WHEN CHANGE IS THE ONLY CONSTANT

Coffee agroforestry and household livelihood strategies in the Meseta de los Pueblos, Nicaragua

Ph.D. Dissertation by: Silke Mason Westphal
International Development Studies
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ABSTRACT:
The Ph.D. research project investigates coffee producer households in the Meseta de los Pueblos, in the Departments of Carazo and Masaya, Nicaragua. The historical context of the local study is the post-reform period of the 1990s, characterised, *inter alia*, by liberal government policies and rapid dismantling of the Sandinista agrarian reform of the 1980s. The study included two types of coffee farms. One type had historically been privately owned. The second type had first formed part of the large estates belonging to Somoza and the group supporting his dictatorship, had then been turned into cooperatives during the Sandinista agrarian reform, and finally been divided up among the cooperative members in the process of de-collectivisation.

The analysis focuses on three key thematic issues: social differentiation, technological change and livelihood diversification. These issues are investigated within an analytical framework based on the diverging positions of central theoretical approaches within the field: the modernisation approach and orthodox political economy theory, the neo-populist small-farm literature and newer political-economy inspired approaches with more empirical oriented analyses of small-scale producers and agrarian change. The issues at stake are investigated from two perspectives: on the one hand, the perspective of the broader processes of social transformation and technological change, and on the other, the perspective of the producer household. The analysis departs from the paradox of a category of small-scale coffee producers that is apparently characterised by continuity, in social as well as in technological terms, in spite of the turbulent political and economic history of the Nicaraguan agricultural sector. This could only be understood in a satisfactory way by combining different types of theoretical explanations and analytical perspectives.

In the broader transformation processes, from which the social category of small-scale coffee producers in the study area emerged, dynamics of social differentiation played a crucial role, but it was also concluded that social struggle and politics importantly influenced the outcome of these processes in different historical periods. The Sandinista agrarian reform was an example hereof.

Another part of the explanation of the persistence of the category of small-scale coffee producer households in spite of adverse pressures was their ability and determination to seize economic opportunities and niches. The study of small-scale producer households’ livelihood trajectories revealed how livelihood diversification could contribute to the possibilities to maintain and regain farm-based livelihoods in the course of the family life cycle. Dynamic adaptation also played an important role with regard to coffee production strategies. Contrary to the image of static ‘traditional’ production systems, the study shows that production strategies were constantly changed and adapted in response to the ways in which broader political economic tendencies were articulated with the dynamics of local markets, demographic, socio-economic and agroecological conditions at different points in time. Complex but limited labour and product markets at local, national and international levels were important for the diversity characterising both livelihood and production strategies. The opportunity structures that presented themselves to the small-scale coffee producer households were, however, neither constant nor equal: Not constant, because they were influenced by the historically changing configurations of broader political and economic tendencies and local and household level dynamics, and not equal, because social heterogeneity acted as a filter for the chances of different producer households achieving a positive dynamic between livelihood diversification and farm production.
RESUMEN EN ESPAÑOL:

El proyecto de Ph.D. investiga las estrategias de vida y de producción de familias cafetaleras en la Meseta de los Pueblos, en los Departamentos de Carazo y Masaya, Nicaragua. El contexto histórico del estudio es la época post-reforma de los años 90, caracterizada por las políticas de gobiernos liberales y la rápida desintegración de la reforma agraria sandinista. El estudio incluye dos tipos de unidades productivas: Uno que históricamente estaba en manos privadas, y el otro tipo, que formó parte de las propiedades del grupo Somoza durante su dictadura, y que después fue integrado a las cooperativas de la reforma agraria en los 1980s, para años más tarde, estar dividido entre los miembros de las cooperativas en el proceso de descolectivización.

El análisis se enfoca en tres temas centrales: diferenciación social, cambio tecnológico y diversificación socio-económica ('livelihood diversification'). Estos temas están investigados dentro de un marco analítico basado en las posiciones divergentes de influyentes enfoques teóricos: los enfoques de modernización y la economía política ortodoxa, la literatura campesina neo-populista y los más recientes enfoques inspirados por la economía política pero proponiendo análisis más empíricos de pequeños productores y transformaciones agrarias. Los temas están investigados desde dos perspectivas: por un lado, una perspectiva amplia de las transformaciones estructurales sociales y tecnológicas, y por otro lado, la perspectiva de la familia productora. El punto de partida del análisis es la paradoja entre una categoría social de pequeños productores de café que aparentemente está caracterizada por continuidad, tanto en términos sociales como tecnológicos, a pesar de la turbulencia política y económica en la historia agraria de Nicaragua. Para poder comprender esa paradoja se requirió de una combinación de diferentes tipos de explicaciones teóricas y perspectivas analíticas.

Dinámicas de diferenciación social jugaron un papel importante en los procesos de transformación desde los cuales surgió la categoría social de los pequeños productores de café en el área del estudio. Sin embargo, el análisis concluye que las luchas sociales y políticas también influían importantantemente en los resultados de esos procesos en diferentes períodos históricos, como por ejemplo, en el caso de la reforma agraria. Otra parte de la explicación para la persistencia de la mencionada categoría social, a pesar de presiones adversas, era la capacidad y voluntad de las familias productoras de aprovechar oportunidades y nichos económicos. El estudio de las trayectorias de las familias productoras reveló que la diversificación de actividades económicas en el transcurso del ciclo familiar podía contribuir a mantener o reestablecer una forma de vida basada en la producción agraria. La adaptación dinámica también caracterizó las estrategias de producción. Opuesto a la imagen de un sistema de producción ‘tradicional’ estático, el estudio demuestra que las estrategias de producción estaban constantemente cambiadas y adaptadas para responder a nuevas tendencias políticas y económicas y su articulación con las dinámicas de mercados locales y condiciones agro-ecológicas, demográficas y socio-económicas en diferentes épocas históricas. La complejidad y las limitantes de los mercados laborales y de productos en el ámbito local, nacional e internacional promovían la diversidad que caracterizaba las estrategias familiares de vida y de producción. Las oportunidades que se brindaron, sin embargo ni eran constantes ni iguales para todas las familias productoras: No constantes, porque dependían de las cambiantes configuraciones históricas de las amplias tendencias políticas y económicas y de las dinámicas en el ámbito local y de la familia. Y no iguales, porque la heterogeneidad social funcionaba como un filtro para las posibilidades de diferentes familias productoras de lograr una dinámica positiva entre diversificación de las actividades económicas y la producción del sistema agroforestal con café.
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For a map of Nicaragua see e.g.:
Acronyms:

ACOSJ: Community association of San José (Asociación Comunitaria de San José)
ATP: Agricultural workers union (Asociación de Trabajadores de Campo)
BANADES: National development bank (Banco Nacional de Desarrollo)
CAP: Collectively managed cooperative form formerly known as CAS (Cooperativa Agropecuaria Productiva)
CAS: Sandinista agricultural cooperative (Cooperativa Agrícola Sandinista)
CATIE: Tropical agriculture research and higher education centre (Centro Agronómico Tropical de Investigación y Enseñanza)
CCS: Credit and service cooperative (Colectivo de Crédito y Servicios)
CNRC: National commission for the revision of confiscations (Comisión Nacional para la Revisión de las Confiscaciones)
CONARCA: National coffee modernisation commission (Comisión Nacional para la Renovación del Café)
CORCO: Coffee producer cooperative in the Carazo area (La Cooperativa Regional de Caficultores de Oriente)
CSM: Cooperative with individually managed plots separated by a ‘dead furrow’ (Cooperativa de Surco Muerto)
CT: Production collective, state farm (Colectivo de Trabajo)
ICO: International Coffee Organisation
INTA: National institute of agricultural and livestock technology (Instituto Nacional de Tecnología Agropecuaria)
MIDINRA: Ministry for agricultural development and agrarian reform (Ministerio de Desarrollo Agropecuario y Reforma Agraria)
mz: Manzana (0.7 hectares)
OCI: Office for the quantification of indemnities (Oficina para la Cuantificación de las Indemnizaciones)
OOT: Territorial planning office (Oficina de Ordenamiento Territorial)
UNAG: Nicaraguan farmers’ and cattle ranchers’ organisation (Unión Nicaragüense de Agricultores y Ganaderos)
UNICAFE: Nicaraguan coffee producers’ organisation (Union Nicaragüense de Cafetaleros)
UNO: Coalition of mid-right parties founded for the 1990 elections (Union Nacional Opositora)
UPE: State farm (Unidad de Producción Estatal)

Spanish and Nicaraguan terms:

Alcalde Indígena: Indigenous mayor in the colonial period
Campesino: Peasant, literally someone who lives in the countryside
Contras: Militant counter-revolutionary movement against the Sandinista government
Hacienda: Large landholding, ranch or plantation
Junta Municipal: Municipal council
Ladino: Person of mixed (European/indigenous) decent
Latifundio: Large landholding
Manzana: Unit of area (0.7 ha)
Meseta: Plateau, flat area in volcanic landscape. (The area within which the Carazo coffee-growing region is located is often referred to as the Meseta de los Pueblos.)
Mestizo: Person of mixed (European/indigenous) decent
Minifundio: Very small, mostly sub-subsistence landholding
Nacatamal: A popular local dish made of corn flour and pork wrapped in banana leaves.
Parcelero: Land reform beneficiary who received an individual farming plot when large holdings were split up
Pulperia: A small home-based shop or kiosk with a limited supply of daily articles
Quinta: Hobby farm, which many urban middle class families in Nicaragua maintained on varying degrees of commercial bases
Quintal: Weight unit (45.45 kg)

Units:

100 C$ = 8 US$ (1999)
1 mz = 0.7 ha
1 qq = 45.45 kg
Chapter 1  Introduction: Peasants, proletarians, producers?

Visiting don Alejandro

We are looking at an agricultural landscape in the coffee growing area of the densely populated Meseta region in south-western Nicaragua. In contrast to other agricultural areas in the western part of the country, the picture is dominated by green and lush vegetation, trees of many different kinds and coffee plants grown in the shady environment. It is hard to believe that a radical elimination of virtually all trees in the coffee fields had taken place in the 1980s under an ambitious coffee modernisation programme.

The name of the village is Fátima. The coffee farm in the picture belongs to don Alejandro, who received the small plot of farmland during the Sandinista agrarian reform in the 1980s. Alejandro lives on the farm with his wife Magdalena, who works in a sewing factory in the nearby town, and two of their children.

Before the agrarian reform, Alejandro had worked as a farm labourer for a large coffee planter in the area, who belonged to the group supporting the then dictator Somoza. Alejandro had started working as a farm labourer when he was still a boy, accompanying his father. Farm wage labour was necessary to make ends meet at that time as the small plot of land that the family lived on was not sufficient to maintain the household. When his father died this small property was left to Alejandro’s stepmother and children and he himself did not inherit.

At the beginning of the 1980s, while working as a coffee farm labourer, the farm that Alejandro worked on was abandoned by its owners. Because they had been affiliated with the Somoza regime they fled the country after the Sandinista revolution. The farm was turned into a cooperative that Alejandro became a member of. The cooperative held the title to the land, and the members were organised as a collective for acquiring credits, purchasing chemical inputs and technical assistance. Coffee production was modernised with capital-intensive technology and managed according to national production plans.

Towards the end of the decade, Alejandro was sent out to fight against the contras in the civil war for a few years and then returned to his cooperative in Fátima. Soon after, in the elections of 1990, the Sandinista party was voted out of office and a liberal coalition took over government. As part of a severe programme of structural adjustment the new government set in motion a rapid dismantling of the agrarian reform. In the course of the process of de-collectivisation Alejandro’s
cooperative was split up and he received an individual plot of 3 mz\(^1\). He thus became a *parcelero* as the individual beneficiaries of agrarian reform land are called in Nicaragua.

Having received his own farmland for the first time in his life, Alejandro started re-modelling the coffee production system he had taken over from the cooperative. Whereas previously, the extensionist had been the one who decided what and how to plant and prescribed the types and quantities of chemicals to be applied, Alejandro now adapted production practices to his own ideas. One of the first changes was to plant and let grow a variety of trees on the coffee plantation: orange, lemon, avocado, mango, timber trees and bananas. He also reduced input levels considerably. Due to the new government’s liberalisation policies, access to credits and chemical inputs had become difficult for small producers like Alejandro. Within a few years, Alejandro’s coffee management practices came to resemble the so-called ‘traditional’ coffee production systems such as that of Gustavo, whose family had owned a small coffee farm in the neighbouring village of San José for generations. On the whole, the similarity in production methods, livelihood strategies and the households’ socio-economic characteristics between the two historically different groups of former cooperative members and private small-scale coffee producers was striking, only 10 years after de-collectivisation.

*The peasant paradox in Nicaragua*

The agrarian structures in Nicaragua underwent a series of drastic changes and disruptions in the second half of the 20\(^{th}\) century. Three fundamentally different political economic currents swept over the agricultural sector within a few decades. Firstly, there was a long period of polarised agricultural development under the exploitative dictatorship of the Somoza family. Secondly, there was a decade of agrarian reform under the Sandinista revolution; including redistribution of land, formation of a collective sector and state-led modernisation of the coffee export sector. Finally, from 1990 onwards, there was a period of liberalisation of the Nicaraguan economy, with rapid de-collectivisation and deregulation of the agricultural sector. In spite of a strong historical tendency towards land concentration, population growth and several decades of urbanisation a large majority of the population had remained rural and depended, at least to some extent, on farming.

\(^1\) 1 \(mz = 0.7 \text{ ha}\)
Introduction: Peasants, proletarians, producers?

Against this background, the question arose as to what had been the impact of the drastic structural changes in the agrarian sector on the Nicaraguan small-scale coffee producers. Seen from a broader perspective the social category of small-scale coffee producers appeared to be surprisingly resistant to the many contextual pressures and changes. Thus, in the coffee sector, 89% of producers were small-scale producers at the time of the study (UNICAFe 1998). Moreover, in spite of the changing political and economic influences, it appeared that the small-scale coffee producer households investigated in this study had continued doing largely what they had done for centuries: managing their small farms with household labour and producing a range of both market and subsistence crops with so-called ‘traditional’ low-input production methods. As the example of Alejandro hints, even the parceleros, who had been subjected to several radical social and technological changes in the course of their life trajectories, had returned to the practices and livelihoods characteristic of the mainstream of small-scale producer households in the region.

How can we interpret the apparent persistence of this social category of small-scale agricultural producers? Are they, in fact, peasants in the traditional sense, backward subsistence farmers resistant to change? Are they efficient family farmers practising sustainable agriculture adapted to local natural conditions and the socio-economic needs of the household? Have they become economically viable, market-oriented smallholders? Or have they ended up being just part-time farmers principally depending on other types of income and on their way out of agriculture? This set of questions has been an important inspiration for the formulation of the research questions of the study.

Research questions

The main tension in the study is between, on the one hand, a social category of small-scale producers that is seemingly characterised by stability and, on the other hand, turbulence and change in the larger economic and political context but also in the life trajectories of the individuals and households who make up the social category. In order to reach an understanding of this paradox of stability and change, the social and technological change processes that Nicaraguan small-scale coffee producers formed part of were investigated from two analytical perspectives; one focusing on the broader agrarian change tendencies, and the other focusing on the producer household.

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2 Small-scale producers are in this case defined as holdings of less than 10 mz.
In one part of the analysis, corresponding to the first research question, the social and technological change processes at stake are investigated from a broader agrarian change perspective with the social category of small-scale coffee producers as its subject. The second research question is directed towards the perspective of the coffee producer households. One part of this question inquires into more general change tendencies in the livelihood and production strategies of the producer households. Another part of the investigation targets the identification of differences in the ways that adaptation had taken place within the group studied. A more specific issue investigated under this question is the trajectories of those small-scale coffee producers who first got access to land as cooperative members during the Sandinista agrarian reform and became individual producers when the cooperatives were parcelled out in the course of de-collectivisation in the 1990s.

1) How can the broader social and technological processes that have lead to the formation and endurance of a social category of small-scale coffee producers with so-called traditional production systems in the Nicaraguan *Meseta* region be understood?

2) a. Seen from a household perspective, how have small-scale coffee producers in the study area adapted and changed their production and livelihood strategies in the period before, during and after the Sandinista agrarian reform?

   b. Are there differences between the production and livelihood strategies of different groups of coffee producer households, among others *parcelero* and historically private producers and how can such differences be explained?

Corresponding to this two-tiered analytical concept, the theoretical framework combines explanations from different types of approaches towards the question of agrarian change, including orthodox and more recent strands within the broader field of political economy theory, the modernisation approach to agricultural development and the neo-populist small-farm literature. The theoretical discussion is structured around three thematic key issues; social differentiation, technological change and livelihood diversification. In the following chapter, the diverging theoretical positions on these issues are used to formulate more specific questions of inquiry to guide the analysis.

The combination of different analytical perspectives and theoretical approaches brought to the fore different kinds of dynamics that took place simultaneously and were mutually constitutive in the processes of change studied. Only by combining explanations from different theoretical approaches focusing on different kinds of
macro and micro dynamics was it possible to reach a satisfactory understanding of the processes of change studied and the apparently paradoxical tendencies observed from the broader agrarian structure perspective and from the household perspective.

How to understand agrarian change in the Nicaraguan context theoretically?

The theoretical approaches chosen for the analysis represent some of the central models of interpretation of the historical role and prospects of small-scale farming in developing societies. One way of dividing the different approaches is according to their focus in the identification of the factors and dynamics driving agrarian change processes. Some have focused more on general, abstract dynamics, such as the functioning of the market economic system and agricultural modernisation building on universal, technological models. Focusing on the farm household, others have emphasised local conditions and dynamics, reflecting the possibilities and constraints of local natural environments and the socio-cultural and demographic patterns evolved within them.

Among the more universalistic approaches are the modernisation and orthodox political economy theories. The more locally focused approaches will, in this study, be represented by Netting and his work on smallholder households (Netting 1993). Related positions, however, can be found in the recent neo-populist literature on small farms and sustainable agriculture (Bunch 1985; Brush and Turner II 1987; Chambers 1989; Pretty 1995; Conway 1997; Rosset 1999), as well as in the historical debate, where traces reach back to Chayanov (Chayanov 1966). As a general tendency, it could be said that the latter positions see more potential in household-based, small-scale farming combining subsistence and market production, whereas the former take a rather more pessimistic view of the future prospects of a social category with such characteristics. In Latin America the two perspectives were reflected in the ardent debate on the importance of peasants’ wage work between proletarianistas (proletarianists) and campesinistas (peasantists) in the 1970s (for a discussion see e.g. (Kearny 1996, pp.108-110; Kay 2000, p.136; Appendini 2001, p.26)).

In their more extreme forms it could be said that the universalist approaches tend towards economic reductionism. The approaches that focus narrowly on dynamics at the household and farm level, on the other hand, bear the risk of perceiving rural households and smallholder agriculture in a static manner, if they ignore the social relations that small-scale producers form part of and the influences of broader contextual changes on producer households’ livelihood strategies and agricultural practices.
Newer theoretical strands departing from the broader field of political economy (Bryceson 1997; Jansen 1998; Bryceson 2000; Jansen 2000; Llambi 2000) have emerged that approach the question of peasants and small-scale agriculture with less ideological overtones and more empirical curiosity than previous debates. The analyses presented within this strand demonstrate a greater openness in the study of the empirical social transformation processes going on in rural societies, processes that are probably different from and more complex than what earlier peasant theories had anticipated. The theoretical and methodological approach of the present research work is greatly inspired by this type of analysis.

The greater openness towards learning from the observed empirical processes in the present analysis, in contrast to the more universalistic theoretical approaches referred to above, is considered of importance to comprehend the livelihood and production strategies of Nicaraguan small-scale coffee producer households in the context of the 1990s. The approach allows us to understand the influence of social struggle and politics on the course that agrarian change processes have taken in the empirical context studied as well as the influences of local natural, cultural and demographic dynamics. Thus the empirical change processes analysed include both the social relations through which the small-scale producers are integrated into society and the human-nature relations expressed in the production processes of the coffee production systems. The natural/technical dimension in this case is considered of significance as the social group that is the subject of the study is defined by their being agricultural producers – an aspect which, as will be seen in the findings, also plays a central role in their own social identification.

Locating the research topic in the Latin American agrarian debate

As mentioned above, the theoretical discussion and the analysis are structured around the diverging positions of the approaches outlined towards three key thematic issues: social differentiation, technological change and livelihood diversification. These three issues were found to be of central importance in the investigated case as well as in the broader theoretical and political debate on agrarian change. In the following, the three thematic issues are located in the context of the Latin American agrarian debate in the second half of the 20th century. The attention given to each of the three issues, and the theoretical explanations associated with them, were closely related to the dominant political tendencies at different points in history. Their theoretical interpretations and implications will be discussed in more depth in Chapter 2.
**Social differentiation and land reforms**

Parallel to the increasing efforts to push national economic growth in the developing countries in the second half of the 20\textsuperscript{th} century, the future role of the rural populations in the agricultural and urban sectors became a political challenge in Latin America as well as in other parts of the developing world. The assumption of the classical growth models that an increasing rural labour surplus would be absorbed by the urban industrial sector did not seem to materialise. The question of the rural poor was reflected in the theoretical debate in which political economic interpretations of the peasant question were prominent among social science scholars, especially when the dependency debate was at its highest in the 1970s (e.g. (Stavenhagen 1978)).

