

Responding to the coffee crisis: a pilot study of farmers' adaptations in Mexico, Guatemala and Honduras

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This paper was accepted for publication in November 2005

This article explores the impacts of market shocks and institutional change on smallholder livelihoods, and the challenge of adaptation in Mexico, Guatemala and Honduras. The rapid decline in coffee prices since the dissolution of the International Coffee Agreement in 1989 has had widespread and profound impacts across coffee-producing regions. The data collected in the three case studies of this project confirm the severity of the impact, particularly in the Mexican and Guatemalan communities. They also illustrate the importance of the historical relationship between farmers and public institutions in defining farmers' perception of risk, their awareness of the nature of the changes they face, and thus the flexibility of their responses to present and future uncertainty. The project's findings indicate that the existence and development of local networks among farmers, service providers and information sources may be critical for facilitating adaptation, particularly in the context of economic liberalization and globalized agriculture.

KEY WORDS: Mexico, Guatemala, Honduras, coffee, livelihood analysis, adaptation, vulnerability, globalization

Introduction

The question of how agricultural systems can or cannot adapt to market fluctuations and economic change is a central focus of academic debate and public policy concern (McMichael 1994; Reilly 1995; Goodman and Watts 1997; Smithers and Smit 1997). Smallholder farmers have been singled out as one population that may be particularly vulnerable to market fluctuations and global economic change, based on the observation that the impacts of global economic volatility are often felt more severely among the world's peasant and smallholder farmers. Moreover, these farmers tend to have relatively

few resources with which to cope (O'Brien and Leichenko 2000; Leichenko and O'Brien 2002).

Coffee producers exemplify this sensitivity. For over a decade, world coffee prices have been at historic lows, driven by a global process of market deregulation and the concurrent concentration of market power in the hands of a small number of multinational commodity traders and coffee distributors (IDB, USAID and WB 2002; Ponte 2002). The impact on coffee-producing countries – most of whom consume negligible quantities of coffee domestically – has been serious. According to one development agency report, revenue from coffee sales in Central America declined by 44% in just one year (1999–2000) (IDB, USAID and WB 2002).

Rural unemployment related to the crisis is increasingly a source of social unrest and mobilization, and there have been disturbing reports in the news media of growing poverty, malnutrition and migration (see, for example, Elton 2002; Rueters 2002; Emmott 2003; Morrison 2003). Several years of drought in Central America, reaching crisis levels in 2001, exacerbated the impact of the collapse of world coffee prices in the region.

This article presents the results of a pilot study on coffee production and adaptation, comparing the responses of farmers to structural changes in the global coffee market in three coffee-producing regions of Mexico, Guatemala and Honduras. As a pilot study, the research was also designed to generate hypotheses about the particular attributes of the farm populations that may be important in facilitating or inhibiting adaptation. As described in detail in the fourth section, the historical role that public policies played in the development of peasant coffee production differed considerably in each country, with Mexico representing the most state-interventionist model of cash crop production and Honduras the least. The distinct history of farmers' relations to the public sector in each case translates into differences in their current expectations of the public sector as they respond to the collapse in coffee prices. This history also relates to differences in the ways that farmers access key services and resources.

The following section situates our research in the growing literature on rural livelihoods and responses to globalization. We follow this discussion with background information on the coffee crisis and the historical context of production in the three countries. After introducing the sites of the case studies, we present the results of our surveys and interviews, and discuss the implications of our results for further research, particularly in the area of state-civil society interaction in the adaptation process.

Farmer's adjustments to market risk and institutional change

Farmers, particularly coffee farmers, are generally accustomed to variability in market conditions and, to different degrees, the risks to their livelihoods and sustenance that such variability entails. Smallholder farmers have coped with such risk in a variety of ways, with a principal strategy being the diversification of crops and incomes (Ellis 2000). A wealth of empirical research has illustrated the adaptability of rural populations to exogenous and endogenous stressors – whether involving shifts in the availability or quality of natural resources, changes in population density and labour, or the

introduction of new technologies (Bennett 1976; Netting 1993). The most recent phase of global market integration, however, has introduced new and perhaps unprecedented challenges for smallholders (Gledhill 1995). Research over the last decade has also illustrated that the impact of global market restructuring, domestic market liberalization and the deregulation of agricultural services are testing the capacities of small-scale farmers to engage in rural markets and to conserve the fundamental rural nature of their identities while transforming their livelihoods (Bebbington 2000; Gledhill 1995; Marsden 1997).

Livelihood analysis has become central to understanding how rural communities and households respond to environmental and social change (Scoones 1998). Livelihood analysis entails the documentation of the resources that households draw upon as they engage with dynamic socio-economic and environmental conditions and shocks, as well as an exploration of the institutional context in which households develop their survival strategies (Carney *et al.* 1999; Ellis 2000). Livelihood adaptation has been defined as the process by which the livelihood choices made by individuals 'either enhance existing security and wealth or try to reduce vulnerability and poverty', with the possibility that some choices will result in 'negative adaptation', and an exacerbation of vulnerability (Davies and Hossain 1997). Livelihood analysis explicitly delineates the relationship of institutions to local resource availability and access, and the resulting choices made at the local level. In this way, livelihood approaches have offered important insights into local development pathways and the dynamics of social and environmental change (Francis 2000; Batterbury 2001; Bebbington 1999).

Through a livelihoods' framework, we aim to position the question of how farmers are responding to global coffee market restructuring as an issue of livelihood adaptation. As described below, smallholder coffee farmers are not simply facing a downturn in the market, but rather a defined shift in global and domestic production and consumption, characterized by Ponte as the 'Latte Revolution' (Ponte 2002). Prices are now more volatile and the capture of coffee profits has become even more concentrated in the last stages of the commodity chain, leaving smallholders with little leverage to improve their livelihoods through primary production (Ponte 2002). In these new conditions, the survival of smallholder coffee farmers depends on their capacity to move beyond the strategies they have traditionally used to cope with periodic downturns in the market and instead proactively to adapt to structurally new conditions. For some farmers, such adaptation may entail new production practices

and unfamiliar forms of collective and household organization. For others, survival may entail income diversification, migration or even the abandonment of coffee production.

