%	130	13.0	80	8.0
	3	6	50.0%	18	6.0	10	3.3
	2	10	20.0%	30	15.0	20	10.0
	6	50	12.0%	70	11.7	70	11.7
	10	20	50.0%	150	15.0	80	8.0
	1	4	25.0%	6	6.0	7	7.0
	2.5	10	25.0%	14	5.6	10	4.0
	3	10	30.0%	20	6.7	20	6.7
	10	19	52.6%	70	7.0	70	7.0
	2	5	40.0%	3	1.5	4	2.0
	1	2	50.0%	12	12.0	10	10.0
	4	10	40.0%	65	16.3	30	7.5
	10	12	83.3%	112	11.2	112	11.2
	6	8	75.0%	100	16.7	100	16.7
	10	10	100.0%	380	38.0	350	35.0
	3	5	60.0%	20	6.7	30	10.0
	10	12	83.3%	200	20.0	150	15.0
	5	5	100.0%	130	26.0	120	24.0
	7	14	50.0%	100	14.3	100	14.3
	4	16	25.0%	50	12.5	50	12.5
	7	10	70.0%	140	20.0	100	14.3
	12	30	40.0%	200	16.7	150	12.5

	2	12	16.7%	25	12.5	15	7.5
	6	8	75.0%	115	19.2	120	20.0
	3	10	30.0%	38	12.7	35	11.7
	3	10	30.0%	20	6.7	35	11.7
	4	20	20.0%	40	10.0	25	6.3
	1	5	20.0%	10	10.0	8	8.0
	4	10	40.0%	50	12.5	50	12.5
	3	15	20.0%	18	6.0	10	3.3
	20	63	31.7%	300	15.0	200	10.0
Total (group)	206.5	584	35.4%	3146	15.2	2551	12.4
Average (by farm)	5.4	15.4	43.8%	82.8	13.0	67.1	11.0
Median	4	10	40.0%	55	12.5	50	10
Smallest	1	2	12.0%	3	1.5	4	2
Largest	20	63	100.0%	380	38	350	35

Source: La Esperanza documents, 2004

*Actual membership is currently at 62

Appendix E: Historical Coffee Price Data, 1984-2003

Other Mild Arabicas and Nicaragua (to grower)

Monthly Price Data (US cents/lb), 1984-2003

source: International Coffee Organization, Historical Price Data

	Monthly Average Indicator Prices (Other Mild Arabicas)												
Years	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Average**
1984	143.71	145.91	148.32	150.21	150.25	147.30	144.11	145.70	142.23	136.87	140.21	140.80	**144.64**
1985	145.39	144.08	141.88	141.47	142.69	141.89	135.07	133.48	133.48	140.51	155.65	196.96	**146.05**
1986	237.87	228.19	239.60	226.04	211.34	177.08	172.31	173.86	199.50	177.59	156.69	136.23	**194.69**
1987	123.53	120.96	103.77	107.55	117.30	105.12	99.90	102.19	110.52	119.38	126.34	126.88	**113.62**
1988	128.02	138.54	136.55	136.42	138.65	143.93	141.97	132.57	137.85	133.73	135.39	147.63	**137.60**
1989	152.13	139.95	140.31	143.88	140.37	125.32	88.09	78.51	78.42	68.65	70.87	72.47	**108.25**
1990	76.02	83.95	94.73	94.71	92.97	89.15	86.65	94.43	95.39	91.58	84.72	89.18	**89.46**
1991	85.93	89.21	93.56	91.96	87.88	85.78	83.24	81.77	87.06	79.77	78.20	75.35	**84.98**
1992	73.41	68.45	70.37	65.92	60.86	59.09	58.20	52.93	53.23	61.57	67.31	77.19	**64.04**
1993	69.39	67.65	63.62	57.87	62.18	62.50	71.81	76.92	80.77	76.64	78.60	81.19	**70.76**
1994	78.95	83.93	87.06	90.57	121.88	143.43	218.89	200.44	222.00	201.85	182.91	168.54	**150.04**
1995	172.62	169.79	179.43	174.40	171.01	154.49	145.66	153.21	134.46	127.27	125.25	106.24	**151.15**
1996	110.65	124.09	120.84	123.50	129.27	125.46	122.47	126.22	118.70	124.20	124.07	117.02	**122.21**
1997	132.86	168.37	194.70	206.99	267.27	222.02	190.41	190.80	189.87	167.66	160.27	177.44	**189.06**
1998	177.80	178.18	157.65	150.35	137.72	124.93	117.60	123.21	111.85	109.72	116.37	117.39	**135.23**
1999	112.96	105.48	105.39	102.11	111.07	107.21	94.85	91.37	84.31	94.20	113.38	124.46	**103.90**
2000	111.11	103.44	100.73	94.61	94.15	86.44	87.35	76.92	75.78	76.66	71.54	66.16	**87.07**
2001	65.98	67.19	66.50	66.13	69.22	63.90	58.72	59.72	58.07	56.40	58.85	56.72	**62.28**
2002	58.25	59.12	64.47	65.43	61.40	58.57	56.48	54.27	60.67	65.73	69.87	64.16	**61.54**
2003	65.57	66.41	61.75	64.69	66.26	61.04	62.95	63.89	66.41	64.30	62.30	62.28	**63.99**