The structural dynamics of the market economic system were seen as the root cause of social differentiation and of marginalisation of large parts of the rural population in the context of dependent development (for a discussion see Kay (Kay 1989, p.88-124)). De Janvry has used the term ‘double (under-) developmental squeeze’ to characterise the dilemma of the rural populations: on the one hand seeing their possibilities of living off the land diminish as pressure on the land increases and on the other lacking alternative employment options because of limited development in other sectors (de Janvry, Sadoulet et al. 1989, p.396).

Land reforms had taken place in some Latin American countries earlier in the century, but gathered momentum in the 1960-70s in the aftermath of the Cuban revolution. The historical background of the land reforms was centuries of polarised development starting with the colonial *latifundio-minifundio* system and a continued concentration of land and wealth in the hands of the few and increasing numbers of poor without the means to secure their livelihoods (see e.g. (Feder 1971, p.83-97)). The objectives, the set-up and the extent of the reforms depended on the social and political forces involved in the different countries and on the type of government that launched them: some a result of political concern for redistribution, others with modernisation of the agricultural sector as their prime target\(^3\) (de Janvry, Sadoulet et al. 1998, p.1; Kay 2000, p.127-129).

\(^3\) Land reforms carried out in the context of a revolution were those of Mexico (1917), Bolivia (1952), and Nicaragua (1979). However, also authoritarian regimes carried out land reforms in Peru (1969-75) and Ecuador (1964), as did democratically elected governments in Chile (1964-73), Colombia (1961-), Guatemala (1952-54), Honduras (1973-), El Salvador (1980-) and the Dominican Republic (1961-). The analysis by de Janvry et al. found that in some of the Latin American land reforms redistribution of land was in fact a secondary aim to that of modernisation. The threat of expropriation of unproductive land under land reforms was, thus, used as a political instrument to induce modernisation in the non-reformed sector (de Janvry, A., E. Sadoulet, et al. (1998)).
In the aftermath of the Latin American land reforms a literature has recently emerged that shows a renewed interest in the ongoing rural social transformation processes, raising the question, among others, of what happened to the beneficiaries of the land reforms that had taken place all over the region (Thiesenhusen 1995; Loker 1996; de Janvry, Key et al. 1997; Baumeister 1999). Although their conclusions on the political motives and the outcome of the Latin American land reforms are critical, de Janvry et al. suggest that:

“Parcelized farms in the reform sector do open the possibility of a successful independent smallholder sector, a historical novelty for most of Latin America. Whether this sector will survive and create a thriving rural middle class is one of the great challenges of today’s agrarian question.”

(de Janvry, Sadoulet et al. 1998, p.10)

In a discussion of the trajectories that land reform beneficiaries across Latin America have taken, their competitiveness and post reform differentiation, de Janvry et al. identify three adjustment paths (de Janvry, Sadoulet et al. 1998, p.14). The first is characterised by the failure of land reform beneficiaries to become competitive and, as a consequence, selling out the farming plots received. The wider implications are re-concentration of land and proletarianisation of former beneficiaries, often associated with migration. The second path consists of involution into subsistence type agricultural production supplemented with seasonal wage labour and migration, implying semi-proletarianisation of the reform beneficiaries and functional dualism. Finally, the third path outlined is that of successful, capitalised and modernised smallholders. While examples are given of the first two paths, Chile and Peru respectively, it is observed that experiences of de-collectivisation hitherto have shown little incidence of the third path.

Analyses of the situation of the agrarian reform beneficiaries of Central America do not seem too optimistic about their prospects. Baumeister (Baumeister 1999, p.15) in his assessment of the impact of the Central American agrarian reforms characterises the trend in the 1990s as massive sales of holdings. The general perception among observers of the process of parcelling out the cooperative lands in Nicaragua appears to be the same, a clear tendency that agrarian reform beneficiaries, the so-called parceleros, lose their newly gained access to land due to debts, lack of tenure security and other problems (Nitlapán 1994; Stanfield 1994). Still, the question posed by de Janvry et al. regarding the possibilities of a successful independent smallholder sector provided by the land reforms is both interesting and relevant and deserves to be further studied for different types of agrarian reform beneficiaries in different empirical contexts. Inspired by the
emerging debate on what happened after the Latin American land reforms, the present analysis has looked closer at one segment of the Nicaraguan agrarian reform beneficiaries: former members of coffee cooperatives who still were in possession of land at the end of the 1990s.

**Focus on agricultural technology**

The 1980s saw an increased focus on technological modernisation of small-scale agriculture in the development strategies of national ministries and international aid programmes. The political economic perspective that had dominated the peasant debate in the previous decade emphasised the importance of structural dynamics in the agrarian sector, the question of class formation and land distribution. Focus in the agrarian debate was now redirected towards technological development targeting viable individual farming units. The prospects of the rural poor to achieve economic progress were assumed to depend on the adoption of the right farming technology and improvement of smallholders’ technological and economic skills (Johnston 1975; Mellor and Desai 1985). All over the continent, state-led agricultural modernisation initiatives were carried out and implemented through national agricultural extension systems. Often such initiatives also formed part of broader integrated rural development programmes and were sidelined by supportive macro-economic measures. In Nicaragua, the state-led coffee modernisation programme CONARCA, carried out in the study region was an example of such efforts.

In Latin America around the 1990s, the integrated rural development programmes, public subsidies, and regulation of price and trade policies of the previous decades were replaced by structural adjustment policies and market liberalisation. Cutbacks in public budgets and a general withdrawal of the state from rural credit and technical service functions left institutional gaps that were only partly filled by other agents, such as NGOs and other types of organisational set-ups.

The appearance of new actors and institutional structures in the rural development field towards the end of the 20th century was accompanied by a certain shift in the agendas and objectives for development interventions, among others a re-orientation of the agricultural technology model envisaged for the small-scale sector. While mainstream agricultural development to a large degree continued to pursue modernisation strategies with capital-intensive technologies coined from the concept of the ‘green revolution’, the new approach towards farming and rural livelihoods followed the increasing global focus on themes of environment and sustainable development. This entailed, *inter alia*, the promotion of environmentally friendly production methods, including low input cultivation practices, trees and biodiversity in agricultural systems.
This tendency towards re-orientation was also reflected in the agricultural strategies of some of the institutions related to the Nicaraguan coffee sector. Thus, within a few decades, the coffee producers in the study region had experienced different policies and strategies of NGOs, donor and international development agencies and their national and local counterparts: first a strong promotion of modernisation and later of sustainable agricultural methods. But how did the promoted practices and principles, of first modernisation and then sustainable agriculture, correspond to rural peoples’ own visions, criteria and reality, and the social relations and dynamics by which these are formed? This is one of the practical perspectives inspiring the choice of small-scale coffee production systems as an empirical theme for this study.

Recent tendencies: semi-proletarianisation or diversified livelihoods?
While in certain circles the promotion of agricultural development continued under the heading of sustainable agriculture, the mainstream academic and political debate seemed to lose sight of the question of peasants and small-scale agriculture when the discourse of market liberalisation took over the global and national political agendas in the 1990s. All over the world as in Latin America rural people making a living based on small-scale and often sub-subsistence farming, however, did not. But what are the main tendencies in the social change processes taking place in the small-scale agricultural sectors across the continent? Taking a broad view of the Latin American rural change processes during the 20th century a general trend towards the historical dualistic *latifundio-minifundio* structure giving way to more complex and facetted agrarian structures has been observed. This happened under the influence of the ongoing social, economic and political processes, including population growth, agricultural modernisation and land reforms (de Janvry, Sadoulet et al. 1998, p.10).

Kay observes that although the Latin American peasantry is far from disappearing at the turn of the millennium, its relative importance for agricultural production is diminishing (Kay 2000). He points out a general trend toward reduced average farm sizes among the small peasantry and decreasing shares of household income provided by agricultural production. In spite of limited employment possibilities for the rural poor, household incomes within this group are becoming more dependent on other types of work. The most frequent employment opportunities consist of seasonal agricultural wage labour, but increasingly also include non-agricultural work. Kay concludes that semi-proletarianisation is the dominant tendency among small peasants in Latin America (Kay 2000, p.132). Investigating the question of livelihood diversification from a more disaggregate perspective the present study cannot generally be said to be an example of such a trend, however.
It was found that livelihood diversification among Nicaraguan coffee small-scale producer households was an expression of different types of dynamics. Some of these matched the image of semi-proletarianised peasant households caught in a stagnant situation with sub-subsistence agricultural production and badly paid warm wage labour. Other types, however, were far more positively interrelated with farm production.

It may appear that we are presently witnessing new tendencies of rural social change that are difficult to grasp within the conventional theoretical frameworks and the social categories belonging to them. It has become difficult to know how to label the empirical groups of small agricultural producers such as those studied in the present research work. This difficulty is reflected in the literature in which authors within the field are grappling with a range of different terms to define them. In critical reaction to the peasant debate of the 1970s, the use of the term has been questioned and a re-conceptualisation has been called for (Roseberry 1983; Kearny 1996). The literature of recent years shows a tendency to seek other concepts than that of ‘peasants’ because of the underlying theoretical and ideological connotations indicated by its use. Other terms such as ‘smallholder’ (Netting 1993), ‘resource poor farmers’ (Chambers and Jiggins 1986) or, in a Latin-American context, ‘campesino’ (Loker 1996) and ‘producer’ (Jansen 1998) have been preferred by different authors, each with their set of theoretical implications.

In the present study the term ‘producer’ with its narrower connotation has been chosen. Although features matching the theoretical concept of peasants may well be identified among the households included in the sample group, the term producer is considered to be more in accordance with the analytical approach of the study and its claim to relative empirical openness. The general concern of the study was with small-scale coffee producer households, which was reflected in the choice of the villages studied. The criteria for sample selection, however, were based only on a certain crop production (coffee) and not defined by criteria of social strata or class. It was, thus, not an aim to approach the study with preconceived notions of the producer households’ positions in the social relations and change processes they formed part of, but to let these be subject to the analysis and its conclusions.

The Nicaraguan case

The Nicaraguan case is an illustrative example to analyse the nature of the ongoing rural change processes in a Latin American context. With a national economy based on agro-export, a long history of economic polarisation reaching back to the
colony period, an agrarian reform and in recent years, a strong political move towards market liberalisation and de-regulation, the Nicaraguan case epitomises several important historical trends characterising the region, albeit in a somewhat condensed form.

The problems and challenges arising from the social context of the studied rural households are also well-known throughout the region: poverty, population growth, increasing pressure on agricultural land and, on the other hand, limited employment opportunities in other sectors and withdrawal of the state from agricultural and social service systems. In Nicaragua, drastic social, economic and political changes and disruptions during the past three decades have influenced the outlook of the population and made uncertainty a major consideration in their lives and their planning for the future. And more specifically, for the producers of export crops such as coffee, severe moments of risk consisting of fluctuations in world market commodity prices and climatic effects marked production conditions during the 1990s. It is within this context that the ways in which coffee producer households have adapted their livelihood and production strategies are studied.

In the following it is briefly outlined how the three thematic key issues of social differentiation, technological change and livelihood diversification are investigated in the analysis of the social and technological change processes in small-scale coffee production in the study area.

Social differentiation
Despite marked historical tendencies towards concentration of land and resources followed by a far reaching agrarian reform focused on the formation of a strong collective sector, small-scale household producers continue to dominate the Nicaraguan coffee sector, at least in numbers if not in cultivated areas and production. The background to the formation and the endurance of this social category forms part of the analysis. Moreover, what kinds of tendencies characterised the social processes that the coffee producer households formed part of in the 1990s are investigated, 10 years after the agrarian reform had started to be dismantled, and in a context of structural adjustment policies and economic liberalisation.

The study includes a comparison of two different groups of small-scale coffee producers; one with their background in the reformed sector and the other with a history as private small-scale producers. Socially the point of departure of the parceleros before the revolution had mostly been that of proletarianised peasants working for large coffee and other export crop producers. This was followed by a period as cooperative members and then, as a result of the parcelling out of
cooperative land, they received farming plots of their own. The trajectories of the two groups of small-scale coffee producers, that were found to lead to a homogenisation of their livelihood and production strategies, were considered interesting with regard to a discussion of the uni-linear social and technological perspectives assumed in the modernisation and orthodox political economy approaches. Moreover, by including a group of parceleros in the study I have tried to contribute to casting light on some aspects of the question of the outcome of the Latin American agrarian reforms.

**Technological change**

The coffee producers of the study area had a history of several decades of world market integration through the production of coffee for export, during which they had experienced boom as well as bust periods in the international coffee market. The traditional way of cultivating coffee in Nicaragua had been in shaded systems provided by a variety of trees growing between the coffee plants and virtually without use of chemicals. In the 1980s, however, a vigorous state-led coffee modernisation programme, CONARCA, was carried out in the study region. CONARCA entailed the elimination of the existing shaded coffee systems and the introduction of modern varieties cultivated with high levels of external inputs and without shade trees. The new system depended heavily on state support in the form of credits, subsidised inputs and agricultural extension services. Although some of the measures introduced had a wider effect, the main target group of the programme was the large-scale coffee farms, first and foremost those in the collective sector. Thus, besides the differences in their social trajectories, there was a marked difference in production technology between the private small-scale coffee producers and the cooperative farmers during the agrarian reform of the 1980s.

Notwithstanding these historical influences, at the time of the study, the majority of small-scale producers in the area obviously cultivated their coffee in so-called traditional production systems with the use of a dense cover of shade trees, intercropping of different products and low-input management practices. A question arising from this observation is how the so-called ‘traditional’ coffee cultivation practices of the producers of the region can be understood. This question is investigated in different ways, *inter alia* with regard to the sample group as a whole and in a comparison of the two different groups of parcelero and private coffee producers.

Analysing the ways that the parceleros had adapted their production strategies to the new conditions the study found that by the end of the 1990s, the parcelero coffee producers in the study area, the *Meseta* region in south-western Nicaragua, had
adapted their production strategies in such a way that they were hardly distinguishable from the historically private small-scale producers. This was in part a consequence of the economic liberalisation policies of the 1990s, which meant that the previous support measures for cooperative and small-scale private producers disappeared. There were, however, also more locally-rooted explanations related to agro-ecological conditions and markets, and the socio-economic situations of the producer households. The homogenisation of the production strategies of parceleros and private small-scale coffee producers, however, did not mean that no differences could be observed among the sample group. In order to reach an understanding of the dynamics of these differences, the analysis combines explanations deriving from the concepts of the family life cycle and of social differentiation.

*Livelihood diversification*

In the pacific region of Nicaragua, population growth, fragmentation of farmland, and very limited possibilities of permanent employment in other sectors had contributed to an economic environment that had promoted the tendency of diversifying the income and activity portfolios of rural households with different kinds of off- and non-farm activities, among these seasonal and more permanent migration.

The analysis investigates the dynamics associated with livelihood diversification in small-scale coffee producer households, including the reasons for seeking employment outside the farm. In addition, the impact of different types of off- and non-farm work on farm production are investigated and their implications for the wider rural change processes in the region are discussed, based *inter alia* on the concepts of proletarianisation, de-peasantisation and de-agrarianisation. The analysis undertaken from the perspective of the producer household suggested that proletarianisation or semi-proletarianisation were not the general outcome of livelihood diversification among the cases studied. By investigating the dynamics between off- and non-farm work and farming over time, it became obvious that livelihood diversification could even contribute to achieving and maintaining a farm-based livelihood in spite of difficult odds.

*Research strategy*

*Levels of analysis*

To be able to answer the questions about the social and technological processes characterising the group of coffee producers in the study it was considered necessary to carry out a household perspective analysis as well as to include an
investigation of the broader agrarian structures with relevance for the case. The analysis of households’ livelihood and production strategies aimed at learning how producer households responded to the social and natural conditions they were facing and how and why different households responded in different ways. Moreover, the household perspective was necessary to facilitate the analysis of how strategies and outcomes at the coffee production system and the socio-economic dynamics at the household level influenced each other.

The analysis also required directing a part of the enquiry at broader structural issues in order to reach an understanding of the ways in which changes in strategies over time and differences between producer households were articulated with dynamics in the households’ wider social and natural environment. Explanations of this type were drawn into the analysis as far as considered appropriate. These have to be seen in an historical perspective to understand the changes and disruptions, divergences and convergences that have influenced the social change processes within the Nicaraguan small-scale agricultural sector. The marked structural changes in the Nicaraguan agricultural sector - with the Somoza dictatorship until 1979, the Sandinista revolution and agrarian reform, and the change to a liberal government in 1990 accompanied by drastic political and economic shifts towards de-collectivisation, de-regulation and privatisation - are used as historical landmarks to structure the analysis. The post-agrarian reform period is given most emphasis in the empirical analysis of livelihoods and producer strategies.

By integrating a household perspective and a broader structural perspective in the analysis the aim has been to overcome the methodological dilemma that Giddens has called the “unhappy division of labour” between micro- and macro- sociological approaches:

“Microsociology is taken to be concerned with the “free agent”, which can safely be left to theoretical standpoints such as those of symbolic interactionism or ethnomethodology to elucidate; while the province of macrosociology is presumed to be that of analysing the structural constraints which set limits to free activity.”

(Giddens 1984, p.139)

In the present analysis, the dynamics studied at the micro level are understood as embedded in the broader political, economic, social and technological change processes that have taken place in the region. As far as was possible within the scope of the study, an aim has been to analyse the agroforestry and livelihood strategies in an historical perspective. Moreover, an attempt has been made to
grasp the ‘small’ structural dynamics at work in the social processes at the level of the household and production system. The household level of analysis is considered important because it makes it possible to study the social change processes going on in rural areas, in this case of Nicaragua, in a disaggregate form. Changing patterns of employment and labour allocation, land use and cropping systems, demographic tendencies, etc. are thus considered to be social and economic dynamics to which household level studies can make a valuable contribution.

It should be emphasised that precisely the interaction between micro and macro dynamics has been interesting in the present analysis, and that one of the major methodological findings regarding the combination of a household perspective with a broader agrarian change perspective was that the one without the other was not sufficient to fully understand the processes at stake.

The natural dimension
The research focus on livelihood and farming strategies of coffee producer households, moreover, required an approach that allowed for an integration of the natural dimension of the production processes studied. The concept of political ecology has been a useful inspiration in this regard, an approach that has taken up the challenge of bridging the gap between the social and natural sciences.

In a discussion of theoretical approaches to land use, environmental and natural resource issues Jansen emphasises the importance of taking seriously the natural dimension in analyses of this kind of topics and criticises the tendency of social constructionism and discourse analysis to over-socialise environmental problems (Jansen 1998, p.225). The present study does not deal directly with environmental problems, but the argument is equally applicable to the more general question of society’s interaction with nature, of which the agricultural production processes form a part.

"An agnostic stance or relativist approach of the problems and the causes form no part of political ecology. (…) political ecology should be based on a methodology which helps to explain the object of analysis: our relation to nature and the causes of environmental deterioration. This necessarily includes a position on the biophysical processes that are bound up with environmental deterioration. Existing explanations of biophysical processes should not only be located in power games but also tested to see whether they provide insights into (deeper) social or natural structures. This also makes social science less arrogant and more open to the specificities of the work of natural/technical science. Not only do the power games
and the cultural categories of natural scientists matter but also the content and methods of their work since these are shaped by the deeper structures of nature.”

(Jansen 1998, p.225)

In the analytical framework of the present study the integration of the natural dimension is undertaken by means of a combination of elements of different theoretical and methodological approaches from social science theory and more technically oriented approaches from the field of agricultural science. At the coffee production system and farm level the analytical framework draws on the perspectives of farming systems research and agroecology to facilitate an understanding of the coffee production practices and strategies studied.

A concrete comprehension of these features is viewed as an important precondition to understand the ways in which producer households manage and allocate the assets available to them to make a living. More specifically, the issues to be investigated are the characteristics and functioning of the coffee agroforestry system, including coffee management practices, input, labour and system output. Special focus is put on the shade strata, tree diversity and species selection and the functions assigned to trees and agroforestry system by the producers. This is among others due to the fact that the radical elimination of the shade trees traditionally used in coffee production systems in the study area was an important feature of modernisation of the cooperative farms. The role of shade trees in the coffee production systems of different types of producer households is therefore an important aspect of the analysis at this level.

Use of theory
The theoretical framework for the present study departs from a discussion of three central thematic issues in the debate on agrarian change in developing countries; social differentiation, technological change and the historically changing role of farming in rural households’ livelihoods as expressed in the concepts of livelihood diversification. To this end, some of the most prominent theoretical positions on the agrarian question are introduced; conventional political economic and modernisation theories, functionalist approaches to smallholder agriculture and, as a third position, more recent contributions combining inspiration from political economy thinking with a more empirical focus towards their analyses. Similarities and divergences between the different theoretical positions towards the selected issues are identified and formulated into questions in order to guide the empirical analysis.