Although there are arguably reasons why capacities to adapt to structural changes in international markets may be different from capacities to adapt to climate change, the generic factors that influence farmers' capacities to manage exogenous shocks and structurally different production conditions are likely to be similar. This is particularly the case from a livelihoods' perspective, in which households are responding simultaneously to multiple interacting stressors. Adaptive capacity in the global change literature is associated with past and present exposure to hazards and shocks; with access to, and command over, various forms of assets, capitals, services, knowledge and technology; with perceptions of and tolerance of risk and impacts; and with freedom to use resources and skills to mitigate future risk (Brooks and Adger 2004). At a broader scale, a system's adaptive capacity relates to factors such as institutional structures, flexibility in norms and legal frameworks, the degree and extent of poverty and resource distribution inequities, physical infrastructure and investment (Yohe 2001). Formal institutions and public policy are hypothesized to be particularly critical in the adaptation process, given the ways in which policy can influence resource access and distribution, the range of choice available to actors, and thus the strategies of individuals in response to risk (Adger 2001; Adger 2003; Chapin *et al.* 2004). Even apparently similar populations may have quite different relations to public and private organizations and institutions, and these differences may lead to important contrasts in adaptive capacity (Davies and Hossain 1997; Eakin 2002).

In their analyses of institutional change in the coffee sector in Mexico, both Greta Krippner (1997) and Richard Snyder (2001) emphasize the importance of the historical relationship between the state and different groups of civil society in explaining the forms of governance and regulation that emerged after the domestic restructuring of Mexico's coffee sector. Collectively, their research suggests that the way in which the state organized its withdrawal from its heavy-handed role in the coffee sector may have much to do with differences in the mobilization and power of producers' organizations, the political elite and the capitalist classes, and negotiation of these interests with those of the state. Although our project did not set out to test the importance of institutional networks or social capital in farmers' responses to the crisis, we found insights from this literature useful in understanding the differences in the observed

responses of farmers to the coffee crisis in Mexico, Guatemala and Honduras, and thus a promising direction for subsequent research.

The coffee crisis

The international coffee market is one of the world's most volatile, exhibiting extreme sensitivity to fluctuations in the supply from a handful of coffee-producing countries (Martínez Morales 1997; de la Roche 2000). For more than a decade, coffee farmers around the world have been struggling to adapt to exacerbated volatility in supply and prices, precipitated not only by climatic events in the largest producer countries (notably Brazil), but also by important changes in production technology, processing techniques and the structure of international markets (Ponte 2002). In 2003, the index prices of unprocessed 'other mild' Arabica coffee (the class of coffee produced in Mexico and Central America) were only slightly above the historic lows registered in 2001, when prices in real terms were their lowest in the century (IDB, USAID and WB 2002) (Figure 1).

Many analysts believe that oversupply is at the root of the present crisis (CEPAL 2002; Ponte 2002). After the system of coffee export quotas (the International Coffee Agreement, or ICA), administered by the International Coffee Organization, collapsed in 1989, the regulation of coffee production and quality was left to each individual producer country. Almost immediately following the dissolution of the agreement, excessive quantities of coffee entered international markets, prices became quite volatile and the overall quality of the coffee began to decline (Ponte 2002). Many of the coffee-producing nations, including Mexico, were simultaneously in the process of deregulating, privatizing, and otherwise liberalizing agricultural production and national agricultural institutions. This had the effect of exacerbating the uncertainties faced by coffee farmers at the end of the 1980s (Hernández Navarro and Célis Callejas 1994; Ponte 2002).

In the early 1990s, Brazil's plantations suffered significant damage from a series of frost events that, in part, compensated for the declining quality and excessive supply of coffee entering world markets in the aftermath of the ICA's collapse. However, by 1997, Brazil had not only recovered its planted area, but had made important changes in its production technology, thus regaining its dominant role in the industry (CEPAL 2002). Meanwhile Vietnam went from being the 17th largest producer of coffee in the world in 1990, with just over one million sacks, to being the world's second largest supplier in 2001, with over 12 million 60 kg sacks (ICO 2004).

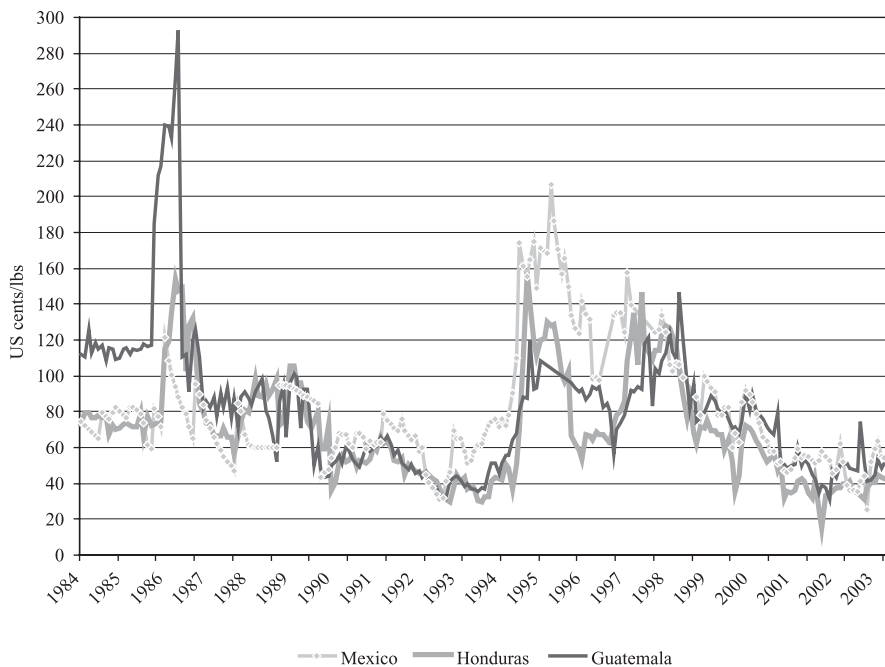


Figure 1 Prices paid to growers for Arabica coffee
 Source: International Coffee Organization

The relatively slow growth in coffee consumption, particularly in less industrialized nations and coffee exporting countries, has compounded the problem of oversupply (CEPAL 2002). New coffee-processing technology has also increased the competitiveness of the market for producers of higher-value Arabica beans, by improving the taste of lower-quality (and lower value) Robusta coffee. As a result, coffee roasters can now market larger volumes of Robusta beans in higher-end markets (Ponte 2002). Robusta coffee is the principal type of coffee produced in Vietnam, and relatively uncommon in the highland coffee plantations of Mexico and Central America.

The number of international coffee buyers, roasters and distributors has also become increasingly small, limited to a handful of multinationals that have the capacity to hold and process large stocks of green coffee. The market dominance of a few multinational coffee roasters (e.g. Sara Lee, Nestle, Proctor and Gamble, and Phillip Morris) and coffee traders has had a depressive effect on prices, which has widened the gap between farm gate and retail prices (Martínez Morales 1997; CEPAL 2002). The collective result of these transformations is a profound change in the world coffee market in which the environmental and economic spaces for smallholder production are increasingly threatened.