	Monthly Price Paid to Grower (Nicaragua)												
Years	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Average**
1983	100.47	117.74	117.74	117.74	117.74	117.74	117.74	117.74	117.74	156.99	156.99	156.99	**126.11**
1984	156.99	156.99	156.99	156.99	156.99	156.99	156.99	156.99	156.99	235.48	235.48	235.48	**176.61**
1985	235.48	84.52	84.52	84.52	84.52	84.52	84.52	84.52	84.52	50.21	50.21	50.21	**88.52**
1986	50.21	50.21	50.21	50.21	50.21	50.21	50.21	50.21	50.21	67.19	67.19	67.19	**54.46**
1987	67.19	67.19	67.19	67.19	67.19	67.19	67.19	67.19	67.19	126.78	126.78	126.78	**82.09**
1988	88.75	88.75	88.75	84.71	76.86	18.08	12.68	11.09	11.09	7.50	7.37	7.21	**41.90**
1989	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	9.27	9.27	9.27	**8.54**
1990	9.27	9.27	8.63	6.18	2.65	1.90	0.82	0.48	0.35	n/a	n/a	n/a	**n/a**
1991	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	44.14	44.14	44.14	**n/a**
1992	44.14	44.14	44.14	44.14	44.14	44.14	44.14	44.14	44.14	n/a	n/a	n/a	**n/a**

Appendix F: Production and Export Data, 1984-2003

ICO Member Countries and Selected

source: International Coffee Organization

(in 60kg bags)

Years	Total Production (ICO Member Countries)	Total Export (ICO Member Countries)	Total Production (Nicaragua)	Total Export (Nicaragua)	Total Export (Brazil)	Total Production (Brazil)	Total Export (Columbia)	Total Production (Columbia)	Total Export (Vietnam)	Total Production (Vietnam)
1984	83,991,000	68,623,256	851,000	709,112	19,504,752	21,406,000	10,198,980	11,035,000	65,650	230,000
1985	90,170,142	71,358,837	709,000	704,443	19,156,605	30,101,000	9,808,484	11,764,000	156,667	466,000
1986	81,194,000	64,511,480	766,000	558,243	9,498,695	14,958,000	11,565,744	10,753,000	391,667	523,000
1987	107,914,000	71,951,340	647,000	654,445	18,886,993	43,014,000	11,283,264	12,756,000	433,333	753,000
1988	89,461,000	65,815,827	645,000	549,127	17,004,850	22,939,000	9,783,636	10,543,000	566,667	1,040,000
1989	94,120,000	75,912,370	689,000	611,048	18,377,380	24,542,000	10,829,194	12,920,000	948,333	1,006,000
1990	93,321,000	80,561,589	461,000	671,184	16,971,237	27,321,000	13,943,870	14,231,000	1,145,234	1,390,000
1991	101,552,000	75,776,723	708,000	392,053	21,186,728	27,297,000	12,599,185	18,222,000	1,200,952	1,308,000
1992	88,913,000	78,162,537	548,000	635,946	18,793,397	25,972,000	16,564,370	13,823,000	1,937,611	2,340,000
1993	90,366,000	74,972,056	706,000	476,466	17,834,235	26,787,000	13,568,362	11,320,000	2,071,837	3,020,000
1994	95,154,000	70,487,350	684,000	623,514	17,290,243	29,688,000	11,768,089	12,989,000	2,720,911	3,532,000
1995	85,250,000	67,572,526	985,000	681,179	14,411,435	15,784,000	9,814,197	12,878,000	3,546,405	3,938,000
1996	101,865,000	77,548,875	793,000	822,356	15,300,933	27,664,000	10,588,431	10,876,000	3,779,415	5,705,000
1997	95,872,000	80,263,653	1,084,000	714,003	16,841,537	22,758,000	10,918,863	12,211,000	6,177,834	6,915,000
1998	106,164,000	80,079,606	1,073,000	940,584	18,160,587	34,661,000	11,259,929	11,024,000	6,466,712	6,972,000
1999	115,087,000	85,777,352	1,532,000	983,691	23,151,485	32,348,000	9,995,668	9,398,000	7,741,988	11,648,000
2000	112,679,000	89,429,556	1,595,000	1,345,016	18,015,506	32,005,000	9,175,370	10,532,000	11,618,554	14,775,000
2001	109,675,000	90,378,655	1,116,000	1,364,592	23,172,405	33,743,000	9,943,630	11,999,000	13,945,528	13,133,000
2002	121,948,000	88,471,880	1,199,000	955,402	28,161,046	48,480,000	10,273,425	11,889,000	11,771,367	11,555,000
2003	100,691,251	85,793,736	1,395,334	1,013,237	25,687,639	28,825,000	10,244,392	11,000,000	11,641,292	11,250,000