The approach in this regard could be characterised as a rather eclectic one, where only those elements of the larger bodies of theory deemed relevant for the central
themes of the analysis have been included in the discussion. Considering that the issues at stake in the present analysis have been chosen due to their central importance in the general agrarian debate as well as the case study context, the eclecticism should, however, be justified.

The manner in which theory is used in the present analysis, to raise relevant questions for the empirical analysis, is inspired by an approach that Mouzelis calls ‘conceptual pragmatism’ (Mouzelis 1995). Pragmatism, in this context, is viewed as a method for clarifying concepts by showing how they are or can be used. The major task of sociological theory within this conceptualisation is suggested as being to “(...) clarify current conceptual tools and to construct new ones by following criteria of utility rather than truth” (Mouzelis 1995, p.9). Mouzelis, thus sees the chief aim of modern sociological theories to provide conceptual tools for the study of social phenomena that allow for the generation of interesting questions and facilitate the establishment of methodologically proper linkages between different levels of analysis (Mouzelis 1995, pp.3-4).

“(…) the raison d’être of such tools is, negatively, to solve puzzles that hinder open-ended, dialogic communication between social scientists; and more positively, to facilitate the empirical investigation of the social world via asking theoretically interesting questions, providing conceptual means for comparative work, for moving from one level of analysis to another, etc.”

(Mouzelis 1995, p.9)

Mouzelis distinguishes between different types of theory - or different ways of working with theory: theory as tool/resource vs. theory as end-product/topic (Mouzelis 1995, p.2). Leaning on the concept of conceptual pragmatism, the use of theory in the present analysis primarily tends towards the former mode.

The household livelihood strategy and farming systems approaches are used within the larger theoretical framework as a means of operationalising the investigation of the analytical questions posed and to facilitate the organisation of the complex sets of data describing the processes studied at the levels of household and production system. The livelihood strategy concept is considered useful as it allows for an understanding of the farming system, in this case the coffee agroforestry system, as an integral part of a broader portfolio of household economic activities and facilitates the analysis of the relation between production system and livelihood strategies of the producer households in the study area. Besides offering a methodological tool to grasp the dynamics at the household level and the interactions between coffee production system and other economic
activities, the livelihood strategy concept provides a platform for the analysis of the social and economic relations by which producer households are linked to the wider society, such as market, state and civil society institutions. The historical perspective of the case study material provided a background for the discussion of these processes.

Types of data and information sources
The analysis is based on different types of information and sources, comprising literature of theoretical, thematic and geographical relevance and the primary data collected during field studies in Nicaragua within the period July 1998 to May 2000. The core of the fieldwork was made up of farm and household level studies carried out in the villages of Fátima in the Department of Carazo, San José de Monteredondo and San Juan de la Concepción in the Department of Masaya. Two surveys with samples of 62 and 39 respondents including interviews and measurements in the coffee agroforestry systems, 6 in-depth case studies, a series of individual key person and group interviews and a focus group workshop were carried out. Moreover, the primary information comprised local and national level key person interviews with individuals and representatives of public and private organisations, administrators, researchers, extensionists, development workers, etc., informal conversations and personal observations.

Reader’s guide
Chapter 2 contains the theoretical discussion and analytical framework of the study. The chapter consists of four sub-sections. The first presents different influential theoretical approaches in the peasant and agricultural development debate. The approaches outlined are: firstly, the modernisation paradigm and orthodox political economy approaches; secondly, neo-populist approaches towards smallholder households and sustainable agriculture and, thirdly, newer political-economy inspired approaches towards the analysis of social relations and human-nature relations of which small-scale producer households form a part. In the second sub-section of Chapter 2 the three thematic key issues - social differentiation, technological change and livelihood diversification - are discussed. Based on a discussion of the diverging theoretical positions towards these issues, questions of inquiry are formulated for the empirical analysis. In the third sub-section some conceptual considerations are outlined regarding the principal units of analysis, the household and the coffee production system. In order to be used to organise the data pertaining to each level the concept of household livelihood strategies and the approaches of farming systems research and agroecology are introduced. Moreover, a brief outline is given of the scientific context of the
concept of agroforestry and previous research carried out within the field. The last section of Chapter 2 contains a description of and reflections on the methodology used for data collection and analysis.

Chapter 3 provides an historical background for the understanding of the small-scale coffee producers of the study region, regarding both the nature of the social category they represent and their technological characteristics as producers. The chapter is structured into two major parts: one spanning the period from the introduction of coffee as an export crop in the late 19th century up to the Sandinista revolution, and the other dealing with the agrarian reform years from 1979 to 1990.

As one aspect of the early history of coffee production in the study region the technological changes that took place in the production systems are analysed, *inter alia* questioning the notion of ‘traditional’ coffee production. Another feature is the social transformation process that was set in motion by coffee expansion, where different models of interpretation are discussed. It is concluded that historical processes of social differentiation were important to understand the agrarian structures of the study region. Rather than a general trend towards proletarianisation, however, the social transformation processes set in motion with the expansion of coffee export production were characterised by changing tendencies of peasantisation and de-peasantisation shaped by social struggle and politics. The impact of the agrarian reform was of interest to the present study in at least two important ways. One was the redistribution of land to groups of rural people who had lost their access to land in the course of the polarised agricultural development process preceding the revolution. The other regards the radical coffee modernisation programme that was carried out in the reformed sector, and that signified a major difference between the production technologies used by the two groups of coffee producers included in the study, *parceleros* and historically private producers.

Chapter 4 investigates the wider scenario that the studied producer households faced in the aftermath of the agrarian reform characterised by drastic economic, political and institutional changes in the agrarian structures. In doing so, the chapter presents one of the contextual layers by which the observed changes in the target group’s livelihood and production strategies are analysed in the subsequent chapters. Apart from investigating the broader structural conditions and changes that potentially affected the entire group of coffee producers included in the study, the economic and technological differences between the two groups of historically private and *parcelero* producers are pointed out. A second purpose of Chapter 4 is to analyse some of the general tendencies within the rural change processes in post-reform Nicaragua, discussing them vis-à-vis the concepts of re- and de-peasantisation and de-agrarianisation. The discussion, which at this point is mainly
based on aggregate regional and national level data on land distribution and employment of the rural work force, sets the scene for the household level analysis in the succeeding chapters.

Chapter 5 takes us to the local level. A brief introduction to the study villages and their geographical setting is followed by a socio-economic characterisation of the farm households included in the sample group. The concept of livelihood diversification is used to analyse the ways in which the producer households combined incomes from farm production and off- and non-farm work. This is inter alia done by studying the households’ allocation of labour to different economic activities and the patterns of income, spending and investment including some of the important considerations and criteria motivating decisions in this regard. The analysis leads onto the question of de-agrarianisation as a possible implication of livelihood diversification. In the light of the findings of the previous chapter on this point, the analysis is taken to a more detailed and qualitative level, including the dynamics between livelihood diversification and farm investments, the present activities and future prospects of the younger generation and the social identity of the respondents reflected in their views on these issues. While livelihood diversification among the group of respondents could not be seen as an expression of a general tendency towards de-agrarianisation, the prospects of the younger generation were not that clear. The characterisation of the producer households’ income and activity portfolios moreover prepares the ground for the analysis of difference between livelihood strategies undertaken in Chapter 6.

Chapter 6 studies changes and differences in the livelihood strategies of the sample group and investigates the implications of livelihood diversification at the household level. The chapter, inter alia, contains a qualitative case study analysis to provide deeper insights into the complex dynamics characterising the livelihood strategies of the producer households and to provide an understanding of how and why livelihood strategies differed and changed over time. A discussion of the importance of household level and broader political and economic dynamics for the explanation of these processes forms part of the analysis. It was found that a satisfactory understanding could not be achieved by referring to only one of the theoretical perspectives, but that an integration of different types of explanatory concepts was required to grasp the important relations between local dynamics and broader political and economic tendencies. While family cycle dynamics accounted for part of the explanation of social differences between producer households, the explanation could not stand alone but had to be seen in combination with the historical conditions for agricultural production and the possibilities to gain access to land and capital influenced by changing markets and policies. Another part of the explanation of difference between the producer
households was found in the concept of social differentiation. The importance of aspects of social differentiation in livelihood strategies and farm production are, among others, illustrated by means of a typology of three different livelihood strategies. Based on this a quantitative comparison of key socio-economic and production variables is carried out, highlighting the differential dynamics characterising the relation between livelihood strategy and coffee production system of different groups of producer households. It was found that the type of off- and non-farm work greatly influenced the quality of these dynamics, producers’ engagement in farm-wage labour indicating the most negative situation.

The central analytical discussion of Chapter 7 relates to the question of the importance of local adaptation vs. modernisation as explanatory principles for the characteristics of the production systems and the technological change processes observed among the small-scale coffee producers studied. These change processes include general, longer-term tendencies in response to economic, social, demographic and natural conditions as well as the more specific adaptation of the parceleros’ production strategies from modernised production systems to diverse, agroforestry systems in the post-reform context, leading to a homogenisation of the two groups in terms of their production systems. Land use intensification, reduced input use and diversification of the coffee agroforestry systems are identified as general tendencies of change in response to the altered conditions regarding inter alia land size, markets and product prices.

Chapter 8 analyses differences in the management and output of the coffee agroforestry systems of the sample by means of the two diverging theoretical concepts of family cycle dynamics and social differentiation. The analysis includes a closer investigation of the links between livelihood strategy types and coffee agroforestry production identified in Chapter 6 by means of analyses of the in-depth case studies and survey data. It is concluded that the diverse, low-input coffee agroforestry systems provided the small-scale producer households with relative socio-economic robustness and allowed for maintenance and improvements to be undertaken with few means. That said, however, social heterogeneity was found to play a role for the extent and quality of improvements and the pace at which adaptation could take place, and thus influenced different households’ possibilities of accumulation. Building on the findings of Chapter 6 regarding qualitatively different livelihood strategy types, aspects of social differentiation are identified in the dynamics characterising the relation between livelihood diversification and farm production among the group of coffee producer households studied.
Finally, Chapter 9 presents the conclusions and a discussion of the perspectives and methodological approach of the analysis.
Chapter 2  Theoretical framework

The present chapter consists of four sections. The first section gives an outline of important theoretical approaches towards the dynamics underlying small-scale agriculture and agrarian change. The theoretical approaches pertain to modernisation and orthodox political economy thinking, the neo-populist small-farm literature, and newer political-economy-inspired approaches towards the study of social relations and human-nature interactions in small-scale farming. The second section of the chapter discusses the positions of the different theoretical approaches towards three key issues in the analysis, social differentiation, technological change and livelihood diversification. Parallels and divergences between the approaches are identified and based on these, questions are formulated in order to guide the empirical analysis. The third section presents reflections on the analytical units of the household and production system and the notion of strategy in this context. The section moreover discusses methodological concepts for the organisation of the empirical data at the levels of the household (the livelihood strategy approach) and the coffee production system (agroforestry and farming systems research). The fourth and final section of the chapter contains an overview of the field study design and methods used for data collection.

2.1  Theoretical positions on social and technological change in small-scale agriculture

In the following three different theoretical positions on the dynamics at work in social transformation and technological change processes in small-scale agriculture are presented. Where relevant, reference is made to their reflections on the historical development and present situation in the Nicaraguan agricultural sector. There are three main divergences between the theoretical perspectives presented. Firstly, between approaches emphasising the importance of larger structural dynamics vs. those seeking explanations at the farm and household level. Secondly, divergences exist between approaches that interpret social differences in terms of individual mobility vs. those focusing on the structural dynamics of social differentiation, and thirdly, between different interpretations of the dynamics and impact of producer households’ off- and non-farm activities.

The presentation of the different theoretical approaches is structured around the three thematic key issues referred to above, in order to prepare the discussion and formulation of questions of inquiry in the next section. Firstly, the interpretation of
rural social change processes and the dynamics creating inequality between small-scale producers is addressed. This is closely related to the question of how the historical nature of the social category of peasants/smallholders is perceived i.e. whether they are seen as a disappearing, changing or continuous social category. Secondly, the issue of production methods and technological change in the small-scale farming sector is raised, among others addressing the question of how changes in small-scale producers’ production practices are explained, and how the links between social stratification and small-scale coffee producers’ production methods and strategies and the outcome of these are perceived. Finally, the question of how the different theoretical approaches to agrarian change deal with those – often important – economic aspects of rural livelihood strategies that are not part of households’ agricultural activities is discussed.

2.1.1 Peasants as an historically ‘doomed’ social category

The historical roots of the debate on peasants and agrarian change reach back to the European classical economists and Marxist political economic theories of the 19th century, among others of Smith, Marx and Engels, and Ricardo. Although these theories differed somewhat with regard to the attention that was paid to the peasant question and the interpretation of their historical role, the general idea of the peasantry as a social category in the process of extinction was shared.

"The teleological perspective of the literature is readily apparent. Peasants are portrayed as technologically backward and doomed by the forces of modernization and industrialization. Yet peasants have confounded western social science by their enduring presence."

(Bryceson 2000, p.6)

The basic theoretical view referred to in the quotation, Bryceson comments, reflects the proponents’ historical context of an industrial transformation of European societies and a peasantry in the process of dissolution. Their perceptions, however, were to influence strongly the later theoretical debate on peasantries in both the ‘Second ’ and the ‘Third World’ well into the next century, and lived on in bourgeois as well as Leninist versions of developmentalism:

"(...)until recently the basic theme concerning nations with large peasantries has been national development, a process seen as synonymous with the elimination of the peasantries of these ‘developing’ nations. Modernization theory and
developmentalism in general are twentieth-century permutations of nineteenth-century unilinear social evolutionism.”

(Kearny 1996, p.42)

The basic assumption of modernisation as the precondition of development, and the peasantry as an anachronistic social category can, thus, be traced in both classical and political economic approaches to agrarian change (for further discussion see (Bryceson 2000) or (Kearny 1996, pp.42-72)).

The modernisation paradigm
The underlying objective in the modernisation approach is to achieve rural development through increasing agricultural productivity and market integration. Modern farming technology, specialisation and increased division of labour are seen as the means to raise the efficiency of agricultural production:

“The mechanism of economic progress in farming is the same one that operates in every sector of the economy. That mechanism is specialization. Not only is there specialization along specific crop lines among farmers, but also a host of functions formerly carried out by the household is transferred to specialised producers. Increasing division of labor in all economic activity brings with it the opportunity to use machinery whose power, speed, and precision multiplies the yield of human effort. Specialization not only makes possible the introduction of capital equipment, it also facilitates changes to better organization and more productive technologies. The result is augmented productivity of land and capital as well as of labor.”

(Tomich 1995, p.36)

While the modernisation approach was initially associated with a principal focus on large-scale agricultural production, in the 1970-80s a strand emerged with an increased focus on technological development within the small-scale farming sector (see e.g. (Johnston 1975; Mellor and Desai 1985; Tomich 1995)).

“It is our contention that a choice and sequence of innovations that is compatible with the progressive modernization of a large and increasing fraction of a country’s small farmers has important economic as well as social advantages. A “unimodal” strategy designed to raise the productivity of a large and increasing fraction of a nation’s farm units is an effective means of fostering rapid economic growth and structural transformation while simultaneously contributing to the social goals of expanding employment opportunities and reducing inequalities in income distribution.”
This reorientation was a result of the growing realisation of enduring rural poverty and the fact that small, subsistence and sub-subsistence farmers with ‘traditional’ farming systems in the developing countries did not seem to disappear and be absorbed in a modern economy as originally anticipated in the modernisation model. The idea is that traditional family farms would become capitalist enterprises and that the market would lead to an efficient allocation of land to the most competitive farmers, whereas uncompetitive production units, such as peasant farms, would eventually vanish.

Within this approach to rural development, agricultural extension plays a central role in disseminating scientific findings to farmers and, thus, inducing the desired modernisation process (Tomich 1995, p.52). In essence, the assumption of the modernisation paradigm is that by introducing the right technology and providing the necessary technical know-how through extension services, small-scale farmers could become viable producers for the market and thereby, eventually, the problem of rural poverty would be solved. The benefits of agricultural modernisation are perceived to be neutral as to scale, as small farmers are thought to be just as capable of benefiting from the new technologies (e.g. high yielding varieties, chemical fertilisers and pesticides, irrigation) as larger farmers. Small-scale farmers are perceived as acting in accordance with the economic principles of the market, adhering to the notion of ‘economic man’. Reasons for success and failure in farming are ascribed to individual skills and resources rather than to structural dynamics causing differentiation.

Among the explanations given for the increased emphasis on technological development in small-farm agriculture are, that both growth and equity issues could be addressed in this way without the need to question the politically sensitive issue of distribution. As pointed out by Ellis, however, this approach builds on an underlying assumption that the rural poor pre-dominantly consist of poor small farmers. Landless rural dwellers and non-agricultural economic activities forming part of rural livelihoods are paid very limited attention within this approach (Ellis 2000, p.22)

The focus on the modernisation of small farms from the 1970-80s was reflected in both the policies of national governments and the strategies of international institutions and aid organisations within the agricultural development field. The

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4 The question of viability as used by the proponents of agricultural modernisation in a Latin American context has i.a. been discussed by Bebbington (Bebbington, A. (1999)).
approach, however, has been losing terrain with the strong neo-liberal current that started to dominate economic and political development later on in the 1980s. This is not to say that a significant change occurred in the attitudes within state and other formal institutions towards small-scale agriculture. Modernisation is still the mainstream agenda in most countries. What changed was principally the perception of the active role of the state in agricultural development. From being a strong promoter of technological modernisation, supplying credits, subsidies and extension services, state intervention was drawn back, leaving the task of agricultural development to the market and private initiatives.

"The critique of big government was driven largely by agendas of structural adjustment and market liberalisation on the economic side, but this found strange echoes and unlikely allies amongst those seeking to reverse the top-down character of rural development projects, and those impatient with the perceived failure of orthodox approaches to address adequately diverse problems at the local levels of action."

(Ellis 2000, p.26)

As Ellis observes, rather interestingly the anti-state-intervention drive of neo-liberal reforms to some extent was supported by the claims of NGOs and grassroots movements promoting community development, participatory processes and low-input farming methods based on agro-ecological principles and local knowledge for Third World rural development. Although the notion of peasants as backward, passive beneficiaries of modern technology and scientific knowledge has been challenged in academic and NGO circles, it is still quite alive among administrators, extensionists and among farmers themselves, where ‘modern’ production technology is perceived as the desirable and so-called traditional farming practices regarded with disrespect. This is true in post-revolutionary Nicaragua as in most other (developing) countries.

The political economy of agrarian change

The political economy of agrarian change also questions the viability of peasant agriculture in the long run. Kearney sums up the orthodox political economy position on the peasant question as follows:

"Lenin’s model is the prime example of such left-wing modernist analysis of the peasantry, which sees it as ‘developing’ itself – as it were, out of existence – by becoming differentiated into capitalist farmers and rural and urban workers."

(Kearney 1996, p.55)
Sharing the basic perspective of modernisation, the focus of political economy theory on social differentiation in the interpretation of the dynamics at play, however, stands in contrast to that of the modernisation approach. Thus, instead of being the solution for the survival of small peasant farms, political economy theory sees modernisation of agricultural technology within the market economic system as part of the dynamics leading to widening disparities in income and wealth of rural families and, ultimately, the extinction of the peasantry as a social category. The exploitative nature of capitalist social relations of production and consequent differences in the financial possibilities to invest in productivity-enhancing technologies are seen as one of the main reasons for the unequal outcome of agricultural modernisation. The anticipated modernisation of the agricultural sector and the dissolution of the peasantry, however, were not perceived as an undesirable process by orthodox political economy theories. From the political economy perspective the crucial issue for the envisaged development model was the social organisation of production, rather than an agricultural technology development qualitatively different from that proposed by the modernisation paradigm.

Although empirical tendencies supporting the development model of the orthodox political economy theories could definitely be identified, peasantries were far from disappearing throughout the 20th century. The widespread historical phenomenon of semi-proletarianised peasants in Latin America as in other developing countries was in the 1970s interpreted in terms of ‘functional dualism’ referring to peasants supposed functionality as suppliers of partly self-sustaining, cheap labour for the capitalist development process (Deere and de Janvry 1979, p.608; Appendini 2001, p.26).

In Nicaragua, the political economy perspective was reflected in the original design of the Sandinista agrarian reform. Jaime Wheelock, who would become one of the main architects of the agrarian reform, has offered the following historical interpretation of the development of the coffee sector and its consequences for traditional small-scale producers in Nicaragua:

“El proceso de acumulación de capital se realiza en Nicaragua a partir de los estímulos de la demanda externa de café, que indujo a la captura de grandes extensiones de tierra apta para el cultivo, así como la proletarización de pequeños productores que fueron expropiados. Factores de producción dedicados con anterioridad a las tradicionales formas de
subsistencia, fueron reunidos y organizados en función de producir mercancías para el mercado capitalista internacional."  