The historical context

Prior to the collapse of the ICA, many coffee-producing nations heavily regulated the production and supply of coffee through state-owned or parastatal coffee institutions. These institutions were responsible for maintaining coffee quality, promoting coffee production and ensuring that producers had the resources with which to meet the volume of exports allocated by the ICA. Given the importance of public policy in understanding adaptive capacity, a brief institutional history of coffee in each country is provided below.

Mexico

Although coffee production in Mexico dates back to the early colonial period, the intervention of the public sector in coffee production was institutionalized formally in the 1940s and 1950s. In 1958, a new coffee agency was founded, the National Mexican Coffee Institute (INMECAFE). Through INMECAFE's efforts in coffee technology diffusion, credit provision and extension, by the mid-1980s coffee had become an important economic activity for smallholder farmers in the states of Chiapas, Oaxaca, Veracruz, Puebla and Guerrero. INMECAFE was the primary source of coffee research and

extension in Mexico, and gradually assumed primary responsibility for commercializing and exporting coffee produced by smallholders (Nolasco 1985). The industrial model of coffee production that was promoted during this period encouraged some coffee communities to specialize in coffee in order to secure credit from INMECAFE (Hoffman *et al.* 1987).

In 1989, the institute was restructured, and in 1992, with the general support of coffee producers, it was officially dissolved and the ownership and management of the state-owned coffee processing plants were transferred to farmers' cooperatives and the private sector (Martínez Morales 1997). In many cases (e.g. in Oaxaca), the institutional 'gaps' left by the closure of the coffee parastatal have been partially bridged by a variety of new governmental and non-governmental organizations (NGOs) (Hernández Díaz 2001). However, despite the participation of many coffee farmers in a publicly funded community finance programme (PRONASOL), overall productivity of the coffee sector fell by over a third between 1989 and 1993, with a corresponding loss in farm income of 70% (Krippner 1997). Rather than directly intervene in coffee commercialization, the Mexican government today has developed a variety of programmes encouraging crop diversification in coffee regions. Most recently, the government is compensating farmers for low prices with a graduated per-kilo payment for coffee commercialized below US\$85/quintal (100 lb), which the agricultural ministry considers to be a threshold of economic viability for smallholder farmers.

Guatemala

Coffee was introduced into Guatemala towards the end of the sixteenth century but its main use was as a medicinal plant. The crop became a primary export for the country in the mid-nineteenth century as the result of a series of reforms brought about by successive liberal governments. However, early production was limited initially by poor roads and infrastructure (Williams 1994, 53–5). Coffee as a plantation crop was produced primarily by the Creole population and European immigrants to Guatemala (Williams 1994, 63–9; Paige 1997). Because much of the prime land for coffee was occupied by Mayan smallholders, national policy gradually forced these farmers off their land and into labour agreements with large landholders (Brockett 1990). Smallholder farmers regained some control of land and entered coffee production in the brief land reforms of the 1950s, just at the point at which coffee production expanded throughout the Americas (Brelmer-Thomas 1987).

During the decades of military rule and armed

conflict, which followed the overthrow of President Arbenz in 1954, smallholder producers were largely marginalized from national production. During and at the end of the war in 1996, international NGOs and foreign bilateral aid agencies came to replace or complement the state as providers of services and development, and in the late 1980s the government encouraged the continuation of local development initiatives that were not political in nature (Bethell 1998). The result has been a proliferation of NGOs in Guatemala, with widely differing relationships to state organizations and programmes.

ANACAFE, the Guatemalan National Coffee Association, was formed in 1960 with the objective of protecting the national economy in matters related to coffee production and export (Wagner, 2001). Unlike INMECAFE in Mexico, ANACAFE was always an autonomous organization, financed by a levy imposed on coffee exports. Over the years, it has played an important role as an intermediary between farmers and policy-makers, as well as providing information and technical support to farmers. Another important event in coffee history for Guatemala in the 1960s was the development of a cooperative system of small producers which brought coffee production to the forefront of the national economy.

In contrast to Mexico, farmers in Guatemala have not traditionally turned to public sector agencies for support, but rather depended on the activities of local organizations and ANACAFE. In 2003, the central government worked with ANACAFE to design policies to help farmers address the crisis, including the implementation of a national fund to support coffee growers. Crop diversification, the promotion of organic coffee through NGOs and the conversion of low-altitude coffee to other crops are all being emphasized in public policy and are being supported through collaboration with private sector banks. NGOs and other grass-roots organizations are also actively providing direct support to small growers to produce organic coffee and to access fair-trade markets, particularly in areas with high levels of poverty and where the legacy of Guatemala's armed conflict has led to a distrust of some public sector organizations.

Honduras

The development of coffee in Honduras followed a more tentative path than in Mexico and Guatemala. A weak central government, poorly integrated national markets, and the least developed transportation infrastructure in Central America complicated the expansion of agricultural production (Williams 1994). Although many rural households grew coffee

before the turn of the twentieth century, it was directed mainly for domestic consumption or local markets (Williams 1994). Land suited to coffee remained largely in the hands of smallholders – with some important regional variations (Williams 1994) – a pattern which, for multiple reasons, has persisted to the present (CLACDS 1999).

Honduras' role as an important coffee exporter did not begin until the 1950s, when the government adopted a concerted stance to boost agricultural exports and improve infrastructure. Financial and technical assistance from the United States Agency for International Development and the United States government helped to expand and improve coffee production¹. The Banco Nacional de Fomento worked to build coffee processing infrastructure from the 1950s into the 1970s. The first coffee growers' organization, the Association of Honduran Coffee Producers (AHPROCAFE according to its Spanish initials), was founded in 1967 (CLACDS 1999).

Starting in the 1970s, a series of laws contributed to coffee's rise in importance. The government set up the Honduran Coffee Institute (IHCAFE) in 1970 to promote coffee production, and the national development bank provided loans to medium-sized growers. Between 1970 and 1980, IHCAFE oversaw a 40% increase in yields per acre (Williams 1994; CLACDS 1999). In 1982, the Coffee Enterprise Protection Law (Decree 78–82) declared all coffee-producing lands exempt from the Agrarian Reform Law, regardless of legal status or environmental considerations (AFE-COHDEFOR 1996). Decree 175 in 1987 established an annual subsidy for road improvements in proportion to coffee production. Furthermore, the National Coffee Fund Law (Decree 146–92) created a fund to cushion producers from price shocks (Tucker 1999). The nation has also promoted technical improvements for coffee production and encouraged higher quality harvests through trophy competitions (CEPAL 2002). These policies led to a continuing expansion in coffee production and initial steps at improved quality. Between 1989/90 and 1999/00, Honduras' production grew by 192%. With the coffee crisis, the Honduran government negotiated with other Latin American nations to destroy up to 1 million 46 kg sacks of low-quality coffee (CEPAL 2002). The National Coffee Fund agreed to provide nearly US\$20 million to coffee producers through a payment for each 46 kg sack of green coffee produced, but only IHCAFE members can take advantage of this subsidy.