(Wheelock 1980, p.190)

As shall be elaborated in the following chapter, the fact that the rural poor were interpreted as proletarians and not as peasants or small-scale producers contributed to a strong focus on large-scale state farms worked with paid farm labour during the first years of the revolution. Although the land reform was also influenced by pragmatic dispositions, - it was easier to maintain the large-scale land units of the expropriated haciendas and convert them into state farms - the design of the land reform had a clear ideological element. The top-down modernisation approach to agricultural development, thus, got a Sandinista variant, that in spite of its revolutionary orientation, has been criticised for not surpassing the perception of the peasant as a passive beneficiary rather than an actor in the process of technology development:

“Los campesinos fueron vistos por los técnicos y por los dirigentes políticos como beneficiarios de ayuda y como receptores de “modernas” y racionales orientaciones económicas y productivas.”

(Nitlapán 1994, p.17)

The prioritisation of production collectives also reflected a belief in the economic advantages of large-scale production units and high-input technologies. This was expressed clearly in the CONARCA coffee modernisation programme carried out in the study area in the beginning of the 1980s. The programme targeted coffee modernisation based on technological models such as that found in Brazilian large-scale coffee plantations, with extensive use of external inputs and full sun exposure. The introduction of a technological model from a geographical and social context quite different from that of Carazo and Masaya can be seen as a reflection of the universalist technology perception characteristic of the modernisation approach.

To sum up, in spite of opposed ideological and theoretical viewpoints, the modernisation approach, rooted in classical economic theories and orthodox

5 The process of capital accumulation in Nicaragua started with the external demand for coffee that induced the capturing of large areas of land apt for the crop, as well as the proletarianisation of the small producers who were expropriated. Factors of production previously dedicated to the traditional forms of subsistence were united and organized in order to produce goods for the international capitalist world market.

6 The technicians and political leaders perceived the peasants as beneficiaries of aid and as recipients of ‘modern’ and rational economic and productional orientation.
political economic thinking, can be said to have a common perspective on the peasant question. Both perceived peasants as a backward population group with outdated technology and a traditional outlook that would have to give way to more efficient production units in a modern agricultural sector. If the two theoretical approaches are grouped together for the purpose of the current discussion this is based on the parallels in their universalist historical perception of peasants and their belief in modern technology as the key to agricultural development, albeit diverging in their social visions.

2.1.2 The comparative advantage of the family farm

A different and more optimistic interpretation of the potential of small family farms in agricultural development than in the modernisation approaches is offered in the recent current of literature on small farms, sustainable agriculture and indigenous knowledge (Bunch 1985; Altieri, Trujillo et al. 1987; Chambers 1989; Gliessman 1990; Netting 1993; Pretty 1995; Maldidier and Marchetti 1996; Röling and Brouwers 1999; Rosset 1999). Within this field of analyses, the focus is mostly at the level of the farming system and household. The use of household labour, agro-ecological farming practices and adaptation to local natural conditions are seen as crucial elements for successful smallholder production. Rosset characterises the multiple advantages of the small farm as follows:

“(…) small farms are “multi-functional” – more productive, more efficient, and contribute more to economic development than large farms. Small farmers can also make better stewards of natural resources, conserving biodiversity and safeguarding the future of sustainability of agricultural production.”

(Rosset 1999, p.2)

Regarding their focus on family labour and intra-household demographic dynamics the approaches within this field have been partly inspired by the historical populist debate on peasants. An early contribution to this line of thinking was provided by A.V. Chayanov, who put forward his theories in the 1920s in the Soviet Union (Chayanov 1966; Kerblay 1971). In opposition to the Soviet strategy of collectivised modernisation of the agrarian sector, Chayanov in his analyses sought to demonstrate the advantages of the traditional organisation and rationality of farming within peasant families and communes. Leaning on a modified version of the neo-classical economic conception, he denied the importance of class relations in creating social difference among peasants, proposing instead the dynamics of the family cycle as the central dynamic in peasant agriculture (Kearny 1996, p.77).
Although they did not necessarily take on board the overall theoretical concepts and conclusions advanced by Chayanov in the historical context of the Soviet Union, his ideas served as an important inspiration for later scholars of the economic behaviour of peasant families. They accept his ideas of special peasant rationalities diverging from the common understanding of the logic of the market economic system e.g. the principle of risk minimisation as opposed to surplus maximisation, and other considerations linked to the special set-up of the peasant household as a unit of both consumption and production based on family labour (see e.g. (Sahlins and Service 1960; Scott 1976; Lipton 1989)).

The point of departure in the recent current of small-farm literature is that the household based organisation of production gives small farmers a comparative advantage over wage labour employing farm enterprises. This is explained, inter alia, by the flexibility that the combined unit of production and consumption permits in the allocation of resources and labour, and the stronger moral dedication to farm work that family members have, compared to hired labourers. Seen from this perspective, the future of small-scale farming looks rather bright:

"I believe that intensive agriculture by landowning smallholder households is economically efficient, environmentally sustainable, and socially integrative."

(Netting 1993, p.27)

According to the small-farm approach, flexibility, resilience, and efficiency in allocating labour and regulating consumption have enabled smallholders to resist polarising tendencies and loss of their access to land (Netting 1993, p.323). As expressed by Rosset, these features serve as an explanation for the fact that smallholders did not vanish as foreseen in the modernist development model:

“(…) small farms are far from being as unproductive or inefficient as so many would have us believe. Peasants have stubbornly clung to the land despite more than a century of harsh policies which have undercut their economic viability.”

(Rosset 1999, p.3)

Although to some extent acknowledging the existence of social stratification, Netting sees social mobility among different ranks of smallholders as more characteristic of smallholder intensive farmers than polarisation and the hardening of class barriers (Netting 1993, p.230).
"Farmers’ experience shows them that situations of relative wealth and poverty are not preordained or fixed, that inequality among smallholders at any point in time does not prevent mobility, both up and down the social ladder. The changing ratios of consumers and workers in the household development cycle, demographic accidents of birth, marriage and death, the inheritance of fields, gains from off-farm employment – all these affect a life course that is not necessarily the same for parents and children, or for different siblings from the same family. Moreover, smallholders are not fatalists. Economic success, although influenced by uncontrollable factors of environment, health, and chance, bears a relationship to personal abilities and moral virtues. It is a drama of striving, and a game that some play better than others."

(Netting 1993, pp.230-231)

Netting’s position on social mobility does not mean that differences in the actual situation of wealth or poverty among producer households are denied but appears to imply the notion that every generation and individual is given new and more or less equal opportunities. Permanent, class-like differentiation among smallholders is, thus, perceived to be prevented by mobility in the personal career and the family cycle (Netting 1993, p.323).

Another aspect that the quotation hints at is the relatively insignificant importance that off- and non-farm work in producer households’ livelihood strategies tends to be assigned in the small-farm literature. Its existence is acknowledged, but often tends to be perceived as a random and optional income element and not as forming part of more far-reaching change tendencies, neither within producer households’ livelihood strategies nor in the broader economic change processes in rural society. The changes focused on are mostly changes within agriculture, such as processes of intensification or dis-intensification, and do not take into account those qualitative changes in the livelihood strategies of rural households that involve off- and non-farm occupation, and eventually may lead to livelihood strategies no longer based on farming.

Opposed to the approach to small-farm development promoted by the modernisation side, the proponents of smallholders’ sustainable agricultural practices do not see modern high-input farming methods as the key to increase agricultural productivity. As expressed by Netting:

“Smallholders meet similar ecological/economic problems with a multiplicity of means and understandings. Technological invention and scientific discovery are not the crucial causal factors in the course of agricultural intensification.”
Rather than externally induced technology, knowledge of the local environment and farming methods adapted to these are seen as the basis for intensification. Within the small-farm literature explanations for technological change are generally sought within the local setting, including the natural conditions and internal demographic dynamics.

For the purpose of the present analysis, Netting has been chosen as a prominent and theoretically well-substantiated proponent within the field of neo-populist small-farm and sustainable agriculture approaches and studies. With his strong analytical focus on the individual farm household and its internal dynamics, Netting’s approach can be characterised as one of theoretical-methodological individualism (Kearny 1996, p.105). In the prologue to his book “Smallholders, Householders” he undertakes an explicit delimitation of his analysis, acknowledging that smallholders are rarely entirely economically and politically isolated from the wider society and are affected by elements of political and economic domination. He chooses not to include these aspects in his study, however (Netting 1993, pp.15-21):
“While not denying the elements of political and economic domination that affect many aspects of smallholder life, I contend that we must also examine the ecological relationships of population, agricultural technology, household organization, and land tenure that characterize a distinctive smallholder adaptation to local environment.”

(Netting 1993, pp.20-21)

In the present study it is argued, however, that by omitting or downplaying the social relations by which smallholders are tied into the wider society, not only ‘external’ political and economic conditions are left aside, but also an important dimension of the multiplicity of different dynamics played out within the unit of the farm household and that contribute to constitute smallholders as a social category. Thus, the inclusion of the broader historical processes and tendencies of which producer households form a part in the analysis made it possible to understand how the possibilities to become and be a producer were greatly influenced by the changing political and economic conditions in the wider society.

2.1.3 Newer approaches to small-scale agriculture and agrarian change

In the course of the 1980s the peasant question as such receded in politics as well as in the theoretical debate. The peasant debate was succeeded by other perceptions of small-scale producers and the dynamics of rural development reflecting the general neo-liberal turn in the dominant national and international political agendas:

“Over the past two decades peasants have been slipping from the political and academic gaze. Preoccupation with peasant politics during the 1960s had given way to reconceptualization of peasants as ‘smallholders’, rational economic agents seeking material betterment through participation in agricultural commodity production.”

(Bryceson 2000, p.1)

Meanwhile, the social category formerly discussed under the label of peasants did not seem to be disappearing. During recent years, this has inspired new interest in the issue among scholars concerned with agrarian change processes. Newer strands influenced by political- economy thinking have made interesting contributions, which are more analytical and less programmatic than was characteristic of the preceding theoretical debates. Hence, in the perspectives of the modernisation and conventional political economy approaches as well as the
small-farm literature there has been a tendency to merge ideology with theory. In contrast, the analyses within the more recent strands referred to are characterised by more openness towards the diversity and nuances found in the empirical processes of agrarian change. One strand of the emerging debate has revisited the peasant question to discuss its relevance in the context of the 1990s onwards. Another field of theorising seeking to integrate inspiration from political economy with a more empirical approach to the analysis of agriculture and natural resource management has evolved around the concept of political ecology.

The peasant question revisited

Among the proponents of the first strand referred to above are Bryceson, Jansen and Llambí (Bryceson 1997; Jansen 1998; Bryceson 2000; Jansen 2000; Llambí 2000). In spite of differences in the specific terminology and empirical contexts studied, there are a lot of commonalities in their approaches. One of these is that the analysis of processes of social differentiation and the nature of the social relations that small-scale farmers form part of are brought to the fore again. However, at the same time, the teleological and dualistic understanding of rural class formation that was prevalent in earlier political economic interpretations, and where proletarianisation and capitalisation were perceived of as the only possible trajectories for peasant farmers in the long run, is questioned.

Bryceson takes up the concept of ‘peasants’ and discusses its relevance, outlining as one of its strengths the possibility to combine market and non-market aspects of household production and organisation of labour, as well as the different social contexts, of which rural people form part and the social relations and dynamics that link them together in family, community and class. Based on the work of Shanin (Shanin 1971) Bryceson defines the concept of ‘peasants’ in terms of the following four criteria:
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"farm – the pursuit of an agricultural livelihood which combines subsistence production with commodity production;

family – internal social organization based on family labour, whereby the family serves as the unit of production, consumption, reproduction, socialization, welfare and risk-spreading;

class – external subordination to state authorities as well as regional or international markets, inferring surplus extraction and class differentiation;

community – village settlement and traditional conformist attitudes and outlook."

(Bryceson 2000, p.2)

Bryceson specifies that in her usage the community is perceived as a middle ground between family and class, denoting relative physical isolation and local extended family and patron-client relations, and emphasises the relative importance of class in her theoretical approach. Bryceson, referring to the above definition of peasants, comments on how the notion of community, although important for the understanding of the social relations existing at the local level, should not be over-emphasised as this would blur the understanding of the ways in which peasants are integrated into wider society:

"In fact, the isolationist character of the community criterion cannot be overstated without undermining class which clearly posits peasants vis-à-vis a wider market and state structures."

(Bryceson 2000, p.2)

Contrasting the unilinear perspective found in structural deterministic interpretations of rural class formation of earlier political economic theory, Bryceson operates with the concept of the two - related but distinct - processes of (de-) peasantisation and (de-)agrarianisation (Bryceson 2000, p.3). The processes of peasantisation and de-peasantisation are defined as "(...) fluctuating populations of rural producers involved in the peasant labour process (...)", the criteria of which are outlined in the definition above. The concept aims to grasp in a better way than in the more teleological models of earlier approaches the complexity and dynamics of social transformation processes in the rural sector.

Processes of agrarianisation and de-agrarianisation are defined as "(...) economic sectorial change arising from expansion and contraction of rural populations that derive their livelihood from agriculture". De-agrarianisation, however, is not perceived as a simply discernible trend. It is defined as a long-term process made up of a
combination of different features; occupational adjustment, income-earning reorientation, social identification, and spatial relocation of rural people towards livelihoods not based on agriculture (Bryceson 1997, p.4). Empirical processes of de-agrarianisation, thus, may be expressed in different ways, where the four features mentioned above do not necessarily unfold at the same time. Moreover, Bryceson draws attention to the question of welfare outcomes of the ongoing processes of de-agrarianisation for different social groups:

“The process of de-agrarianisation is creating a number of new welfare outcomes, both positive and negative for those involved that are not necessarily accommodated by existing cultural constructs and socio-economic institutions. (...) The distribution of benefits and costs results in large patchworks of relative advantage and disadvantage by gender, age and class.”

(Bryceson 1997, p.248)

The concepts of (de-)peasantisation and (de-)agrarianisation are considered relevant to the present analyses in several ways. One regards the specific situation of small-scale producers in the Nicaraguan post-revolutionary context, where the concept of re-peasantisation was useful in the analysis of beneficiaries of the agrarian reform. Moreover, the concepts of de-peasantisation and de-agrarianisation have been an analytical inspiration for the discussion of the consequences of livelihood diversification.

In line with Bryceson’s usage of the concept of peasantisation and de-peasantisation, indicating that peasants are not an historically given, constant social category, Llambí (Llambí 2000) has formulated the following critique of the usage of ‘peasants’ and ‘peasantry’ as generalising terms:

"To speak of 'peasants' or the 'peasantry' in general runs the risk of reification, giving agency to an abstract category at a time when current social theory is concerned to bring back the social agents involved in these processes. For this reason, it is important to analyse the differential impact of globalization processes and structural adjustment policies on the different types of 'peasant' farmers."

(Llambí 2000, p.181)

Although Llambí criticises the notion of an immanent ‘peasantness’ common to all so-called peasant enterprises, he does not discard the peasant concept altogether. Rather, he argues that there are different and changing types of peasants, defined by the social relations through which they are linked to other social agents at local, national and global levels. In his analysis of horticultural production in the Venezuelan Andes, Llambí thus draws attention to how globalisation processes
and structural adjustment programmes are creating the conditions for the emergence of new ruralities and new forms of peasantry, as well as for dissolving former rural social categories (Llambi 2000, p.176).

A similar line of critique is employed by Jansen, arguing that the contemporary smallholder is not an historically fixed category, but that most producer types exist as the result of contemporary and changing relations e.g. qua product markets and labour opportunities outside agriculture (Jansen 1998, p.158). In contrast to Bryceson, Jansen does not use the term peasant in his analysis of the social processes pertaining to hillside agriculture in a Honduran village but instead chooses the term producer. As a consequence of the social relations and dynamics and the production systems identified in the empirical context of his analysis he defines different producer types (Jansen 1998, pp.160-161). Jansen proposes the concept of ‘nickel-and-dime-capitalism’ to characterise the processes of social differentiation identified at the local level (see also (Kearny 1996, p.95)). Social differentiation is defined as the process by which several classes emerge out of a peasantry as different producer types develop with different relations to labour and capital (Jansen 1998, p.13). The concept of nickel-and-dime capitalism is put forward in critical response to the bi-modal perspective of conventional political economic analyses. According to Jansen, this perspective tends to perceive social differentiation to be completed in the Honduran context with a class of capitalist producers and one of semi-proletarian producers, who are impoverished peasants. The concept of nickel-and-dime-capitalism is formulated as opposed to “larger processes of capital accumulation and labour exploitation” and proposed as an appropriate concept for a situation such as he studied, where it is not corporate capital that determines the social relations of production but the relations between different types of peasant producer households at the local level.

Political ecology

Parallel to his position on the bi-modal models of the social transformation processes taking place in Central America, Jansen criticises dualistic approaches to environmental problems related to agriculture in developing regions. Briefly, these approaches divide environmental problems into two categories: problems created by large-scale capital intensive production mainly in the form of pollution (through use of pesticides, etc.), and problems of land degradation and resource depletion caused by poor, semi-proletarianised producers in their struggle for survival. In his own analysis, Jansen reveals how processes leading to environmental degradation are much more complex than the functional dualism perspective suggests (Jansen 1998, pp.13-14).
This brings us to the second recent strand of thought that has been inspired by political economy theory, political ecology (Blaikie 1985; Blaikie and Brookfield 1987; Bryant 1992; Blaikie 1994; Peet and Watts 1996; Jansen 1998). More than an attempt at a coherent grand theory the political ecology approach is characterised by a multiplicity of analyses and theoretical discussions with a basically political economy perspective held together by a focus on the use and management of natural resources. The political ecology approach, thus, allows for both plurality of explanations and methods and empirical diversity regarding the issues studied. Blaikie and Brookfield describe the concept of political ecology in the following way:

“The phrase ‘political ecology’ combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself.”

(Blaikie and Brookfield 1987, p.17)

The understanding of the social relations between classes and groups within society and the relations between society and nature as dialectic processes has been subject to debate in the political ecology approach. Thus, several authors have criticised a tendency towards economic reductionism in the interpretations of the human-nature relation (Blaikie and Brookfield 1987, p.17; Bryant 1992, p.18-ff; Jansen 1998, p.225). Based on this type of critique Peet and Watts formulated the following passage on their understanding of the dialectical perspective in political ecology:
“In our view, dialectical analysis instead provides the possibility of imagining a system of relations that does not consume the autonomy of the particular, one in which a number of dynamic tendencies in shifting hierarchical arrangements are constantly disturbed by new sequences of different events, a dynamic which has pattern, order and determination without being teleological, a theory of totalities, which, because it values their unique aspects, is not totalizing.”

(Peet and Watts 1993, p.249)

An understanding of the relations within society and between society and nature as that outlined above has certain implications for the empirical analysis. If empirical change processes are the outcome of changing relations and shifting hierarchies of different dynamic tendencies, the study of these processes becomes an imperative. In the case of the human-nature relation this implies the study of the interplay of different social and natural dynamics in its concrete geographical manifestation. The present analysis has attempted to achieve this by studying how the historical social processes interlace with the specific location and natural conditions of the study area in the shaping of coffee agroforestry systems and strategies by small-scale producer households.

2.2 Central thematic issues and questions of inquiry

In the following, three issues of central relevance for the analytical framework are discussed with reference to the theoretical positions outlined above. The thematic issues concern firstly, social stratification and the dynamics underlying inequality among small-scale producer households, secondly; the question of production methods and technological change in small-scale farming and thirdly, processes of livelihood diversification and their implications at the household level and in the broader perspective of agrarian change. The theoretical discussion of each of these issues is then used to formulate questions of inquiry for the empirical analysis.

2.2.1 Social differentiation vs. mobility and family cycle dynamics

The question of inequality and its determinants is an important point of contention in the theoretical debate on the historical dynamics characterising small-scale agriculture as well as in agricultural sector policies and rural development strategies in developing countries. With regard to interpreting the dynamics leading to social difference, the divide between the above presented theoretical positions runs between, on the one hand, the approaches of modernisation theory
and the smallholder approach represented by Netting, and on the other, a focus on social differentiation as found in orthodox political economy theory and the newer strands represented by Bryceson, Jansen and Llambi. The former position is that social differences are principally a result of individual mobility based on personal skills and use of the right technologies, and with regard to the position represented by Netting, an emphasis on family labour and intra-household demographic dynamics. The latter position is that more structural dynamics vis-à-vis social differentiation are at play in the agrarian change processes that entail different possibilities for different producers depending on the social relations by which they are linked into society.

Concerning the nature of the social category of peasants or smallholders, three basic theoretical positions can be outlined. The unilinear perception represented by the modernisation approach and orthodox political economy theory, simply speaking, is that agricultural development implies the transformation of traditional, subsistence oriented peasants to modern, market-oriented producers, whereas those unable to undertake this shift eventually lose their access to land in the process.

According to the second position, as represented by Netting, smallholders have been able to resist the polarising dynamics in the wider society and cling onto their farmland, utilising the advantages of the household economic unit and successfully adapting their farming practices to local environmental conditions.

“The wonder is that the same forces of capital, law, and politics that perpetuate inequality in the larger world cannot seem to convert the mass of smallholders into a landless proletariat of wage workers.”

(Netting 1993, p.320)

Because of their “stubborn resistance to alienation from the means of production” smallholders are perceived of as a social category characterised by continuity (Netting 1993, p.191). Social differences existing between smallholders are seen as far less important and less permanent than the social inequality brought about by the dynamics in the ‘the larger world’, beyond the smallholder category.

The perception reflected in the quotation, however, seems questionable in that it downplays the importance of links between smallholder households and other social actors and also ignores that the ‘larger world’ is not a homogenous social and economic entity but a complex fabric made up of social relations between many different social groups, of which smallholders form part. Hence Llambi
criticises the tendency encountered within the field of rural and peasant studies to focus narrowly on the local context and to overlook the links between local, national and global processes:

"(…) rural and peasant studies – both old and new – which emphasize local specificities have tended to underplay the links between these local processes and their national and supranational contexts."

(Llambí 2000, p.176)

The third theoretical position, which Llambí holds, understands contemporary categories of peasants or smallholders as a result of historical processes and changing social relations, which constitute different types of producers (Jansen 1998; Jansen 2000; Llambí 2000). This also means that groups of rural producers can both leave and return to be involved in peasant labour processes as indicated in the concept of (de-)peasantisation (Bryceson 2000). It could, thus, be said that the scholars within this strand coincide with the small-farm approach in that peasants are not seen as historically ‘doomed’ to extinction as indicated in the first position. On the other hand, this position differs somewhat from the explanations offered by Netting in that it stresses the importance of dynamics of social differentiation in the social processes of which small-scale producers form part. Thus, arguing against the notion of a constant social category of smallholders, Jansen points towards the extensive debates on land reforms in Latin America and concludes that the persistence of smallholders can only be understood in terms of social struggle (Jansen 1998, p.19).

Although Netting acknowledges the existence of social stratification within the smallholder category he tends towards a perception emphasising the similarities rather than the differences between smallholders vis-à-vis other social categories. The notion of relative equality of opportunities and individual mobility within the smallholder category is explained by elements of autonomy in agricultural decision-making, household labour mobilisation and possession of land. Commenting on Netting’s position Jansen agrees that a certain social mobility among small-scale producers may take place at the individual level. However, there also exist processes of social differentiation within which different types of producers are tied together by polarised relationships:

"Individual mobility (…) does not terminate qualitative difference between types of producers. In his denial of polarisation among smallholders, Netting fails to see qualitatively different characteristics that make producers act differently."
Likewise, based on his analysis of peasants in Venezuela in the context of globalisation, Llambí stresses the importance of social difference in defining the room for manoeuvre of different groups of producers. Social heterogeneity among producers, he suggests, functions as a ‘filter’ setting limits to the ways in which, and the extent to which, adaptation to and attempts to modify change dynamics with a negative impact can take place.

“Briefly stated, the social heterogeneity of farming is conceived as a filter which sets limits to the ways in which social agents can adapt and respond to changes in their economic, political and natural environment or to their attempts to modify or even subvert those ‘external’ changes which affect them negatively.”

(Llambí 2000, p.181)

The above discussion, thus, shows two basically different ways of understanding the question of social difference among smallholders or peasants. On the one hand, a perspective of individual mobility and on the other the theoretical concept of social differentiation. The former understanding is found in different variants in the modernisation approach and the small-farm literature. In the non-Marxist branch of the modernisation approach, social differences between producer households are mainly perceived as being a result of individual mobility due to personal characteristics and technological and economic farming skills. The small-farm approach also espouses individual mobility but gives more emphasis to differences in labour availability due to households’ different positions in the family cycle. Opposed to these perspectives the political economy inspired approaches propose dynamics of social differentiation, albeit with different degrees of determination, as the principal explanation of inequality between producers. These approaches include Llambí’s depiction of social heterogeneity filtering producer households’ possibilities of response and adaptation and concepts pointing towards progressive differentiation in the longer term perspective.

In Nicaragua, in spite of centuries of polarised development and marked structural changes in the country’s recent history, a high rate of participation of smallholders in the coffee sector could be observed at the time of the study. Against the diverging theoretical positions discussed above, the social processes that lead to the formation and endurance of this group of producers is therefore a question that is interesting to investigate in the Nicaraguan context. The first question inquires into the apparent stability of the social category of small-scale coffee producers by
means of the explanatory concept of the small-farm approach, which proposes continuity as a characteristic feature of the social category of smallholders:

⇒ Can the notion, as put forward by Netting, that smallholder households’ reliance on family labour and local adaptation protect them against the effects of social differentiation processes, explain the relative stability of the social category of small-scale coffee producers in the study region?

Although the group of small-scale coffee producer households included in the study sample demonstrated some general similarities with regard to their production and livelihood strategies, more detailed studies showed that some differences could also be observed within the group. These differences are targeted in the questions of inquiry concerning technological change and livelihood diversification in the following sections. The analysis of the questions is based on the theoretical divergence between the approaches perceiving the social category of smallholders as one characterised by individual mobility and relative equality of possibilities vs. those who understand social difference as an outcome of more structural dynamics at play in the agrarian change processes.

Concerning the dynamics related to social inequality it should be said that it has not been attempted to carry out a comprehensive analysis of social differentiation processes that are taking place within the sample group or of which they as a whole form a part in relation to other social groups. The aim, more modestly, has been to investigate the role of social differentiation for the ways in which livelihood and production strategies were formed and interrelated. The analysis, thus, identifies aspects of differentiation in the change processes investigated where these are of importance, but at the same time points towards other aspects, where common characteristics among the group of producer households studied are considered more relevant.

2.2.2 Technological change and adaptation in small-scale coffee production

As outlined above, the question of technological change has been a central issue in the different approaches to agricultural development in one form or another, some focusing more on universal technology models, others emphasising the importance of agro-ecological conditions in specific local settings. In the modernisation approach agricultural technology development with scientifically developed capital-intensive methods is seen as the solution to rural poverty. Small-scale producers’ adoption of new technology, according to this view, will lead to increased agricultural productivity and thereby to higher incomes and less rural
poverty. Orthodox political economy shares the unilinear understanding of the modernisation approach in the sense that technological development is perceived as a process by which traditional farming practices with low levels of productivity are replaced by modern, efficient technology.

In contrast to the universalist approach to technological modernisation, both Netting and Jansen recognise the importance of the specific natural, social and cultural conditions in different local contexts for the use, adaptation and development of production technologies. Their approaches and their understanding of the social dynamics of technological change, however, are quite different. Netting’s focus emphasises producers’ ability to adapt to local ecological conditions and family cycle dynamics in his explanation of the ways smallholder-farming systems are created and adapted. Jansen, on the other hand, holds that technological and social aspects of local production must be seen as the outcome of broader and more complex social processes, where specific features of local environments, individuals, households and communities are articulated with broader structural dynamics at different levels. Jansen includes the links between farming practices and technological change and social difference in his analysis. In contrast to the tendency in orthodox political economy to perceive technological change as a unilinear process of modernisation, the aspects of Jansen’s analysis concerned with farming practices among small-scale producers show much more complex dynamics of technology change and hybridised ways of merging so-called traditional and modern technology.

The diverging interpretations of the dynamics driving technological change in small-scale agricultural production can, thus, be summarised as follows. Firstly, a unilinear development trend, away from so-called traditional, diverse and labour intensive farming practices toward modern agriculture i.e. specialised, market-oriented and capital-intensive production systems. Secondly, adaptation to local agro-ecological conditions and changing household labour availability in consequence of family cycle dynamics as in Netting’s concept of smallholder agriculture. Thirdly, as *inter alia* in the political ecology approach as used in Jansen’s analysis, changes in production technology can be interpreted as an expression of more flexible and hybridised technological change processes in response to both broader economic and political influences and local social and natural dynamics.

In the empirical context of the present study, changes in farming practices and coffee production technology have been of importance in several ways. The introduction of coffee as an export crop in the 19th Century brought about major changes in land tenure, agricultural practices and political-economic structures,
and sparked fundamental social transformation processes in the region. Later, during the agrarian reform of the 1980s, production technology became a marked difference between the small-scale private coffee producers and the cooperative farmers. The collective sector was modernised radically by state efforts, while most small-scale private producers continued to manage their ‘traditional’ production systems with minor changes. Another important aspect of the study having to do with technological change is the parceleros’ conversion of their coffee production strategies from modern, high-input methods without shade trees to low-input, diverse agroforestry systems, when they established themselves as private producers after de-collectivisation in the 1990s. At the time of the study, the general picture was that of low-input coffee production systems with dense shade covers and diverse tree composition. Based on the different theoretical approaches the following question of inquiry is posed:

- Can the coffee agroforestry systems found in the study area be interpreted as traditional production systems adapted to the local natural conditions and household needs, relatively unaffected by broader political and economic influences? - or have they actually changed, but in other ways than foreseen in the conventional model of ‘modernisation’?

Another fundamental difference between the theoretical positions outlined regarding the question of technological change is the understanding of the associated socio-economic dynamics. As described in the previous section the perception of social change encountered in the modernisation approach is based on the concept of individual mobility among smallholders. In line with this view, the technology perception pertaining to this approach assumes scale neutrality of the modern production methods promoted. Differences between farmers’ productivity are to a large extent explained by adoption or non-adoption of specialised production systems and modern capital-intensive technology, which, according to the modernisation approach, are the key to economic progress.

In contrast to the modernisation approach, political economy theory sees technological modernisation in the market economic system as leading to increasing social differentiation into capitalist farmers and those rural dwellers who lose out in the process and become proletarianised. Social difference is interpreted as an outcome of polarised relations and unequal possibilities to invest in and improve the production system depending on different capital-availability.

Sharing the basic view of individual mobility among smallholders, Netting has a quite different focus in his approach towards technology and technological change than the modernisation approach. Adaptation of farming practices to the local
environmental conditions is seen as paramount for successful smallholder farming. Household labour availability and personal skills are seen as the main determinants of difference in such locally adapted, low-input farming systems. The characteristics of the family farm, however, are assumed to prevent progressive social differentiation among smallholders.

The coffee production systems of the sample group had some general characteristics in common, but a closer look revealed some difference in the management and output of the different producers’ coffee agroforestry systems. The diverging views on the determinants of difference among small-scale producers of the theoretical positions outlined above are used to inquire into this issue:

 Departing from the diverging positions of the small-farm approach and political economy theory, what are the roles of household labour and capital in the processes leading to differences between the coffee production strategies studied and their outcomes?

2.2.3 Livelihood diversification

A third central issue in the analysis concerns tendencies towards livelihood diversification among producer households. With regard to this issue the theoretical positions outlined above can basically be divided into that of agricultural modernisation, orthodox political economy and the small-farm literature, on the one hand, and that of more livelihood-oriented approaches, as for instance Ellis’ concept of livelihood diversification and Bryceson’s concept of (de-) agrarianisation processes, on the other.

In general terms it could be said that the traditional approaches towards rural development are based on a compartmentalised view of economic sectors and activities. This has implied a tendency in the modernisation approach as well as in the small-farm literature to perceive rural people engaging in agricultural production as being exclusively farmers. The strong focus on agricultural production implied a tendency to ignore the importance of other economic activities contributing to rural households’ livelihoods. Solutions to rural poverty inspired by these lines of thinking have principally been sought within agricultural sector development. In rural development and agricultural sector interventions and literature off- and non-farm activities such as migration have often tended to be seen as having a directly negative impact on agricultural development because family labour is drawn away from the farm (see e.g. (Low 1986, p.26)).
Without an explicit position on processes of livelihood diversification, the dualistic perspective of orthodox political economy theory has not left room to envision other historical trajectories for peasant farmers than that of becoming capitalised producers or proletarianised. The dominant perception of rural economies being divided into clearly distinguishable sectors and economic development following a unilinear pattern, also in this theoretical tradition, has implied an interpretation of rural people’s involvement in other economic activities than farming as a sign of transition from one stage of development to another i.e. from farming towards proletarianisation or semi-proletarianisation.

In the small-farm literature, as represented by Netting (Netting 1993), off-and non-farm work in producer households’ livelihood strategies tends to be dealt with in a rather cursory way. Engagement in off-farm work is merely mentioned as a more or less randomly occurring option in producer households’ income portfolios, not as forming part of economic change processes within the farm, the household or wider society. Neither does off- or non farm work appear to be perceived of as having any larger impact on farming, be it concerning farm productivity in the shorter run or regarding the changing of livelihoods in the longer run. In the small-farm literature an implicit assumption appears to be that producer households generally aspire to maintain a farm-based livelihood, and that the objective of household livelihood strategies and production strategies is to secure this. A question that seems difficult to answer within this framework, however, is what motivates larger qualitative changes in household livelihood strategies, in cases where they are not due to external pressures. It could, thus, be questioned how far it can be taken for granted that maintaining a certain livelihood path is always what people aspire to, if, for instance, all farmers necessarily want to keep on being or want their children to be farmers.

Instead of presuming that rural households generally and constantly aspire to uphold farm-based livelihoods as in Netting’s approach, the concept put forward by Bryceson (Bryceson 1997) of agrarianisation and de-agrarianisation allows for the understanding of processes of rural peoples’ increasing and decreasing involvement in agriculture and non-agricultural economic activities in different time periods, in which the four central aspects mentioned above play a role; occupational adjustment, income-earning reorientation, social identification and spatial relocation (Bryceson 1997, p.4). Jansen is also interesting in this context. Thus, his understanding of different producer types being constituted via their relations with product markets and labour opportunities outside agriculture highlights the influence of off-and non-farm work on farming but without predetermined assumptions as to the outcome.
Finally, Ellis’ concept (Ellis 2000) suggests that the maintenance of a diversified portfolio of economic activities can also be understood as a more permanent strategy: for example in order to minimise risk or to maximise the utilisation of household labour during agricultural off-seasons. His concept is based on a very empirical approach to the determining conditions and dynamics and the implications of livelihood diversification. Ellis defines rural livelihood diversification as follows:

“Rural livelihood diversification is defined as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and improve their standard of living.”

(Ellis 2000, p.15)

Departing from an extensive review of the recent literature within the field, Ellis has systematised different analytical approaches, findings and divergences. Based on this review, he cautiously concludes that livelihood diversification seems to be an increasing trend among rural households in developing countries. He also points towards some general trends and determinants of livelihood diversification i.e. seasonality, differentiated labour markets, risk strategies, coping behaviour, credit market imperfections, and inter-temporal savings and investment strategies (Ellis 1998, p.11). The central divergences identified in the literature on livelihood diversification consider the relationship between farm productivity and income diversification at the household level and, seen in a broader perspective, the consequences of livelihood diversification for agricultural and non-agricultural sector development in rural areas. Instead of giving support to one of these positions, Ellis rather pragmatically concludes that “[d]iversification is an infinitely heterogeneous social and economic process, obeying a myriad of pressures and possibilities in the rural economy” (Ellis 1998, p.29). Contradicting interpretations, he reasons, reflect the specific spatial and temporal contexts of the different studies.

In brief, the theoretical approaches outlined above differ in their interpretations of the determinants as well as the implications of off- and non-farm economic activities in producer households’ livelihood strategies. The modernisation and political economy approaches tend to interpret small-scale agricultural producers’ engagement in off- and non-farm work as a phase of transition in the agricultural development process, involving increasing capitalisation of production and an accompanying process of proletarianisation by which large parts of the rural population are forced into wage labour. Bryceson’s empirical analysis of ongoing agrarian change processes in Africa may be said to point in a similar direction. Her
concept of de-agrarianisation, however, leaves more room for different types of
dynamics and outcomes of the empirical processes studied. The remaining
approaches are less explicit about the broader change tendencies that producer
households’ engagement in other types of work may imply. In the small-farm
literature off-and non-farm activities tend to be perceived as optional elements in
producer households’ livelihood strategies while farming remains the central
activity, seemingly without implying any major change tendencies. Finally, the
explanations offered by Ellis’ concept could be said to remain at a rather
descriptive level, suggesting a pragmatic and pluralistic approach to the study of
processes of livelihood diversification. A significant point distinguishing his
approach from the modernisation and political economy positions, however, is that
livelihood diversification is understood as not necessarily being merely a phase of
transition, but also as a more permanent way of making a living for rural people.

As is the case more generally in Latin America, it has been observed that in
Nicaragua increasing numbers of rural people engage in off- and non-farm work
and that a growing share of rural household incomes is derived from non-
aricultural activities. Livelihood diversification was a widespread tendency in the
study region that was densely populated and characterised by many rural-urban
linkages. This tendency was thus also observed among the sample group. Against
this empirical background, the implications of livelihood diversification are
investigated:

Does livelihood diversification among the coffee producer households studied indicate a
move away from agriculturally based livelihoods as outlined in the concept of de-
agrarianisation?

Diversified livelihood strategies could be said to be a characteristic feature of the
sample households in general terms. However, while some of the coffee producer
households diversified their activity and income portfolios, others did not. As a
second issue related to livelihood diversification, therefore, the analysis inquires
into the possible reasons for this difference in the livelihood strategies of the
producer households studied. Based on the theoretical discussion, one possible
explanation is that small-scale producers’ engagement in off- and non-farm work is
a consequence of economic compulsion due to insufficient incomes from farming.
This would imply that poorer producers were more likely to engage in off- and
non-farm work than more well-off producers. Assuming such a dynamic, the
political economy approach could be expected to contribute to the explanation of
the observed dynamics:
Can the dynamics associated with livelihood diversification among the studied producer households be framed by the theoretical concepts of social differentiation and (semi-) proletarianisation?

– Or can other, qualitatively different, dynamics be identified, which imply less detrimental relations between farming and off- and non-farm work?

2.3 Dealing with the data: analytical units, concepts and criteria

In this section, the concepts of household livelihood strategies, agroforestry and farming systems are introduced in order to operationalise the questions posed in the theoretical discussion above and facilitate the organisation of data in the empirical analysis. Moreover, definitions of the analytical units of the household and the farming system are outlined and their implications are discussed.

2.3.1 Households, livelihood strategies and diversification

An analytically valuable feature of the livelihood strategy approach is that it makes it possible to grasp the, often complex, portfolio of productive and reproductive activities that household members undertake in contributing to their livelihood. Moreover, it is important for the current research topic that the approach facilitates the study of both the human-nature interaction and the relations between households and the wider society of which they are a part. The breadth of the concept, however, also entails a challenge to develop its analytical value for the study. In order to focus the analysis it will be oriented to the questions raised in the theoretical discussion regarding social differentiation, technological change and livelihood diversification. The work of various authors (Chambers and Conway 1992; Preston 1992; Rennie and Singh 1996; Scoones 1998) on households and their livelihood strategies and by Ellis (Ellis 1998; Ellis 2000) on rural livelihood diversification have inspired this part of the analytical framework.

Household livelihood strategies

The household livelihood approach is considered useful for the analysis of the type of producer households studied, as the household unit embraces flows of cash and resources between production, off-farm and non-farm activities, investment and household consumption. Moreover, it is a unit within which decisions regarding the allocation of these resources are made. It should be added, however, that in those parts of the study dealing with coffee production systems and strategies, the
focus is to some extent narrowed down to the principal coffee agroforestry manager, who was usually the male head of household.

Considering the declared demise of the unitary household model in the recent debate on the function and importance of the household in different socio-economic and cultural contexts, defining the household as a principal level of analysis is seen as a conscious choice. This is based on the empirical relevance of the household in the study area as the social and economic unit within which decisions on organisation of labour and resources are made, albeit not always in a collective manner as shall be discussed below. The specific household, however, will never be a fixed unit. Its members age, die, get born, migrate, enter into new relations, break up etc., a fluidity that has to be taken into account as a general methodological consideration when working with the household as unit of analysis. In the present analysis, moreover, the family life cycle is an important aspect contributing to the explanation of temporary livelihood diversification in the livelihood strategies studied. The study of coffee producer households in the study area departs from the pragmatic delimitation made by Ellis:

"(...) the term household continues to be used as the main shorthand for describing the resident social unit, extended where applicable to include migrants and others who make intermittent or regular contributions to household welfare."

(Ellis 2000, p.21)

In once respect, Ellis’ definition will be slightly modified for this analysis. Thus, the residential social unit is limited to those explicitly belonging to the household and contributing and/or depending on the household economically. This additional comment is made because adult children, mostly sons, were sometimes found living within their parents’ homestead but explicitly living economically independent lives (‘viven aparte’). Family members living on the same plot of land but in a separate household were therefore only included if clear economic links in terms of cash, labour or other regular contributions existed. Ideally, all the non-resident contributions and migrant activities should have been included to complete the picture of the livelihood strategies of the studied households.

7 “You can’t imagine what it’s like to hear Joe Stiglitz say that the days of the unitary model are over.” Marjorie McElroy, Duke University; (Panelist Session 2: GENDER AND THE HOUSEHOLD) in response to a passage in the opening speech by Senior Vice President and Chief Economist Joseph Stiglitz at a World Bank conference on gender and development: “Economists sometimes use models that over time lose their usefulness. (...) A good example is economists’ use of the household as the basic unit of economic analysis.” (WorldBank (1998)). The fact that the general use of the unitary model of the household is abandoned in such prominent economical circles as the World Bank is an indication of the mainstreaming of the recognition of the inadequacy of such an unreflected practice.
Although a comprehensive study of these aspects was not possible this was attempted as far as the scope of the study permitted.