Methods

One of the primary objectives of this study was to generate hypotheses for future research. A comparative

case study approach is particularly useful for hypothesis generation, and was chosen as an appropriate method for this project (cf. Macridis and Brown 1990). Case studies allow for the capture of in-depth, ethnographic detail that is often essential for understanding why and how changes are occurring (Moran 1995). A cross-country comparison, while challenging for interpretation, transforms the concept of 'country' from being a platform on which change is occurring, to being an active independent variable, combining those attributes of policy, history and culture that are particular to the country in question and that may be essential in understanding the processes of change observed. The comparative method facilitates the identification of issues common to all cases that may be of potential theoretical relevance (Bryman 2001; Hunt 1995).

Comparative case study approaches are also challenging: they can be labour intensive and costly; representative cases must be selected with care, and effort must be taken to ensure that all required data are available in each site to avoid the problems of missing data necessary for comparison (Hunt 1995). Moreover, the differences observed between case studies may be attributable to factors not included in the research design, and the elements covered by the research protocol may have different interpretations across contrasting cases. We addressed these potential problems by incorporating multiple methods (a household survey, interviews, group discussions and the collection and analysis of secondary data sources), selecting case studies that were broadly characteristic of the smallholder coffee producers in the general population of each country, adhering to a single set of carefully designed and pre-tested research protocols, and relying on close communication among the different research teams across the three countries.

We implemented a survey of 125 smallholder households in the three countries in early 2003 (28 in Guatemala, 60 in Mexico and 37 in Honduras) (Castellanos *et al.* 2003). The precise definition of 'smallholder' coffee farmer varies from country to country. However, in our selected case studies, the farm households were all small, compared to the definition of larger-scale producers within each country (e.g. farmers with more than 20 ha in Mexico, or farmers producing more than 2000 quintals of coffee in Guatemala) and of similar scale in terms of between-country comparison (averaging between 1 and 2 ha planted in coffee in all three countries). The survey covered household demographics, migration patterns, land use and agricultural/livestock production strategies, the impact of low coffee prices on household expenditures

and investment, the use of agricultural inputs and services, and possession of household material goods. It also explored respondents' experiences with, and perceptions of, risks including climate hazards. Respondents were asked about recent changes (since 1997) that they had implemented in their production strategies, land use and investments, as well as their perception of changes in public policy, labour availability, and natural resources.

Semi-structured, open-ended interviews were also conducted with large-scale producers, agricultural extension agents and service providers, coffee traders and buyers, members of civic agricultural organizations and NGOs and other relevant experts in each country, following an interview protocol (Castellanos *et al.* 2003).

The case studies

Coffee is one of the primary exports of Mesoamerica. According to data from the International Coffee Organization, the joint production of Mexico, Guatemala, and Honduras accounts for nearly 10% of world coffee supplies (<http://www.ico.org/prices/po.htm>, accessed 9 September 2005). The number of people employed in the coffee sub-sector, either as farm labourers, producers or coffee processors, ranges from over 100 000 in Honduras to over 700 000 in Guatemala (CEPAL 2002). Similar to other regions where coffee production has been an important economic activity, the vast majority of the coffee farmers in the three countries have less than 10 ha in production – and in many cases less than 5 ha (CEPAL 2002).

The Mexican case study site, located in Veracruz, has been a historic leader in state and national coffee production. Over 90% of the coffee grown in the state is shade grown on the steep slopes of the Sierra Madre Oriental. Rainfall on these slopes tends to be plentiful, averaging 1700 mm annually. The two coffee-producing communities selected for the study in Veracruz were located in the coffee district of Coatepec (in the counties of Coatepec and Xico), at both extremes of the ideal altitude range for production in this region (at 700 and 1200 m, respectively). The average landholding size in the two communities was 2.5 ha, approximately the average for coffee farms in Veracruz, and indeed for Mexico as a whole (Regalado Ortiz 1996). The coffee produced in both communities was Arabica, and with only a few exceptions was sold to intermediaries in the form of the raw, unprocessed coffee berries.

In Guatemala, the study site of San Pedro la Laguna is located in the Department of Sololá, home to Lake Atitlán, the third site most visited by

tourists and one of the first protected areas declared in the country fifty years ago. Coffee is mainly grown on the hillsides of the three volcanoes that enclose the southern part of the lake watershed at altitudes that range from 700 to 1600 m. San Pedro la Laguna is one of 11 municipalities around the lake with a territory that is comprised mainly of the volcano with the same name. The small farmers interviewed as part of this study grow their coffee under heavy shade on the north-facing slopes, where rainfall is not as abundant (1100 mm annually) as it is on the south-facing slopes where the larger plantations exist. San Pedro la Laguna produces about one-fifth of the coffee produced in the Department of Sololá, which represents around 3% of the national production (ANACAFE website). The average landholding area for the interviewed farmers was 2.1 ha, the smallest of the three study sites considered. This is, in part, a reflection of the high population density in the municipality of 426 inhabitants per km² in 2004 (Instituto Nacional de Estadística de Guatemala). As with the other two sites, the coffee produced in San Pedro is Arabica and is sold to intermediaries in the form of raw, unprocessed coffee berries.

In Honduras, the Department of Lempira has been experiencing a rapid expansion of coffee production since the early 1990s, in response to infrastructure improvements (especially new roads) and national economic incentives. When the Brazilian crop was decimated by frost and drought in 1994, the resulting price increase brought windfall profits to those who already produced coffee, and encouraged greater investments from those who had recently begun planting with national incentives. The research focuses on La Campa, a *municipio* (similar to a county) dominated by people of Lenca Indian descent. Coffee now represents the primary source of income for most residents, but until recently, the major economic activity was the subsistence production of maize and beans. Between 1990/1 (the first year for which data were available for La Campa) and 2000/1, the officially recorded harvest increased from 24 363.4 kg to 238 445.6 kg (Instituto Hondureño del Café 1991 2001)². The *municipio* receives an average annual precipitation of 1300 mm, with slightly more falling in the higher elevations where coffee is grown (Tucker 1996). The survey found an average landholding of 6.67 ha, but the average area planted in coffee was only 1.96 ha, similar to the area in coffee for Mexico and Guatemala. Most farmers grow Arabica coffee under shade on the steep slopes typical of the region. Depending on the resources of the producer, the coffee is sold as unprocessed coffee berries or as processed, partially dried bean (*pergamino*), which

is purchased by intermediaries. Larger producers who own a vehicle usually deliver their harvest directly to a regional buyer's warehouse.