In the theoretical debate, diverging perceptions of household decision-making and labour allocation can be encountered. A frequent point of contention is the extent to which households decide and act as a group in different situations. When suggesting the ability of households to mobilise disciplined and responsible labour as a competitive advantage of family farms compared to agriculture based on wage labour, Netting, for instance, tends towards the notion of a corporate unit with centralised decision-making and common goals.

“A household head may schedule tasks and actively cooperate in many of the group activities, but there may be little overt direction and few commands, because members know what they are supposed to do.”

(Netting 1993, p.75)

In the present analysis the choice of the household as unit of analysis, however, does not mean that it is perceived as a homogenous entity with the same values, interests, opinions etc. among the members. Nor is it assumed that the decisions made at the household level are necessarily concerted or coordinated. It is recognised that actions and decisions might be the outcome of negotiations or ‘anarchistic’ individual behaviour. In the empirical analysis decisions regarding off-farm work and young people’s migration are examples to be discussed regarding the nature of the internal planning and decision-making processes of the households. Other aspects in which intra-household differences come to the fore are gender-related perceptions and prioritisation of incomes, spending and investment. Thus an aim was to allow for internal difference and contradictions to be visible as far as the scope of the analysis permitted. It is acknowledged that far more sophisticated definitions and models of analysis would be needed to fully grasp the complex fabric that made up the social relations and dynamics at the household level. The above-outlined definition, however, is deemed sufficient for the purpose of the present analysis.

A ‘livelihood’ has been defined by Chambers and Conway (Chambers and Conway 1992) as comprising people, their capabilities and their means of living i.e. food, income and assets, this last being both tangible and intangible. Building on the livelihood concepts outlined by Chambers and Conway (Chambers and Conway 1992) and Scoones (Scoones 1998), Ellis has defined what he at some point calls the “assets-mediating processes-activities” approach (Ellis 2000, p.31).
“A livelihood comprises the assets (natural, physical, human, financial and social), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household.”

(Ellis 2000, p.10)

To achieve the desired products and benefits to make a living, the household allocates its resources, labour and capital in a certain combination, and thereby forms what is called a ‘livelihood strategy’. A crucial question regarding the concept of livelihood strategies that shall be discussed in the following is how the available assets can be used and combined in view of the given opportunities and constraints.

Taking a view to the ways in which farm households can try to secure or achieve an improvement of their livelihood situation, Scoones (Scoones 1998, p.9) identifies three basic strategy types: agricultural intensification or extensification, livelihood diversification, and migration and remittances. In the present analysis the first two strategy types will be examined more closely, firstly in the study of coffee agroforestry strategies, and secondly in the study of strategies at the household level. The third strategy type will not receive the same focus, but is to some extent included as it forms part of the activity and income portfolios in some households’ livelihood strategies. As part of the analysis of the case the study investigates whether these strategy types are present among the households in the study area, and how they might have changed over time, considering the broader structural changes and disruptions that have taken place in Nicaragua during the past decades and the processes taking place at the household and farm levels. Furthermore, how different strategy types mutually support or exclude one another is discussed, e.g. if off- and non-farm employment means less possibilities to intensify agriculture due to labour constraints or better possibilities to intensify because the income generated is used for farm investments.

With respect to the question why and how households and individuals adapt their livelihood strategies, Ellis *inter alia* distinguishes between qualitatively different types of strategies termed ‘coping strategies’ and ‘adaptive’ strategies. Adaptive strategies refer to the “(...) way households respond over the long term to adverse events, cycles and trends”, and that, if successful, decrease the households’ proneness to crisis and improve their capacity to resist shocks. Coping strategies, on the other hand, are described as short term responses that may help to overcome acute crises but do not necessarily leave the household in a better position to cope with future crises or adversities (Ellis 2000, p.45). It could be questioned how far it is appropriate to use the notion of strategy to describe situations where households
have very little or no choice in their struggle to survive (for further discussion see e.g. (Wallace 1993, p.99)). The idea that different dynamics can be at play in livelihood diversification, which in turn lead to differential outcomes, however, is considered relevant to the analysis. To this end, the pair of terms ‘economic compulsion’ and ‘economic opportunity’ as used by Bryceson (Bryceson 2000, p.246) are introduced in the present study to describe the reasons leading to livelihood diversification.

An interesting case study of diversification as response to risk in farm households’ diversification strategies in the rural area of Masaya has been presented by D’Exelle et al. (D’Exelle and Bastiaensen 2000). In a comparison of small-scale farms, different dynamics of diversification were found that were interpreted in terms of different risk management strategies, ex ante- and ex-post risk management (see also (Ellis 1998, p.13-14)). One was a voluntary, proactive strategy to spread risk over different income sources and thereby make the household economy less vulnerable. The other, in contrast, formed part of a struggle for survival in cases where farm production was not sufficient to support the family.

“Ex ante risk-reducing strategies, such as income diversification and reverting to less risky technologies and products, are widespread in the region. In particular, the diversification of income sources and activities with low covariate risk reduces both predictable seasonal fluctuations and unpredictable price and climate fluctuations.”

(D’Exelle and Bastiaensen 2000, p.104)

The considerations regarding risk spreading and covariate risk in the quotation are relevant in the analysis of the implications of off-and non-farm work in small-scale coffee producers’ livelihood diversification, as is the question of risk in the analysis of changes in farming technology and products in the coffee agroforestry systems studied.

Strategies or opportunity grabbing?
While it may not seem that difficult to identify available opportunities and pressures that define the range of options that people have, a question that has posed more challenges to social researchers is how they navigate within this room-for-maneuvre. To what extent are households’ strategies the deliberate outcome of individuals’ or groups’ objectives, the result of opportunity-grabbing or mere reactions to external dynamics? It is an open question as to how far the ‘strategy’ concept makes sense for analysing the practices and decision-making of farm
households. Various authors have critically discussed the concept of strategy in their work (Crow 1989; Wallace 1993; Gould 1997).

The emergence of the concept of strategy within sociology has been explained as a reaction to the “agentlessness of marxist structuralism” (Gould 1997, p.73). A recurring point of critique, however, is that of social scientists’ imposing a model of rationality upon the households and individuals studied, assuming that they make conscious decisions about the activities they carry out, an assumption that cannot be taken for granted, hence the critique.

In certain types of analyses, among others from the household economics side (see e.g. (Low 1992)), there has been a tendency to attribute producers with an ‘economic man’ rationality. This, simply put, implies a perception of households’ livelihood strategies as mathematical equations with land, capital and family labour as the variables and the principle of economic utility maximisation describing the function. As shall be elaborated on below, in most cases this is probably a too simplistic way of putting a complex issue, however.

Preston (Preston 1992) has defined ‘strategy’ as an analytical concept rather than a planning related one, a de facto strategy, so to speak. According to this perception household livelihood strategies are not understood as explicitly formulated measures by which to achieve pre-defined, consistent goals, but rather as the sum of activities that household members carry out to contribute to their livelihood, consisting partly of routine practices, partly the result of conscious decisions over the allocation of labour and resources (Preston 1992, p.4). This definition of the concept would logically imply that everybody has a strategy, and further deem the question of deliberation irrelevant to the analysis.

Wallace (Wallace 1993) refers to a concept of strategy suggested by Allan Warde (Warde 1990) according to which strategy can be understood in a strong and a weak sense. Perceiving strategy in the strong sense assumes a rational set of actions, which, however, Warde considers difficult to sustain. A second way to understand the concept is in the weak sense, which means that it can be inferred that households have a strategy when they tailor their needs to resources in predictable ways (Wallace 1993, p.107). In her discussion of the concept of strategy Wallace draws attention to the role of the researcher and the interview situation as such in making explicit strategies or calculations that until that moment were implicit in the respondent’s actions or even in leading respondents to create strategies in the situation (Wallace 1993, p.114). Although taking a critical stance towards some of the weaknesses of the strategy concept, she acknowledges its value for empirical studies at the household level if used in a conscious manner:
“Thus where there is some sort of rational calculation then we could infer a ‘strategy’ but not necessarily under other circumstances. The research method used must enable us to interpret how people are constructing this rationality.”

(Wallace 1993, p.14)

It can be methodologically difficult to discern whether actions are undertaken deliberately or consciously or not and it may therefore turn out impossible to tease out generalisable conclusions on the issue from the case material. However, there did exist examples of quite explicit strategies among the producers and households who participated in this study and instead of discarding it from the beginning, the analytical relevance of the concept will be discussed in relation to the empirical material.

Another point of critique raised against the concept of strategy is a tendency towards voluntarism (Wallace 1993, p.96). Morgan (Morgan 1989) has argued against this critique, however, holding that ‘strategy’, if used carefully, can incorporate the recognition of power and access to resources and structural constraints. Human agency, to use Jansen’s words, in this context is understood:

“(…) not as rational choice, simple adaptive behaviour, or rational farming, but as the inherent capacity to reproduce multiple social structures, which offer resources as well as constraints to producers”

(Jansen 1998, p.21)

An alternative to the concept of strategy for characterising the behaviour of people seeking to maintain a livelihood is the notion of people grabbing opportunities. The focus lies more on the maintenance of flexibility to respond to changing and newly arising possibilities than on internal planning processes within the household (Juul 1999, p.227). Considering the diverse portfolio of often very different and changing types of activities that the case study households and their members engaged in, the concept of opportunity grabbing would seem to have some relevance. On the other hand, to be able to grab an opportunity, would one not have to identify it as such first? Or in other words, it will be suggested that, to be able to perceive something as an opportunity it would have to fit into some general idea of where you are heading or what you want to achieve. A preliminary conclusion regarding this question could be that it may not be so important whether strategies are deliberate or not, but rather whether the opportunities grabbed fit into the more general perspectives or visions people have for their
future. The in-depth case studies carried out as part of the analysis were included to contribute to answer these aspects of the research questions regarding households’ livelihood and production strategies.

2.3.2  Agroforestry systems and change in coffee production strategies

The present section contains a brief presentation of the approaches of agroforestry and farming systems and discusses the coffee agroforestry system as a unit of analysis for the study of technological change. The section has two purposes: to give a brief presentation of the research experience and debates within the field and to outline the methodological concept used for the organisation of the empirical data in the analysis at the level of the coffee production system.

As already argued in the discussion of the political ecology approach, an understanding of the biophysical as well as the social dimensions of the human-nature interaction is required to fully understand the agricultural production processes and the changes taking place within them over time. The natural conditions in a given local context constitute the material basis of the production processes taking place and contribute to shaping agricultural practices and technological change. This is particularly clearly expressed in small-scale agriculture in developing countries, where producer households depend on the use of local natural resources in an often very direct way. In the cases studied, for instance, the special properties of the crop coffee and the influence of local climatic conditions were important to understand the technological change processes leading to the evolution of the diverse, shaded coffee agroforestry systems found in the study area.

Agroforestry in a research context

The broader debate on sustainable agriculture for rural development in Third World countries has inspired the choice of coffee agroforestry practices as a theme for the analysis. Agroforestry incorporates many of the principles promoted by this newly emerged paradigm, offering practices that are held to be both environmentally and socially advantageous. Agroforestry practices and systems, which basically imply the combination of tree growing with crop cultivation and in some cases animals, exist in many different forms around the world. The essence of agroforestry according to Nair (Nair 1993) can be summarised as being:

“(…) the purposeful growing or deliberate retention of trees with crops and/or animals in interacting combinations for multiple products or benefits from the same management unit.”
The integration of trees into agricultural cropping and livestock systems has increasingly been promoted as appropriate for small-scale farm households (Gliessman 1990, p.160). The argument is based on the possibility of combining different products for subsistence and sale in multi-strata systems, intensive utilisation of small land units worked by family labour, and low external input requirements, as agro-ecologically based fertilising and pest management can be used in the diverse, biomass rich systems.

Studies from various regions of the tropics have analysed locally evolved agroforestry systems, the socio-economic and agro-ecological factors leading to their development and their potential for sustaining livelihoods and resource protection. Research analysing socio-economic and agro-ecological interactions in agroforestry within the perspective of broader, contextual, economic, demographic and social changes is scarcer. Some studies were found, especially from Southeast Asia, that describe the evolution of complex agroforestry systems due to factors such as increasing land scarcity, lack of off-farm employment and other restrictions (Penny and Singarimbum 1973; Aumeeruddy and Sansonnes 1994; Caron 1995). Other studies have noted a tendency towards less complex agro-ecological structures and less sustainable management practices, as the influence of urbanisation, market orientation and promotion of modern agricultural production methods increased (Soemarwoto 1987; Michon and Mary 1990; Jose and Shanmugaratnam 1993).

Looking at the findings of these studies, the inquiry into the adaptation of the production strategies of small-scale coffee producers in the area of Carazo and Masaya is interesting, as several of the socio-economic and demographic tendencies mentioned could be observed. Among these were increasing pressure on the land, limited possibilities for off-farm employment, urbanisation, market orientation and the vigorous promotion of modern agricultural methods that took place in the course of the 1980s. Against this background, questions to be investigated in the course of the analysis are whether the producers of the study area tended towards agricultural intensification or dis-intensification, and towards specialisation or diversification of their farming systems in response to the contextual changes experienced, and in the case of diversification, how and why this was undertaken.

Compared to Southeast Asia, fewer case studies on the interactions of socio-economic and agro-ecological aspects of diverse local agroforestry systems in Central America were found. However, some literature of this kind does exist. For instance, as to the south-western region of Nicaragua some studies of diverse agroforestry systems
including coffee, such as tropical homegardens, have been carried out (e.g. (Lok 1994; Viquez, Prado et al. 1994; Marsh and Hernández 1996; Méndez 1996)). Other studies with a more direct focus on coffee agroforestry systems in the region have inter alia been carried out on tree diversity and its socio-economic determinants (LLanderal 1998; Bonilla 1999; Escalante 1999). Moreover, substantial research has been carried out on the biophysical aspects of coffee-shade tree associations by the Area of Agroforestry and Watershed Management at CATIE (e.g. (Beer, Muschler et al. 1998; Fernández and Muschler 1999; Vaast and Snoeck 1999)).

The attention paid to agroforestry originates from a broad spectrum of disciplines and different theoretical angles. From more conventional agricultural and forest sciences focusing on specific biophysical interactions between the components of agroforestry systems, over system-oriented approaches such as farming systems research and agroecology, to farmer-centred and community development approaches, with rural people’s practices, needs and knowledge at the core of their interest. A few comments will be made on the methodological implications of these different approaches. Having realised the need for more integrated, socio-economic and environmentally adapted production systems in small-scale agriculture, the more conventional line of agroforestry research refocused the research content but not so much the basic approach. Existing agroforestry practices from different geographical contexts served as inspiration, whereas the subsequent research and design of appropriate agroforestry systems was carried out under controlled experimental conditions on research stations. Interaction with farmers was confined to subsequent phases of technology validation, adaptation and transfer. Another trend based on the ideas of farming systems research took an interdisciplinary view of agroforestry, including its biophysical and socio-economic components and the interactions between them at the farm level.

**Farming systems research and agroecology**

Farming systems research emerged a few decades ago as an approach opposed to the highly disciplinary division within existing agricultural research. The systems approach is also reflected in the title of one of the most prominent agroforestry journals, "Agroforestry Systems". Turner and Brush (Brush and Turner II 1987) have defined the concepts of farming system and farming system approach in the following way:

* "A farming system is any level of unit(s) engaged in agricultural production as it is wedded in a social, political, economic, and environmental context."

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* “A farming system approach describes the unit(s) in its context and / or explores some characteristics of the unit(s) in terms of all or parts of the context.”

(Brush and Turner II 1987, p.13)

Compared to the conventional disciplinary specialised approaches, the interdisciplinary perspective of farming systems research is considered a more appropriate way of dealing with the study of agroforestry systems which are based on often complex agro-ecological interactions and managed in function of multiple purposes and socio-economic factors.

The design of the analysis of coffee agroforestry systems in the present study is inspired by the farming systems approach as it seeks to include both socio-economic and agricultural management features. Referring to the three major sub-systems of farming systems - human, environmental and genetic - as outlined by Brush and Turner (Brush and Turner II 1987, p.13), the study of management strategies focuses on the human dimension, while the environmental and to a far lesser extent the genetic dimensions are conceived as wider perspectives to the analysis. Moreover, the farming systems-inspired part of the analysis will be limited to the coffee agroforestry systems without going into depth on other farm components. On some farms this implies the exclusion of other types of agricultural and livestock production, whereas on most of the smaller farms, the coffee agroforestry system makes up most of the production system of the farm.

As observed by Boesen and Ravnborg (Boesen 1990), farming systems research peaked in the 1980s, when small farm development was receiving a lot of attention, among others from the donor community. Since then, big farming systems research projects have become fewer. Not least because of their substantial resource demands “on-farm research with a farming systems perspective” has been introduced to replace them (Boesen 1990, p.99). The cost of such research, however, is not the only weakness that has been pointed out with regard to farming systems research. One point of critique has been that inter-disciplinarity regarding the socio-economic aspects of agroforestry is mostly limited to a few strictly economic variables. Another more profound critique targets the descriptiveness of the analytical framework, which implies a lack of ability to explain the dynamic aspects of farming systems, social as well as natural.

With regard to the natural dynamics, agroecology has supplied some useful contributions for the analysis of farming systems, enabling a deeper understanding of the ecological processes that cultivation is based on and the environmental
consequences of different types of farming technology. The concept of agroecology was launched as an ecologically-based response to the established agricultural research. In simple terms, the aim of agroecology has been defined as integrating agricultural and ecological concepts, thus including wo/man and her/his actions into the analysis of ecosystems. Moreover, it has contributed greatly to adding environmental sustainability to the agenda of the current debate on agricultural development. The integrated agro-ecological approach has proved important for the understanding of diverse agroforestry systems, the productivity of which are based on complex ecological interactions (Altieri 1987; Altieri, Trujillo et al. 1987).

Concerning the social dynamics, Brush and Turner point to the deficiency of much farming systems research to target larger theoretical issues related to processes of agricultural change. The farming systems approach is characterised as being:

“(...) descriptive rather than explanatory. It helps identify what processes exist and how sets of interrelated components function together. Why systems work the way they do is an explanatory task best performed by theoretical constructs that have traditionally emerged from economics, geography, or anthropology.”

(Brush and Turner II 1987, p.27)

In the present study, the farming systems approach will be used as a first step in the larger analytical framework of the study. Its function is mainly to organise the empirical material in a way that facilitates the discussion of the theoretically based questions of inquiry. The value of the farming systems approach for the present research work is the relatively detailed study of the coffee agroforestry systems that it has inspired. Getting answers to the questions of what processes are at work at the level of production and how different components interact at the concrete level is seen as an important element in the analysis of processes of agrarian change in a given geographical context.

The next step, however, is to understand why farming systems are created the way they are and why they are changed and adapted. Much of the recent literature on sustainable agriculture has aimed to reveal and document indigenous (or local) knowledge systems in places where traditional practices of this kind exist, in order to be able to transfer and improve them for wider use. In opposition to this approach, Richards criticises the tendency to assume that empirical farming systems are the outcome of deliberate design based on local knowledge systems. Referring to interpretations of mixed farming practices he accuses anthropologists and other academic bystanders of a frequently ‘misplaced abstraction’ when activities of practical import, grown out of the need of the moment, are interpreted
as deliberate strategies. Instead, Richards introduces the term ‘performance’ to describe the ways that farmers carry out their agricultural activities. In contrast to the idea of deliberate spatial design, farmers’ actions are interpreted as the outcome of, sometimes arbitrary, decisions taken ad-hoc in response to momentary endogenous and exogenous influences (Richards 1995, p.62). The arrangement of crops in mixed farming systems, he argues, are not the result of deliberate design following a preconceived plan, but a result or a completed ‘performance’:

“The crop mix – the layout of different crops in the field - is not a design but a result, a completed performance. What transpired in that performance and why can only be interpreted by reconstructing the sequence of events in time. Each mixture is an historical record of what happened to a specific farmer on a specific piece of land in a specific year, not an attempt to implement a general theory of inter-species ecological complementarity (as plant ecologists might suppose).”

(Richards 1990, p.40).

Based on such an historical reconstruction of the ways in which the coffee agroforestry systems in the present study had evolved, there is evidence that coincidence and timing played a great role in the specific arrangement of trees found on different farms. Parallel to the discussion of the notion of ‘strategy’ in the previous section it is suggested, however, that although the notion of a blueprint approach is probably not more appropriate with regard to the studied households’ production strategies than the ways that they form their livelihood strategies, certain patterns or general tendencies in the adaptation of the coffee agroforestry systems may be identified. In the analysis of changes at the level of the coffee agroforestry system the study investigated how these were linked to the changes and adaptation of the households’ livelihood strategies over time and influences from broader contextual changes.

An aspect that should also be considered in this context is that farming has both a concrete, practical aspect and an aspect of meaning, which can play an important role when aiming to reach an understanding of the ongoing processes of adaptation and change in the production strategies studied.

“(…) agrarian technology is not merely an instrument for environmental manipulation, but a symbol that speaks to rural people of their social history and relationships and a sign by which they read their identity and their relationship with past, present and future (…).”