Results

The commercialization of coffee in the three case studies

In the three case studies, the majority of farmers surveyed reported selling their harvests to intermediaries (92%, 57% and 75%, respectively, in the cases of Mexico, Guatemala, and Honduras). The dependence of the smallholders on intermediaries is an important factor in the sensitivity of coffee farmers' livelihoods to the volatility of coffee prices. In most cases, the intermediaries are part of the informal economy. They may be local residents with above average resources, or outsiders who come to purchase the unprocessed coffee berry or *cereza* directly from individual farm households. Coffee berries ideally should be sold for processing within hours of harvesting, limiting the opportunities for farmers to take advantage of any rise in prices after the peak harvest period, unless they de-pulp and dry the beans for storage (Martínez Morales 1997). Farmers often carry their harvest to a point of sale manually or on the back of a mule or donkey; occasionally intermediaries pick up berries at the farm. The prices offered by the intermediaries to the farmers are typically not differentiated by berry quality, but rather are based on the estimated price at which the intermediaries can sell the collected harvest to regional coffee processors (in the three case studies, these processors largely pertained to the private sector). The processors base their price on the 'yield' of each sack of *cereza* in dry, de-pulped beans (*pergamino*), and what they are offered for their beans from national coffee traders, who, in turn, market the coffee to coffee roasters and the soluble coffee industry.

In Coatepec, farmers had become accustomed to their role as primary producers during the decades of INMECAFE's intervention, and thus were generally not equipped or organized to dry and process the beans before bringing them to market. In the 1980s, smallholders had marketed their harvests via credit unions organized and run by INMECAFE. Other farmers had been accustomed to selling their harvests to local large-scale producers (e.g. those with more than 20 ha) for subsequent processing and sale. With the collapse in coffee prices in the early 1990s, many large-scale producers went bankrupt, or, in some cases, ceased to purchase from neighbouring smallholders in an effort to improve the quality and marketability of their own coffee beans. Many de-pulping plants (wet

beneficios) also closed as a result of debt and mismanagement, increasing the cost of coffee processing for smallholders. In 2003, only one of the 60 farmers surveyed in the Mexican communities reported selling his harvest directly to a *beneficio*, and not one reported selling through a coffee cooperative.

In Guatemala, all but three coffee growers interviewed sold their unprocessed berries to intermediaries (locally called 'coyotes'), who in turn sold these berries to local *beneficios*. For producers with small landholdings (e.g. less than 3 ha), and thus small volumes of production, selling directly to a *beneficio* is prohibited by the cost of transport. The intermediaries thus come to collection points near the plantations to buy the berries. The three largest producers interviewed (4–13 ha of coffee planted, but still small producers by national standards) completed the initial wet processing themselves, and then sold the *pergamino* coffee to larger *beneficios* in the capital city (160 km away) for the final processing. This final processing is sometimes completed locally by *beneficios* run by cooperatives; however, only associated growers can take advantage of this option.

In Honduras, coffee growers presented a range of experiences in processing and marketing their coffee beans. Small, poorer farmers tended to sell their unprocessed berries to larger, local growers who operated small *beneficios*. These *beneficio* owners (19% of the Honduran sample) processed their own coffee, as well as that of anyone who sold to them, and carried it in dried form (*pergamino*) to a regional buyer, or else sold it to one of the intermediaries who visited La Campa. Social relationships strongly influenced the choice of buyer/seller. Among the farmers who sold to an intermediary (whether a local or an outside buyer), nearly all held kinship, fictive kinship, longstanding friendship or patron/client ties to the person who purchased their beans.

Despite the price controls of the ICA, the farmers interviewed who had some history in coffee production were quick to explain the 'cyclical' nature of the market, in which prices rose and fell periodically. The prolonged duration of the current downturn and its consequent impacts was, in their view, what distinguished the crisis from those of the past. In contrast with the large-scale producers interviewed in each region, few of the small-scale farmers perceived the downturn to be permanent or were aware of the various factors that analysts were attributing to the structural change in the market.

The impact of the coffee crisis

Despite the fact that the exposure of the households in the three countries to the low producer

Table 1 Impact of the coffee crisis on household income and expenditures

	Percent (frequency)		
	Mexico	Guatemala	Honduras
Income somewhat or greatly diminished	86.7 (52)	67.9 (19)	37.8 (14)
Reduction in harvest	71.7 (43)	82.1 (23)	29.7 (11)
Negatively affected ability to acquire basic goods	96.7 (58)	96.4 (27)	51.4 (19)
Negatively affected ability to pay school fees	26.7 (16)	78.6 (22)	2.7 (1) ^a
Negatively affected ability to pay medical expenses	80.0 (40)	89.3 (25)	29.7 (11)
Reduction in use of purchased inputs	61.7 (37)	59.3 (16)	47.1 (16)
Reduction in investment in plant maintenance	46.7 (28)	71.4 (20)	45.9 (17)
Change in availability of hired labour for harvesting	57.1 (16) ^b	45.9 (17) ^b	64.4 (38)

^aHonduras does not require school fees until secondary grades are completed, and many children receive free school supplies through Plan Honduras. Few children continue to higher grades, so school costs are not a burden to most families.

^bIn Mexico and Guatemala, this change was largely negative (increased labour scarcity) while in Honduras some households reported greater availability of labour while others noted increased scarcity.

Source: Household Surveys (2003)

prices was relatively similar, their perceptions of the crisis and the impacts they reported were not. The household surveys revealed remarkable consistency in the responses of the households surveyed in Mexico and Guatemala, while the experience of the Honduran households with the coffee crisis appeared to be rather different.

The majority of households surveyed in both Mexico and Guatemala reported important losses in income from the coffee crisis, compared with only 37.8% in Honduras (Table 1). Far more households in the Mexican and Guatemalan communities reported having cut back on the amount of coffee they were harvesting, on their investment in purchased inputs as well as on their non-agricultural expenditures as a result of the crisis, than did equivalent households in Honduras. This may have a large part to do with the relative specialization of the surveyed households in coffee. On average, 60% and 73% of the surveyed farmers' land area was planted in coffee in Guatemala and Mexico respectively, compared with 27% in Honduras.