(Bebbington 1993, p.277)
It was found that a relatively detailed understanding and study of the coffee production systems and practices was of great value to be able to inquire into producers’ strategies, considerations and priorities and the meaning they assigned to the farming system, its components and the changes they carried out. Thus, the relatively detailed field studies of the coffee agroforestry systems and the in-depth case studies brought out analytically interesting differences between cases and contradictions and ambiguities between what producers said and what they did that general statements given by producers about their production systems would not have revealed.

### 2.4 Field study methodology, data collection and interpretation

The data gathered in the farm surveys and case studies referred to two levels of analysis, the agroforestry production system and the household. Data at the household level included socio-economic baseline data on household size, composition and incomes, household members’ age and occupations, land use and tenure, etc. At the agroforestry system level questions were *inter alia* directed at production, management practices, including inputs and labour used, tree species and uses, producers’ criteria and technical and agro-ecological knowledge.

*Fieldwork in San José, Fátima and San Juan*

An exploratory pilot study was carried out in July-August 1998, including various field visits with an extensionist working in the study area. 16 semi-structured interviews with small-scale coffee producers and a number of interviews with other types of informants were carried out. Based on the pre-study, the three communities of San José de Monteredondo, Fátima and San Juán de la Concepción were selected for further study.

During the second phase of fieldwork, from February to May 1999, a farm survey was carried out. The survey included a total of 62 coffee producers, based on a random selection of respondents among the coffee farms in each of the three communities. The survey was mainly directed towards the management of the coffee agroforestry system and general farm and household data. The survey was carried out by the researcher, three assistants and a local guide in each of the three communities.

During the final phase of fieldwork in Nicaragua, November 1999 to May 2000, a second survey was carried out, concentrating on the two neighbouring communities of San José de Monteredondo and Fátima. The second survey
comprised additional information on the utilisation of and income from tree products and coffee production data for the cycle 1999/2000. The aim was to include the same 42 respondents that had participated in the first interview round in San José and Fátima. However, for different reasons it was not possible to re-interview 3 of them. The survey data supporting the analysis will therefore have different sample sizes of 62 and 39 farms. Subsequently, in-depth case studies were conducted on six farms in San José and Fátima selected from the survey sample. To complete the local level field studies a focus group workshop was conducted on one of the farms with the producers who had participated in the case studies. The session included presentation of preliminary conclusions and questions arising from the study, and the discussion of these with and among the participants during a meeting and field visit.

Selection criteria
The principal criteria for the selection of the study villages San José, Fátima and San Juan de la Concepción, were that coffee was an important crop, that the principal target group of small-scale coffee producers was fairly represented and that the villages were relatively close to each other. For the second survey and the in-depth case studies it was decided to concentrate on the two neighbouring villages of San José and Fátima for various reasons. Firstly, the geographical characteristics and micro climate were more similar than in San Juan, where the location of the agricultural lands near the volcano Masaya entailed certain differences, among others in terms of the topography and sulphuric emissions from the crater that at times affected crop production. Secondly, in the samples from San José and Fátima both historically private farmers and parceleros were represented, while all respondents in San Juan were from the former category. In the selection of study villages, representativity at the regional or national level was not an aim. However, by analysing the observed practices and processes in the specific empirical setting and discussing them against the theoretical framework of the study it has been intended to bring to the fore relations and dynamics with a wider relevance within the field of small-scale agricultural production and rural livelihoods.

The sample of producer households for the survey was based on a random selection of 20 respondents among the coffee producers in each of the three villages. The selection of respondents was made at random from

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9 One couple had left for the dry season to work in Costa Rica, another respondent was permanently drunk, and a third had sold his plot. Although this third respondent could not supply data for the survey, he was interviewed regarding the reasons for selling his farmland, and his occupation at the time of the interview.

10 Due to practical reasons, the number was slightly higher in one village and one less than the 20 farms aimed at in another village.
Theoretical framework

possible, comprehensive list of coffee producers. The total numbers of coffee producer households from which the samples were drawn were 104 in San José, 54 in Fátima and 78 in San Juan. Farms that were still cooperatively managed were excluded beforehand, as the objective of the study was to investigate the production and livelihood strategies of individual households.

The selection of farms for case studies was undertaken according to a stratification of the producer households’ production and livelihood strategies based on the survey data. The selection was based on preliminary analyses of the sample data, where variation in terms of the key issues of concern was the main principle. The selection of case study households was, thus, undertaken from a stratification of the sample with respect to production and livelihood strategies, i.e. some households engaging in off- and non-farm work/some specialised in farming; some with good/some with bad production levels and incomes from their coffee agroforestry system; some with more specialised/some with more diversified product compositions. Finally, the aim was to include both parceleros and historically private producers. The names of respondents of in-depth interviews, case studies and focus groups have been changed to fictive names in the text.

Methods used for surveys, case studies and data interpretation

During the exploratory study, the interviews carried out were semi-structured based on a liberally administered questionnaire. Semi-structured interviews and more informal conversations were used with key persons. For the surveys carried out in the subsequent phases of the local fieldwork structured questionnaires with closed and open questions were employed, administered in personal interviews. In addition, data related to the shade and coffee structures of the coffee agroforestry systems were taken from a 1000 m² sample plot. These included measurement of the shade percentage by means of a densiometer, inventories of shade trees by species and size category and an evaluation of coffee plant productivity.

The case studies consisted of interviews with the principal coffee producer and other family members about issues related to agroforestry system management and household livelihood strategies, PRA-inspired methods such as ranking and scoring matrixes, field walks, map drawing, life history-interviews, etc. Among the different techniques used in the case studies, a household life-history exercise provided useful information regarding the analysis of changes in the livelihood strategies over time and played an important role for the understanding of the interplay between family life cycle dynamics and broader contextual changes. The exercise consisted of a conversational interview based on an historical matrix, which was filled in with information on the households’ histories as producers, the ways in which they had gained access to land and established their farms, brief
characterisations of the principal activities of the household members, and an account of the ways in which their livelihood strategies had changed over the years.

A combination of interview questions, visual methods and more loosely structured discussions was also used for group interviews and in the focus group workshop held at the end of the field work period.

The study is based on a combination of qualitative and quantitative data, collection and interpretation methods, in some parts used in a complementary manner in others as a means of triangulation. In the final analysis, quantitative data have mostly been analysed by descriptive methods, but a few statistical tests have been used to support qualitatively based arguments (see Appendix No.2 for results of statistical tests referred to in the analysis.)

(For a more detailed discussion of field study techniques and methods see Appendix No. 1.)
Chapter 3  Coffee production and social transformation processes

Coffee has had a central position in the Nicaraguan economy for a long time. Historically, the south-western region, with ‘El Crucero’ south of Managua and the Carazo plateau, was the main coffee producing area in Nicaragua, as its central location close to urban markets and ports made the region favourable for export production. Subsequently, coffee production expanded into the Northern Central region\(^1\) that, due to its better growing conditions in terms of climate and altitude, became the main coffee producing area. Coffee became the primary export product from the end of the 19th century until temporarily overtaken by a cotton boom in the 1950s. When the present study was carried out, coffee was still an important product, not only from the perspective of the national economy, amounting to a fifth of total export, but also as an income source for small-scale producers. Thus, small-scale farmers represented about 89 % of the coffee producers and cultivated almost 40 % of the area under coffee (UNICAFE 1997; UNICAFE 1998; DANIDA 1999). Compared to the numbers of small-scale cultivators, however, their share of the total amounts of coffee produced in the country was modest.

Chapter 3 provides an historical background for understanding the social transformation processes and changes in production structures and technology in the study region that were set off by the introduction of coffee. The chapter is structured into two major time periods, the first spanning from the introduction of coffee to the Sandinista revolution in 1979 and the second dealing with the agrarian reform of the 1980s and the coffee modernisation programme forming part of it.

In the course of the analysis, some of the different theoretical and political interpretations that have been important in the recent development of the Nicaraguan agricultural sector will be discussed. The analysis concludes that neither the orthodox political economy interpretation, as reflected in the initial Sandinista reform strategies, nor the notion of an historical continuous category of smallholders, as proposed by Netting, can sufficiently explain the social processes within the development of the coffee sector in the study region. Coffee expansion did not lead to total proletarianisation of peasants and small-scale producers in the region. It is true that the development of the coffee sector was associated with a tendency towards social differentiation and increasing marginalisation of poorer producers, but a considerable number of small-scale producers succeeded in obtaining land during the privatisation process in the late 19\(^{th}\) century and started to engage in coffee production. On the other hand, today’s small-scale coffee producers cannot simply be understood as the result of historical continuity, but

\(^{1}\) The Departments of Matagalpa, Jinotega and Nueva Segovia.
should rather be seen as an outcome of processes of social struggle under the influence of changing economic dynamics and political tendencies.

Since the introduction of coffee to the region, production methods have undergone several changes in Central America. From the unshaded plantation systems common on the Caribbean islands, coffee production was adapted to the local natural conditions, demographic patterns and social relations of production, *i.e.* involving the use of shade trees. During the Sandinista agrarian reform in the 1980s, an ambitious coffee modernisation programme called CONARCA was carried out in the coffee-growing region of south-western Nicaragua entailing the introduction of modern production technology, based on high yielding varieties and use of chemical inputs. Coffee modernisation in the designated areas also entailed a radical elimination of the trees used as shade in the coffee plantations.

Coffee modernisation with CONARCA, however, did not mark a general transition from traditional low-productive technology to highly productive mono-culture systems in the region as a whole. Coffee production with older and locally adapted varieties, use of shade trees and lower levels of external input continued, especially among individual small-scale producers. Moreover, the success of the CONARCA programme turned out to be rather dubious, among other reasons because the technology introduced was not well adapted to local climatic conditions.

The historical transformations that had taken place in the coffee sector within the studied period were not expressed as irreversible processes, neither as a one-way social process towards proletarianisation nor as a unilinear technological development from traditional coffee growing methods to modern production technologies. At the time of the study, the Nicaraguan coffee sector was characterised by a heterogeneous structure both regarding the size of coffee producers’ land units and production technologies. Hence, in Carazo and Masaya, coffee was grown by large-scale commercial producers, medium-sized family farms and semi-proletarian smallholders alike.

### 3.1 Early history of coffee cultivation in the study region (1797–1979)

#### 3.1.1 When coffee arrived in Central America

First accounts of coffee plants in Central America date back to the middle of the 18th century and actual commercial production started between the turn of the
century and independence in Costa Rica. The germplasm and the technology initially used in Costa Rica were probably imported from Cuba. On the Caribbean Islands, the Dutch, the French and the English among others had started to cultivate coffee for the growing European demand for this beverage. On the islands coffee was produced in plantation systems based on African slave labour (Rice 1990; Samper 1999; Samper 1999).

In contrast to the Caribbean Islands, where coffee was produced within the colonial plantation system, the structure of the emerging coffee sector in Central America was far more heterogeneous. Coffee growing was taken up by both large landholders who had engaged in cattle raising, sugar plantations or other products before the introduction of coffee, and by smaller and medium producers who had accumulated some capital by engaging in economic activities within small-scale trade and commerce. In certain periods and places foreign investors also played a role in Central American coffee production.

In his historical analysis of the coffee sector in Central America, Samper gives an account of the different ways in which the development of the coffee sector was articulated with the specific demographic patterns and the inherited colonial structures characteristic of the Central American countries. In Costa Rica, the Indian populations who inhabited the Central Valley, that should later become the main coffee growing area, were small in numbers. When coffee cultivation expanded, they could not resist the privatisation and the taking over of the land by the coffee growers, and between 1830 and 1860 virtually disappeared from the region. Relative labour scarcity and the existence of an open agricultural frontier, permitting colonisation of new lands, meant that the hacienda system had not developed as it had in other neighbouring countries. As a consequence, family managed coffee farms and paid labour with relatively high wages characterised the Costa Rican coffee sector.

In contrast, in densely populated El Salvador, land was the scarce factor for coffee production. A consequence was the comprehensive enclosure of village commons at an early stage. This development lead to the creation of a mestizo peasantry, and an abundant supply of cheap labour for the coffee haciendas.

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12 The origins of the coffee plant can be traced back to the part of East Africa that now lies within the countries of Ethiopia and Sudan. From Africa the crop spread first to the Arab region, and then to Asia. During the period of European colonialism, the crop was later brought from Java to Europe and from there on to the Caribbean (León, J. (2000)).
In Guatemala, a large Indian population was used as the labour supply for the coffee plantations. The recruitment methods consisting of coercion, debt slavery, threats etc. were obviously based on the oppressive colonial power relations with its hacienda system and exploitation of the indigenous population. The Indian communities, however, were not expropriated to the same extent as in other countries, as the high altitude plains they inhabited were not suitable for coffee cultivation. The relations of production in south-western Nicaragua in the 1850s had some resemblance to those of Guatemala, with relatively high population densities, a large part of the population of indigenous ethnicity, a marked hacienda system, and coercive methods used for labour recruitment (Samper 1999, p.13-14).

In Nicaragua, coffee was grown from the middle of the 19th century, principally in the south-western region, that had good communications by terrestrial and fluvial infrastructure, and major ports. The coffee boom that took place in the second half of the 19th century in the neighbouring countries, did not occur in Nicaragua until around the turn of the century, when production levels came close to those of Costa Rica, the leading coffee producer in Central America.

In the beginning, coffee was mostly cultivated on existing agricultural land, substituting for staple crops and pastures. When commercial coffee production started to increase, many peasant and indigenous families lost their access to farmland in the process and moved their production of staple crops to frontier areas. Later on, coffee production also expanded directly into forested areas, where a few standing trees were often left in the coffee plantations for shade.

A consequence of the subsequent processes of land privatisation and concentration was a transformation of the agricultural production systems of the region. The disappearance of the commons and a gradual reduction of the farm households’ access to land meant that previously semi-permanent agriculture with cyclical fallow was replaced with permanent cultivation of the fields (Dore 1995, p.319). The introduction of coffee, which is a perennial crop, contributed further to the process of fixation of the cultivation patterns:

"En tal caso, la introducción del café alteró definitivamente el ciclo demonte-milpa-barbecho, propio de la agricultura semi-itinerante, aunque pueden haber coexistido ambos sistemas durante la fase inicial hasta agotarse la tierra boscosa cercana y acortarse, para luego desaparecer, el barbecho."\(^{13}\)

\(^{13}\) In such case, the introduction of coffee definitively changed the cycle of slashing-staple crop cultivation-fallow, characteristic for the semi-permanent agriculture, although both systems may have coexisted in the initial phase until the nearby forested land was exhausted and deforested, where after the fallow disappeared.
Recent historical studies of the introduction and development of coffee in Central America supply interesting information regarding the question of technology development in coffee production. Contrary to conventional wisdom in the region, it is shown that shaded coffee production, which today is generally labelled the "traditional method", evolved in Central America subsequent – or at least parallel - to the introduction of production models without shade trees. Manuals for coffee production and descriptions from this period indicate cultivation methods with full sun exposure of the crop i.e. without shade trees:

"En lo relativo de la plantación misma se recomendaba una cuidadosa disposición de los cafetos en cuadro, sin sombra intercalada aunque con árboles circundundantes. Se trataba, pues, de un cultivo a plena o casi plena exposición solar, con densidades de siembra relativamente altas – para la época – en comparación con los cafetales bajo sombra."  

On the Caribbean Islands trees were thus not recommended for shade but only planted around the coffee fields as windbreaks due to the strong winds. However, the biophysical and social conditions of production in Central America were quite different from the Caribbean. When coffee was introduced to Central America, production methods were therefore gradually changed and adapted to the regional and local settings. Thus, in many places, coffee producers started to experiment with different kinds of shade trees to protect the coffee plants from the dry climate and strong solar radiation on the pacific side of the isthmus. On the other hand, strong winds were not a problem in many parts of the Central American coffee areas, making redundant the function of trees as windbreaks along the borders of the fields. In some areas such as the Central Valley of Costa Rica shade was gradually employed in a more systematic manner with selected trees, among others nitrogen-fixing species such as erythrina and inga. In other places, bananas, plantains and fruit trees were inter-cropped and at the same time utilised as shade for the coffee plants. In some places, during the first years after establishment or in coffee plantations with extensive spacing, beans, maize and tubers were inter-cropped.
In spite of the emerging practice of planting shade trees, however, coffee experts and growers’ manuals continued to recommend coffee cultivation with sun exposure, and in Costa Rica cultivation without shade trees was dominant until around 1860. It is reported that a lively debate on the pros and cons of shade in coffee plantations evolved in the press and in coffee grower associations at the time (Samper 1999, p.16)

### 3.1.2 Coffee, land privatisation and peasantisation in the Meseta

Dore recounts how the expansion of coffee cultivation led to a major social transformation in the Meseta de los Pueblos, where the three study villages of this research work were located. Changes in the dominant property regimes were an important element in the transformation process that the region underwent during this period. While most land had been common property until the 1860s, the process of land privatisation accelerated during the second half of the 19th century, and by 1920 most coffee land had individual owners (Dore 1995, p.303).

The process of land privatisation went through different phases. It started when the liberal regime that took over power after national independence launched laws decreeing the enclosure of common lands in the 1830-40s. New institutional structures, a municipal authority, the ‘Junta Municipal’, were superimposed on the existing institutions of indigenous community (comunidad indígena) and its leadership, the indigenous mayor (alcalde indígena), including the designation of corresponding common lands (tierras ejidales) that in many cases overlapped with the territories of the indigenous communities. In a transition period, the two institutional systems existed parallely without major conflicts, partly because land was abundant. However, expanding coffee cultivation meant an increasing demand for land and thereby highlighted the question of land rights and local authority.

For the implementation of the new land privatisation policies, the government entitled the Junta Municipal to grant land rights to claimants. One important criterion was that the petitioner could prove that the land in question had been used by his family during a certain period of years. In the case of Diriómo, this was defined as a minimum of twenty years. Another important principle, however, was that of the Junta’s authority in land matters, translating into a practice oriented towards local power and kinship relations. Although, de facto, the common property lands held by Indian and Ladino communities were not eliminated entirely, a growing number of claims to be granted private rights of possession (derecho de posesión) were directed to the municipal authorities from the 1850s
onwards. While most politically and economically well off producers succeeded in their land claims, many of the smaller producers were not able to undertake the bureaucratic process or sold their claim. However, in the case of Diriómo, Dore comments that what was remarkable about the outcome of this first phase of the privatisation process was that so many of them did actually obtain rights to their land (Dore 1995, p.309).

A second phase in the change process regarding land property was an increasing concentration of land that took place in the course of the 1880-90s. During this phase larger coffee producers had increased their holdings at the expense of small producers and peasants, who were bought out or directly expropriated. Government policy supported this process with a number of decrees in 1857 that favoured private over common property rights and fortified the rights of planters vis-à-vis those of peasants and labourers. Moreover, larger landholdings than ever were petitioned for from the Juntas Municipales and in the claims, the principle of previous occupancy was in many cases redefined as the intention to put the land to productive use, meaning coffee production (Dore 1995, p.315). Land titling started at the beginning of the 19th century:

"This [the land titling process] accelerated the stratification of the peasantry as money was the key to negotiating the bureaucratic terrain. Lawyers, notaries, surveyors and a host of other functionaries prepared the documentation that pre-figured a land title. As a result, many smallholders, people with less than five manzanas, who had acquired a claim to the fields they cultivated within the town's ejido, sold their right of possession."

(Dore 1995, p.317)

Of those farm families who did not sell their rights, some kept on cultivating the land but did just not apply for a title because of the costs and the bureaucratic procedures associated with the acquisition of a land title. Thus was also the case for many of the producer families that settled in the area of San José de Monteredondo in the 19th century, who never obtained a legal title to their farmland. According to the Secretary of the Municipality of Masatepe, although a plot of land had been in the hands of a family for several generations, it could still not be legally registered at the time of the study (Int.López 2000).

Land titles had importance in several ways, among others to grant tenure security in situations of dispute, in land transactions or when seeking credit. Compared to other countries, however, land titles did not have the same significance for the
development of coffee production in Nicaragua because credits were mostly obtained through informal channels (kinship and patronage) as the financial system was very weak, and enforcement of land tenure was exercised more by power than by legal mechanisms (Dore 1995, p.316).

The processes of change in the agricultural sector were accompanied by government efforts to promote export production. The new land regulations were a crucial feature of these policies. To support coffee production, moreover, forced labour drafts were re-introduced and functioned between 1880 and 1915. For instance in the Mombacho area, according to these regulations, all male peasants were obliged to work on the coffee plantations for three months every year (Dore 1995, p.320). Leaning on the functional dualism argument Charlip has suggested that, at that time, there was no reason for the large growers to seek to dispossess smallholders completely in order to create a work force. Labour was principally needed during the three months of the coffee harvest, which meant that employing larger quantities of labour on a permanent basis would have presented an unnecessary economic burden to the planters (Charlip 1999, p.101).

The privatisation process also involved ethnicity. From colonial times, the question of ethnicity had been closely linked to that of rights to land. Thus, the Spanish Crown had granted the Indian communities common property rights to the land they cultivated. After independence in the 1820s, the colonial racial categories were abolished by the new regime in the name of liberal ideology. For some time, however, the indigenous communities maintained a quite clear ethnic identity that was tied to their communal land rights, but by the mid-19th century, ethnic boundaries had become increasingly blurred.