In many cases, the households' cuts in expenditures on purchased inputs were accompanied by reductions in time dedicated to the coffee maintenance practices of weeding and pruning. The supply of labour for harvesting coffee was reported to be particularly scarce in the Mexican and Guatemalan communities because the low coffee prices made labour unaffordable (for example, a kilo of *cereza* in 2003 in Coatepec sold for 1.20 pesos, while the minimal salary for a coffee harvester was 1.00 peso per kilo harvested). Farmers in both

these regions reported that the labour force that previously sought work in coffee harvesting was now migrating out of the region in search of higher-paying work. In focus group discussions in the two Mexican communities, farmers reported that labour scarcity was forcing them to leave as much as 50% of their harvest on the trees.

Responses of farmers to the coffee crisis

It was hypothesized that farmers would respond to the crisis through activities designed to cope with and survive some of the markets' more negative effects on their income, and/or by taking proactive measures not only to address their current predicament, but also to prepare themselves for future uncertainties. To measure adaptation, the households were specifically asked about changes that they had made in their production strategies: changes in planted area, change in crop mix, the introduction of alternative crops, as well as their engagement in organic coffee production as a new commercial strategy. With perhaps the exception of changing crop mix, these actions represent conscious decisions that, while reversible, entail investment, risk and commitment on the part of the farm unit to a particular expectation of the future. In this light, these decisions were interpreted as adaptations, in the sense that they went beyond coping actions that are primarily designed to address a present acute crisis (such as decreasing input use or seeking temporary employment). Although the farmers were also asked about changes in management, labour, and input use, their answers were

almost uniformly negative, indicating that they had either made no change or had diminished their investments. These answers were therefore considered to be additional, albeit indirect, measures of the economic impact of the crisis (see above).

In the Mexican case study, the most frequent adaptation by farmers was planting an alternative crop (reported by 28% of households). In an ironic reversal of the coffee policies of previous decades, encouraging crop diversification is now an explicit part of the government's response to the crisis, although as yet the specific monetary or technical incentives for diversification are not well defined. Of the two Mexican communities, the one at lower altitude had never fully abandoned alternative crops when coffee monocropping was being promoted by INMECAFE. There, partly because coffee was relatively less suitable to the climatic conditions at 700 m.a.s.l., and partly because INMECAFE had never focused its production incentives on farmers at that altitude, farmers had always maintained some land in sugar cane and some in subsistence crops, in addition to coffee. In this community, most of the farmers who reported planting alternative crops were, in effect, returning to these traditional alternatives to coffee. These initiatives were not related to any particular public sector programme. In the higher-altitude community, during the 1980s farmers had abandoned almost all alternative crops under the direction of INMECAFE. In 2003, a group of eight farmers (of the 30 surveyed in this community) was participating in a new publicly subsidized programme promoting the cultivation of macadamia and cedar, intercropped with their coffee trees.

Very few households in Guatemala reported altering their land use or adopting alternative crops, and those that did explained their changes as being a retreat from commercial production into the relative security of maize and beans. Of the adaptations explored, organic coffee appeared to be the most popular means of adjusting to the crisis in Guatemala, although even then the proportion of farmers engaging in organic production was not high. The majority of the organic farmers had begun farming organically in the eight years prior to the survey, that is, before the present crisis in international prices began. These farmers suggested that they were motivated by reports of better prices for organic products and by difficulties in paying for chemical fertilizer. Organic coffee production in the area has been promoted for the past decade by NGOs concerned with protecting the natural resources in this protected land and with improving the access of smallholder producers to niche export markets.

In contrast to the other two regions, a substantial

Table 2 Adjustments of coffee farmers

	Percent (frequency)		
	Mexico	Guatemala	Honduras
Changed crop mix	15.0 (9)	17.9 (5)	51.4 (19)
Changed planted area	15.0 (9)	22.2 (6)	75.0 (27)
Planted alternative crop	28.3 (17)	10.7 (3)	34.1 (13)
Uses organic production methods	17.0 (10)	39.0 (11)	22.0 (8)

Source: Household Surveys (2003)

proportion of surveyed farmers in La Campa reported altering their production strategies in some significant way during the last five years (Table 2). Changes in planted area represented the most frequent response, but a relatively large percentage of farmers reported changing their crop mix. Again, the responses of the Honduran households reflected their relatively more diverse agricultural strategies and relatively larger landholdings, as well as a different attitude towards coffee. Only one household in the Honduran sample grew coffee exclusively, compared with over half of the Mexican households surveyed. Not only did several households in La Campa mention *increasing* the amount of land in coffee, but also they discussed planting a variety of other crops for both subsistence and sale (sugar cane, potatoes, beans, maize, bananas, and yucca). When those who had expanded their coffee fields were asked why, they expressed confidence that coffee prices would eventually rise, and they wanted to be ready to take advantage of the opportunity.

Household endowments and access to services

The survey measured the households' command over, and access to, a variety of resources that hypothetically might play a determinant role in their capacity to respond to livelihood stress. Differences in household wealth, the age and experience of the heads of households, landholding size, crop diversity and households' access to agricultural services were all considered in explaining both within-case study and between-case study differences in adaptations. Although the sample of this study is small, those factors that not only explain the between-country differences, but also the within-country differences in adaptation are clear candidates for further research.

In comparison to the other two countries, the respondents in Mexico had dedicated more years to coffee production, and the heads of households

Table 3 Access to agricultural services

	Mexico	Guatemala	Honduras
Households who received technical assistance in the 5 years prior to survey (%)	15.0	46.4	35.1
Households who received other support from government programme in 5 years prior to survey (%)	65.5	35.7	32.4
Respondents who are members of agricultural organization (%)	30.0	17.9	78.4
Respondents who received a loan in the 5 years prior to the survey (%)	35.6	35.7	59.5
Average age of household head (years)	52	42	46
Average years of education (years)	6	6	4
Average years planting coffee (years)	27	15	12
Average of Material Goods Index	3.7	4.2	1.3

Source: Household Survey (2003)

tended to be older. The average education level of the heads of household was low in all three cases, but lowest in Honduras where the respondents reported having on average only four years of schooling, compared with almost six in Guatemala and Mexico. The high level of schooling for the Guatemala site is unexpected for that region, traditionally an area of high poverty and illiteracy rates. The relatively high level of standard of living for the Guatemala site is in large part due to the wealth resulting from coffee production.

A simple index representing the un-weighted sum of ten possible material goods (i.e. television, radio, telephone, cell phone, refrigerator, blender, car, truck, bicycle and motorcycle) owned by the household was used as a rough comparison of overall material wealth between the three regions. On average, the Mexican and Guatemalan households owned approximately four of the ten items, while those households surveyed in Honduras on average reported ownership of only one of the list of goods.

In contrast, the Honduran households exceeded their counterparts in Mexico and Guatemala in terms of their landholding size, and the amount of that landholding that was cultivated (this is in large part the result of the low population densities in Honduras, the lowest in the region). While the Mexican and Guatemalan households had, on average, command over 2.5 and 2.0 ha respectively, with nearly all of that land cultivated, the Honduran households reported landholdings averaging 6 ha, with only 3 ha in cultivation. Household access to fallow or uncultivated land may be a critical dimension in farmers' capacity to diversify, especially when land is planted with a perennial crop such as coffee. The larger landholdings, including uncultivated lands, among the

Honduran farmers represented a significant contrast with their Mexican and Guatemalan counterparts.

The survey also found notable differences between the three case studies in terms of the respective access of farmers to agricultural services and information. Of the three case studies, public sector support programmes and subsidies played by far the strongest role in farmers' livelihoods in Mexico (Table 3). Sixty-five percent of the households surveyed reported participating in one or more programmes, almost all of which involved a direct payment to the farm household through the coffee commercialization support programme as well as a public welfare programme (*Oportunidades*). In comparison, 35.7% and 32.4% of households in Guatemala and Honduras, respectively, reported participating in public sector support programmes. In Guatemala, the majority of these households reported receiving subsidized fertilizer, while in Honduras the households were primarily benefiting from 'Plan Honduras' which provides school supplies for disadvantaged children attending primary grades.

While there appeared to be far less public-sector intervention in the form of direct payments in the coffee sector in Guatemala and Honduras, the households surveyed in these countries reported significantly greater use of agricultural technical assistance than those in Mexico, although this assistance was still far from universal in the two case studies (Table 3). Despite important budgetary reductions in the 1990s, ANACAFE was still present in Sololá and was the source of technical support for almost half of the farmers surveyed who received it. In Honduras, the two national producer associations, AHPROCAFE and ANACAFE, together with the parastatal IHCAFE, were the primary sources of technical support for the surveyed

Table 4 Household participation in adjustment strategies according to access to services (percent of households)

	Mexico (adoption of alternative)		Guatemala (organic production)		Honduras (change in crop mix)		Honduras (change in cultivated area)	
	Yes	No	Yes	No	Yes	No	Yes	No
Technical assistance	41***	5	82**	24	53*	17	41	11
Credit	47	31	55	24	63	56	63	37
Organization	65***	17	36*	6	86	67	78	78

Significant at *** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$ (Pearson's chi-square and Fisher's exact test).

farmers in La Campa. Of the three case studies, agricultural credit was most widely available in La Campa (Table 3). This primarily reflects widespread participation in rural micro-credit unions, known as *Cajas Rurales* (66.7% of all loans reported).

Both access to credit and agricultural extension in La Campa were statistically associated with the participation of the surveyed farmers in farmer organizations and associations (significant at $P < 0.01$ and $P < 0.05$, respectively). An impressive 78% of the farmers surveyed reported being affiliated with an agricultural organization, including *Cajas Rurales* and production cooperatives, compared with only 30% of the Mexican and 18% of the Guatemalan respondents. Across the three case studies, farmers cited access to technical support, credit, commercial opportunities and agricultural information as the primary benefits of organization membership.

In the Mexico case studies, the survey revealed that farmers who did not participate in agricultural organizations considered them 'fraudulent' or 'too political', and thus generally saw little utility in participating. Farmer organizations in Mexico have traditionally been closely affiliated with political parties, particularly with the *Partido Revolucionario Institucional* (PRI), which for most of the twentieth century used the organizations as a means of distributing patronage and securing votes. Interviews in the region of study also suggested that there has been a problem with corruption in the distribution of subsidies to the coffee sector through farm organizations. In contrast, the Guatemala data suggest that some growers are just not interested in participating in local agricultural organizations because they simply do not see a need, or do not readily recognize the benefits from joining such an organization. Some of the growers that did express interest could not identify an organization that fit their needs or, in the case of the larger growers interviewed, one that accepted growers of their particular landholding size (many cooperatives are organized around very small growers).

Assets and adaptation

While the differences noted between the three case studies suggest important differences in patterns of development and resource availability, these differences are not necessarily related to the adaptive activities in each country. In general, indicators of human capital – education, age, and experience in coffee – were less associated with those farmers who were engaged in adaptive activities than indicators of social organization and assets obtained through institutional transactions.

In the Mexican case study, farmers who adopted an alternative crop to coffee were more likely to be members of an agricultural organization (in most cases, the *Consejo Regional de Café de Coatepec*, a regional affiliate of the national parastatal organization that replaced INMECAFE), were more likely to have received technical assistance and/or credit from formal sources (e.g. through the public bank BANRURAL, through government programmes such as SEDESOL, or through the state coffee agency COVERCAFE) in the previous five years, and reported greater than average participation in a variety of government programmes (Table 4). Age, education, landholding size and experience with coffee were not significantly associated with the adoption of an alternative crop.

The very small number of households that reported taking any particular adaptive action in Guatemala limited the extent to which statistical analyses could test what assets and attributes were associated with those households. Proportionally more farmers who were engaged in organic production had benefited from technical assistance and credit, and were members of agricultural organizations than those who were not farming organically. As noted before, some farmers in the area had been involved with agricultural organizations promoting organic coffee well before the price crisis started, and they were naturally the first to receive assistance and credit when needed.

In Honduras, those farmers who reported changing their land area and/or changing their crop mix also reported a proportionally higher access to technical assistance and credit in the five years prior to the survey than those that had not adopted an alternative crop. However, only the access to technical assistance proved to be significantly associated (through a chi-square analysis) with a change in crop mix.

Perceptions of policy and programme change

As a rough measure of the influence of policy change on farmers' strategies and opportunities, farmers were also asked in the survey if they had perceived any changes in public policy in recent years, and if so, to describe such changes. The respondents in Mexico who perceived that there had been some change in public policy and programmes (42%) were divided about the direction of that change. Those negative about the changes they observed complained that the disappearance of INMECAFE had left them without the credit and technical support they needed. Those positive about the changes noted that the government was now providing some compensation for the low prices in cash payments, and that the social welfare programme *Oportunidades* had been helpful to their incomes.

Far fewer households in Guatemala (27%) noted a change in public policy, and those that had referred primarily to the government programme of distributing subsidized fertilizers. This practice was not implemented by the government as a response to the price crisis, but as a general policy to support agricultural production in the country. In Honduras, 32% of households who observed change associated this change with infrastructure and social service improvements (road construction, schools and clinics), rather than public investment in production or coffee. A few farmers mentioned the coffee retention programme as a positive public sector response to the crisis, but they were very much in the minority, and these were the largest producers in the sample who had easier access to governmental programmes.

Discussion and conclusions

In all three cases, the farmers faced similar world prices for coffee, although according to the International Coffee Organization, producer prices in Honduras were the lowest of the three countries. Yet far more households in the communities surveyed in Mexico and Guatemala reported suffering livelihood impacts from the drop in coffee prices than in Honduras, and it was in Honduras

that farmers appeared to be the most proactive and adaptive.

The relative optimism of the Honduran households about coffee, compared to the communities in Mexico and Guatemala, may appear puzzling until the local context is considered. Most of La Campa's farmers have had a relatively brief experience with coffee, and it is the only export crop that they have thus far been able to produce. It is difficult for them to gauge the severity of this coffee crisis, which for many is their first experience with price volatility. Moreover, most producers have diverse subsistence options and livelihood options; few households are specialists in coffee production. Most are able to leverage low cost or 'free' labour through family and social networks, so their risks are lower than those faced by those farmers in Mexico and Guatemala who have relied on hired labour in the past. Within Honduras farmers' current ranges of options and resources, expanding coffee production may yet appear viable, given their confidence that prices will climb. If prices continue to be low, however, it is likely that farmers will re-evaluate and seek alternatives. It is also important to note that coffee farmers in other parts of Honduras, with a longer history of production and potentially greater dependence on coffee, may have very different perspectives from those farmers in La Campa.

The differences observed in material wealth and education in the three case studies (reflecting the pace and history of development in each region) may also explain some of the differences observed in the impact of the crisis. Many farmers surveyed in Coatepec and Sololá had lived through the coffee boom in the late 1970s and early 1980s, a period in which capital accumulated in regional marketing centres and farmers enjoyed substantial support for their production. The surge in rural investment after the peace returned in Guatemala, and the proximity of the Sololá and the Coatepec communities to urban centres, have also resulted in rising standards of living. A growth of tourism, manufacturing and other industries in the two regions has elevated the importance of education in the eyes of rural residents as they increasingly aspire to higher levels of material consumption. The collapse of coffee prices, and the loss of the types of agricultural supports farmers had formerly enjoyed, would thus be particularly marked in the Mexican and Guatemalan case studies. In contrast, in La Campa, farmers had only recently begun to benefit from public investment in rural development infrastructure and social services.

In terms of the various factors that appear to contribute to adaptive capacity in each country, access to market and technical information, finance

and having sufficient land with which to diversify into alternative crops are obviously important. While there is apparently more public sector intervention in the coffee sector in Coatepec than in the other two cases, this intervention in itself does not appear to be satisfying farmers' needs for technical support. Instead, it is rural credit unions and the continued presence of organizations like ANACAFE and NGOs that appear to be instrumental in facilitating farmers' adaptations in Honduras and Guatemala.

The data also suggest that the observed differences in access to agricultural technology and services are related to different expectations about where the solution to the crisis will originate. Of particular note is the historical relationship of farmers to public sector agencies, and the expectations that this relationship may have engendered (Adger 2003). The Mexican coffee sector is still struggling with the transition from a highly state-controlled environment to one in which self-organization and mobilization may be critical for survival. The historical degree of involvement of the federal government in coffee production and trade far surpassed that of both Guatemala and Honduras. Not only did INMECAFE cultivate a strong dependence of farmers on the state, but also in the process promoting monocultures of coffee as part of its modernization policy, INMECAFE also indirectly undermined individual and community risk management strategies involving income and agricultural diversification (similar 'maladaptive' policies have been noted in other country contexts; see Stevens *et al.* 2003). In the case of the two communities surveyed in this study, it appears that the same institutional legacy that created high expectations of public sector intervention has also alienated farmers from seeking support in agricultural organizations who might be able to partially substitute for the state's absence. By contrast, the relative autonomy of ANACAFE in Guatemala has preserved its legitimacy with farmers. According to diverse assessments (CLACDS 1999; IDB, USAID and WB 2002), ANACAFE has continued to play an important technical role in advising national coffee production policy and in providing some agricultural services.

In Honduras, the history of weak central government and poor market integration has meant that most farmers – at least in the region of our research – have not become dependent on state support or on access to external credit, nor have they focused solely on export crop production. Farmers' minimal expectations of state assistance appear to have contributed to their relatively proactive approach to maintaining diversified livelihoods and seeking alternative strategies. The Honduran farmers, however, have planted export-oriented coffee for significantly less time than their counterparts in

Mexico and Guatemala, therefore the Hondurans' greater diversification may simply reflect the fact that they have not had the time to convert as much land to coffee as the other nations' households (see Tucker and Southworth 2005).

In short, while our research did not set out to test the importance of farmer's expectations of public institutions or farm-level organization in the process of adaptation, our results suggest that such issues – while very difficult to assess – may be central to understanding the responses of rural communities to livelihood stress. The role of farm-level associations, NGOs and formal and informal institutions in coffee farmers' livelihood strategies will be explored formally in subsequent research. Given coffee's importance, not only to rural livelihoods and the regional economy, but also to the region's ecology, further work is needed to monitor the implications of farmers' choices for rural economic welfare, as well as for the ecology of coffee regions. Our follow-up research will address the interaction of market and non-market stressors (e.g. climatic variability and pests) on the viability of coffee farmers' livelihood choices, and the implications of these choices for the regional landscape and economy.

Acknowledgements

Funding for this research was from the Inter-American Institute for Global Change Research (IAI SGP-15). Supplementary funding and support was provided by the Center for the Study of Institutions, Population, and Environmental Change (CIPEC) at Indiana University, Bloomington, under a National Science Foundation grant (SBR-9521918). The authors would like to acknowledge the collaboration of Dr Cecilia Conde in the project design and implementation, and the participation of Daniela Diamente, Ignacio (Nacho) Escorriola, Genaro Martínez González, Gerardo Ávila Pardo and Martha Lizeth Moreno in the survey data collection and analysis. Ing. José Luis Martínez of the National Institute for Agricultural, Livestock, Forestry and Fishery Research (INIFAP) provided support in the fieldwork in Mexico. The comments of Alex Winkels on an earlier draft of this article were greatly appreciated, as were the comments of anonymous reviewers.

Notes

- 1 Investment in Honduras was related to US concern to stop the threat of communist expansion in Central America, which was perceived as imminent with the 1950 election in Guatemala of President Jacobo Arbenz, whose socialist policies included expropriation (with reimbursement) of unused land controlled by US companies.

2 La Campa produced 529.64 sacks of 46 kg in 1990/91, and 5183.60 sacks in 2000/1. The 2000/1 figures reflect a decline in production from the 1999/2000 harvest of 7684.33 sacks, evidently related to the reduction in investment in coffee inputs with the fall in prices. These figures underestimate the actual harvest because they only include harvests from members of IHCAFE; some producers cannot afford the legal fees or do not wish to bother with the procedures to gain membership.

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