"By the middle of the nineteenth century ethnic differentiation in this region of Nicaragua was only remotely related to racial origin. Whether families were Indian or ladino increasingly depended on an inseparable mix of wealth, culture and politics."

(Dore 1995, p.306)

The process of ladinoisation intensified throughout the century, due, among other things, to uprisings against the government’s new land laws and the civil war between liberals and conservatives that resulted in internal displacement and mixing of population groups of different geographical and ethnic background. When communal land rights were abolished by the liberal regime, an important signifier of Indian ethnicity was eliminated. The transformation of the local production systems from semi-permanent slash-and-burn agriculture towards
fixation and intensification of the farming practices contributed to further ethnical homogenisation:

"La adopción del arado no fue, por cierto, sólo un cambio tecnológico, sino significó también la preeminencia final de prácticas agropecuarias de tradición europea sobre sistemas autóctonos. En tal sentido, formó parte del proceso de "ladinización" o mestizaje cultural."\(^{15}\)

(Samper 1999, p.37)

Although the racial origins of the local population were increasingly blurred, differences defined along the lines of the categories indígenas and ladinos were still marked in terms of social status and an exclusion of the indigenous population from the local political institutions, namely the junta municipal. This in turn influenced the assignation of land during the privatisation process, especially because the granting of land by the junta municipal was a political process influenced strongly by kinship and patronage bonds, as observed by Dore (Dore 1995, p.318).

In general, coffee expansion and land privatisation contributed to a growing social differentiation of the rural population. Although social differences within villages had existed when land tenure systems were based on usufruct rights to communal property, capital accumulation was limited and practically all families had access to land and resources for subsistence. With the privatisation and commoditisation of land accompanying the introduction of commercial coffee production in the region, the situation changed considerably.

In this context it is worth noting that Nicaragua did not have a regularised currency before 1870. Monetisation of the rural economy and the introduction of taxes on land, coffee trees and the use of natural resources (pastures, wood gathering and hunting) contributed further to social differentiation. Thus, although taxes were levied on both small and large, subsistence and commercial producers, the effects were harsher on those who had little if any money income than on producers already integrated into the money economy. Moreover, the labour drafts imposed upon the peasant population were another factor limiting their possibilities for surplus accumulation on their own farms.

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\(^{15}\) The adoption of the plough was, for sure, not only a technological change, but also signified the ultimate pre-eminence of agricultural practices of the European tradition over the indigenous systems. In this sense, it formed part of the process of ‘ladinoisation’ or cultural ‘mestizaje’.
When Change is the Only Constant

“Elimination of the commons, disappearance of the Indians, privatization of land, institutionalization of forced labour, ecological degradation, and increasing monetization were all aspects of the social revolution which transformed southwestern Nicaragua from 1850 to 1920. Instead of constituting a society characterized by bourgeoisie and proletariat, struggles unleashed by the spread of coffee created a stratified peasantry enmeshed in a social order which was ruled by the power of patronage.”

(Dore 1995, p.320)

As a result of the expansion of coffee production and the accompanying privatization processes, social differences exacerbated, with a group of poor families left without access to land and some richer ones who became medium sized coffee producers. However, Dore concludes, that by 1920 both of these groups were still relatively small, while the majority of families in Diriomo were peasants with small or medium sized farming plots to which many of them held a title (Dore 1995, p.320).

Dore’s conclusions regarding the social structures within the early coffee sector are supported by another historical analysis carried out by Charlip (Charlip 1999). This study states that, in 1909, 75 percent of the farms and 55 percent of the land were held by minifundistas and small and medium-sized producers (Charlip 1999, p.100-101).

“That most small farmers did not loose their land to expanding latifundia with the introduction of coffee does not mean there was no exploitation or that the relationship among smaller and larger growers was not conflictive. The struggle was fought on many fronts and in many ways. While the smaller growers produced coffee, the wealthy elite lent them money, processed their coffee, and marketed it overseas.”

(Charlip 1999, p.102)

That a large number of smaller producers were able to gain access to private land and engage in coffee production, thus, did not mean that the opportunities to profit from this new export crop production were equal for all producers.

3.1.3 Settlement, land tenure, and social relations of production in the study area
Of the three villages included in the study, San José de Monteredondo is the one about which it has been possible to find most historical material regarding the origins of the current population. According to interviews with local inhabitants carried out by a schoolteacher and local historian, the community of San José was founded by three families that migrated from the nearby municipality of Niquinohomo in the 1880s:

“They came from Niquinohomo (...). From there they came to mark out the land, the area where they could work.”

(Int.Ticay 2000)

The migration from Niquinohomo to the area of what was to become San José happened during the period of coffee expansion and increasing land concentration described above. Even if not based on specific historical data on land use in Niquinohomo at the time, it may be assumed that the processes described in the Mombacho area south-east of Niquinohomo have had some influence on demographic movements, combined with a general increase in population numbers.

Local sources agree that the land of what would become San José was abandoned at the time of the settlement by the people of Niquinohomo, but there exist different versions as to the ownership situation at the time of settlement. One villager stated that when the families settled in the area, the land belonged to a large landholder, but had been abandoned for some time (Int.Gutierrez 2000). According to others, the land did not have an owner. Various sources agree, however, that the settlers directed land claims to the alcalde indígena and paid to obtain their land rights, as told by don Gerónemo, an elderly inhabitant of San José:

“To live here you had to solicit a right. (...) At that time, everybody had to buy the right from them (the municipality) to live here.”

(Int.Ticay 2000)

He also told how the alcalde indígena then forwarded the claim to the municipal authorities in Masatepe. At least a part of the land in the area had formerly been used for extensive cattle ranching and had no dense forest cover when the settlers from Niquinohomo arrived. During the first decades after settlement, the producers in San José cultivated staple crops for subsistence, combined with cattle,

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16 Based on local historical interviews carried out by Álvaro López in San José.
chicken and hunting small animals (Int.Gutierrez 2000; Int.López 2000). Around 1900, sugar cane was grown as the first cash crop. In the 1930s, tobacco appeared in the area and not until the beginning of the 1950s did coffee start to replace tobacco in larger land lots in San José (Int.López 2000).

At first the landholdings of the families arriving from Niquinohomo were extensive: “In the beginning they grabbed [land] as far as the eye reached.” (Int.López 2000). However, as the families grew, land was divided between heirs and, later, parts of the land were sold to outsiders coming from the nearby larger villages of Masatepe and Jinotepe. It was reported that the large landholdings existing presently were accumulated little by little by some of these producers, while the original families had been left with small plots only. Especially during the Somoza regime, many small producers were expropriated by large landholders by different means, for instance by sending their cattle into cultivated areas, or by taking over the land of indebted producers (Int.López 2000).

Today, San José is characterised by a great number of smallholders, although some larger landholdings exist, among them two prominent coffee haciendas. During the years of the agrarian reform, a few cooperatives were formed in San José, but much of the land remained in the hands of small and medium scale producers.

Before the revolution, the area of the neighbouring village of Fátima was dominated by large landholdings, with settlements of landless farm workers nearby. Coffee was one of the principal crops on the haciendas of the area. Some of the landholdings belonged to the clique around Somoza and were consequently expropriated during the revolution. Later the farms were turned into cooperatives, with many former farm workers as members.

The area of the municipality of La Concepción today, to which the third study village belongs, started to be inhabited temporarily by cultivators of tobacco and food grains by the middle of the 19th century. These producers originated from the Department of Managua and lived in provisional housing during the growing season. Years later, two families from Ticuantepe came to settle more permanently in the area and, thus, laid the foundation for the two villages of San Juan de la Concepción and La Concepción that were officially recognised in 1889. La Concepción would later become the centre of the municipality and today has many more inhabitants and economic activity than the study village San Juan de la Concepción (INIFOM/AMUNIC 1997).

In San Juan de La Concepción around the turn of the century the principal production was of sugar cane, replaced by coffee around the 1920s. Today,
agriculture in the area is characterised by diversified production of fruit and vegetables, strongly linked to the markets of Managua. In terms of landholdings, minifundio is widespread. In the village of San Juan de la Concepción, no cooperatives from the Sandinista era were encountered during the survey, although various cooperatives existed in the neighbouring villages. The absence of cooperatives in San Juan de la Concepción might be explained by the mountainous terrain of much of the farmland belonging to the village that lies on the slopes of the Masaya volcano. Thus the haciendas that were expropriated during the agrarian reform tended to occupy the better and flatter lands.

3.1.4 1920 to 1979: export-led agricultural growth

The period of liberal government up to the beginning of the 20th century had seen export-led economic growth supported by liberal reforms and favourable world market conditions. During this period, the new bourgeoisie based on coffee and tobacco export production strengthened their position vis-à-vis the traditional landed elite, represented by the conservative party, but also at the expense of the peasantry, as described above.

However, following the US-American invasion of Nicaragua in 1909, as a result of which the liberal government of president Zelaya was overthrown, the years of growth and a relatively stable political situation came to an end. The invasion was a result of political conflict between the liberal government on the one hand, and on the other the conservatives and US-American economic interests, that were strongly represented in the Nicaraguan export and financial sector. The years following the invasion were characterised by political turbulence with changing US-supported conservative presidents facing strong opposition from the liberals, until a liberal president was supported by the USA in 1927 in order to appease the opposition. Moreover, the USA had created the National Guard as an ‘independent force’, to stabilise the conflictive political situation. However, tensions persevered and escalated when a nationalist guerrilla uprising against the US presence, led by Augusto César Sandino, turned into a war.

In 1933 the USA pulled out of Nicaragua, leaving behind a strong National Guard to keep order in the country with Anastasio Somoza García as its leader. Soon after, Somoza had Sandino captured and executed and from then on rapidly increased his political and economic base among the established elites until manoeuvring himself into presidential power in 1936.
Adding to the political conflicts, the great depression (1929-33) seriously affected the external conditions for economic growth and coffee prices dropped to a third of what they had been before the crisis. In order to compensate for falling prices the larger coffee producers sought to expand their holdings and, thus, maintain income levels. As a consequence the expulsion of peasant producers from the land in the coffee growing areas was reinforced (Belling 1993, pp.95-107; Enríquez 1997, pp.60-63).

As no industrialisation of significance had taken place in Nicaragua, agricultural export maintained its central importance for the national economy. Coffee kept its dominating role throughout the 1930-40s, but at the same time a certain diversification started to take place with export of timber, rubber and minerals. The economic growth experienced at the time created the environment for political coexistence between Somoza and the old oligarchy who, although grudgingly, accepted his dominance as long as they were allowed to prosper economically. This political coexistence was facilitated by the boom in agricultural export-production that took place in the following decades. Between 1950 and 1979, due to favourable world market prices, diversification of products and agricultural export production boomed. Coffee production increased by 151% in value, sugar by 250%, cotton by 500% and meat by 377%. In general, growth in agricultural production was achieved by means of expansion in cultivated land rather than increases in productivity, although some segments within the coffee sector undertook a partial modernisation with new varieties and production methods (Maldidier and Marchetti 1996, p.24).

Total grain production for the internal market also grew during the period, but only by 60% (Maldidier and Marchetti 1996, p.24). While export production was mainly in the hands of medium and large-scale producers, food production for the internal market was principally carried out by small and peasant producers. The increasing marginalisation of this group of producers due to expanding export production, thus, had consequences for the cultivation of food grains:

“When the campesinado experienced growing marginalization with the expansion of agroexport production, so too did its cultivation of basic grains. Corn and beans were pushed into less fertile areas in the region – if not out of the region entirely. Yields and overall production levels dropped accordingly.”

(Enríquez 1997, p.62)
Due to a simultaneous growth in population, *per capita* production of staple crops decreased in the course of the 1970s and grain had to be imported to keep up the national food supply.

During the years of the export boom, Somoza succeeded in concentrating not only political power but also large shares of the Nicaraguan economy in his hands, thereby laying the basis for his family dynasty that dominated the country for several decades. State and external resources (e.g. financial capital) were channelled through the Somoza conglomerate to the modern export enclaves. This meant that the position of the export bourgeoisie was further strengthened, leading to an increasing concentration of land in the densely populated farming areas on the pacific side of the country.

The areas cultivated with coffee had doubled to a total of about 175,000 mz during the two decades. This expansion, however, predominantly favoured the large landholders. Thus, in 1963, three quarters of national coffee production were concentrated in farms of over 500 mz. The Somoza-group owned a great number of these large coffee holdings. Moreover, they held a key economic position in finance, processing, transport, and export enterprises, allowing them to skim disproportionally large shares of the coffee export earnings at the expense of the other coffee producers. Thielen (Thielen 1988) sums up the development within the coffee sector as follows:

> “Zugleich bedingten die Orientierung an schwankenden Weltmarktpreisen, Bodenpreis- und Pachterhöhungen, wachsende Investitions- und Produktionskosten, selektive Kreditvergabe der Banco Central de Nicaragua (Staatsbank der Somozas) sowie staatliche Qualitätskontrolle und zentralisierte Vermarktung eine wachsende ökonomische Enteignung von Klein- und Mittelbauern.” 17

(*Thielen 1988, p.30*)

With the Somoza-group’s ever tightening grip on the national economy and the struggle of the other export producers to get their share of economic growth, the pressure on the land and livelihood conditions of small-scale producers and the poorer rural population was great. Possibilities for permanent wage employment

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17 *At the same time, the orientation towards fluctuating world market prices, increased prices on land purchase and rental, growing investment and production costs, selective granting of credits by the Banco Central de Nicaragua (the Somoza state bank) as well as state quality control and centralised marketing led to a growing expropriation of small and middle farmers.*
were very limited, but many sought to supplement incomes from their small agricultural plots with seasonal wage labour in the export sector during harvests.

In spite of the strong tendency towards concentration of land and resources in the agricultural sector during this period, Maldidier et al. (Maldidier and Marchetti 1996, p.25) observe that small-scale producers’ and minifundistas’ apparently had success in upholding a certain access to land and to keep on producing, albeit under greater constraints. If the increasing marginalisation of small-scale producers did not result in more massive processes of proletarianisation and semi-proletarianisation this is mainly attributed to two conditions. Firstly, especially in areas with favourable agro-ecological conditions and access to urban markets, such as the study area, a growing demand for vegetables and fruit by an emerging urban middle class presented a new window of opportunity for peasants and small producers to gain an agricultural income. Thus, intensification and diversification of production made it possible for peasants to uphold a – at least to some extent - land-based livelihood in spite of competition from larger producers and the reduction of farm sizes due to division of holdings by the system of inheritance.

Secondly, a dynamic agricultural frontier gave some room for expansion for both the areas owned by large landholders and the sub-sector of small-scale and peasant producers. However, it should be added that expansion did not benefit the different strata of the rural producers equally. Thus, while the area occupied by farms of over 500 mz tripled within the period between 1952 to 1978, the area in holdings of under 10 mz only grew by 75 %, which, it should be noted, were shared by a number of smallholders that had almost doubled. The area occupied by medium sized farms of 10-50 mz doubled within the same period, especially in the agricultural frontier areas (Maldidier and Marchetti 1996, p.27).

The tendency towards marginalisation of small-scale producers was mitigated but not halted during the period of general economic growth within the agricultural export sector during the 1950s and 1960s. Moreover, their access to state and other external resources was extremely restricted and politically, they were virtually excluded from participation. In the study region increasing impoverishment of the rural population became a consequence of the development tendencies within the Nicaraguan agricultural sector. The growing social pressure in turn began to be felt as a potential political threat by the Somoza regime. In reaction to this a few measures to improve the situation of the small-scale producers were introduced, among others credit schemes that, however, were very limited in scope and clearly not sufficient to counter the serious social problems:
“In response to the growing discontent that these social conditions produced in the countryside, and the opposition party’s efforts to organize the discontent on its behalf, the Somoza regime made several gestures at implementing “agrarian reform” in the region. (…) Yet the programs did not address the crucial issue of land distribution. Thus, they were doomed to failure in terms of resolving the basic problem of rural poverty and quelling unrest in the countryside, the latter being the primary objective of their implementation.”

(Enríquez 1997, pp.63-64)

At the beginning of the 1970s, a succession of events made the foundations of the Somozas’ national empire shake and ultimately fall. Economically, growth rates began to slow down, which in part was caused by the international recession associated with the oil price crisis. The trade balance was further negatively affected by imports of food products that had become necessary. Under these changed conditions the economic glue that had held together the different fractions of the national elite smouldered, making visible the marked contradictions between them. At the same time dissatisfaction felt by the urban and rural poor who suffered from the exclusive development path followed by the Somozas transformed into increasing social unrest. An earthquake devastated Managua in 1972 and in its aftermath a scandal was caused by the Somoza government’s fraudulent management of funds destined to help the victims of the disaster. This worked as a catalyst in the already combustible national situation. In 1979, a broad, multi-faceted revolutionary movement overthrew the Somoza regime and constituted a new government led by the Sandinista party.

3.2 The Revolution and the agrarian reform (1979-1990)

3.2.1 Sandinista agrarian reform: building up the cooperative sector

During the Somoza dynasty, a growing concentration of property had taken place in Nicaragua. This was not least the case with farmland, a key resource in a national economy based strongly on agricultural export such as the Nicaraguan. With the Sandinista revolution in 1979, 1.9 mio. mz (app. 1.3 mio. ha) of land and many of the most modern installations and machinery were confiscated from the political and economic group supporting Somoza and made state property. The expropriations were backed by Decrees No. 3 and No. 38 of the Government Programme and administered by the newly formed National Institute for Agrarian Reform (INRA). The productive resources confiscated from the Somoza group laid the base for the government strategy to promote agricultural development driven by a modern and economically powerful state sector. In the course of the 1980’s,
the area of the state and cooperative sector increased as further land was confiscated from landowners who fled the country, abandoned their land or were considered counter-revolutionary (Thielen 1988; Lohmann).

During the first years of the revolution, efforts were concentrated on the state production units (LIPE), until a second phase of the agrarian reform was initiated with the passing of a new law in 1981. The law was formulated in response to an increasing pressure from peasants and landless farm labourers to obtain land. The pressure took the form of squatting on private farmland and mass demonstrations. The Government found itself in a difficult position. On the one hand, the government needed to respond to the call for land by the rural poor and, on the other hand, needed to appease the group of productive large-scale producers, who still played an important role in the Nicaraguan economy, and who felt threatened by the new land policies. The result was a reform package that extended the possibilities to confiscate land from large landholders if land was left unproductive or was managed by others than the owners e.g. through leasing or renting arrangements, but the reform package also guaranteed the land rights of any other productive farming unit regardless of size (Thielen 1988, p.165).

The sector of small family farms and medium sized, private farms had generally not been influenced by the land reform, and farms continued to be managed as individual production units. Although in some cases land was also allotted as individual farm units during the initial phase of the agrarian reform, the focus was on the collective production units and individual producers did not benefit from government support programmes to the same extent as the state and cooperative farms.

During the second phase of the agrarian reform the promotion of cooperatives was intensified. The cooperatives that were formed comprised four different types of organization. The CCS (Colectivo de Crédito y Servicio), formed by individual producers mainly to obtain credits and to some extent technical assistance from state agencies. In the CCS, land tenure and farm management remained individual. With about 45 % of the cooperatives belonging to this category, the CCS was the most common cooperative form one year after the cooperative law was passed. Producers who joined a CSM (Cooperativa de Surco Muerto18) also managed their individual plots, but with a higher degree of cooperation, including exchange of labour and common ownership and use of machinery. The most integrated cooperative form was the CAS (Cooperativa Agrícola Sandinista), comprising 20 % of

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18 The term “Cooperativa de Surco Muerto” literally means dead furrow cooperatives, referring to the fact that plots of CSM farmers are merely separated by a “dead”, i.e. non-cultivated, furrow.
the cooperatives formed by 1982. Land ownership and management were collective, ruled by an elected board with a general secretary.

According to the 1983 census, 81% of the CCS members had formerly been farmers and 19% had worked as farm labourers. In contrast, only 48% of the CAS members had been farmers while 52% had been farm labourers. Finally, groups of farm labourers, the CTs (Colectivos de Trabajo), were formed on those state farms producing fruit for export. The CTs were granted use right to state land, allowing them to grow staple crops outside the fruit season (Thielen 1988, pp.173-174).
Table 3.1 The cooperative sector in 1982: organization, members and area

<table>
<thead>
<tr>
<th>Organization type</th>
<th>Number of farms</th>
<th>%</th>
<th>Members</th>
<th>%</th>
<th>Area (mz)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.A.S.</td>
<td>578</td>
<td>20.3</td>
<td>7,895</td>
<td>11.5</td>
<td>171,000</td>
<td>9.7</td>
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<tr>
<td>C.C.S.</td>
<td>1,275</td>
<td>44.8</td>
<td>43,265</td>
<td>63.2</td>
<td>1,157,000</td>
<td>65.7</td>
</tr>
<tr>
<td>C.S.M.</td>
<td>375</td>
<td>13.1</td>
<td>11,324</td>
<td>16.6</td>
<td>243,000</td>
<td>14.0</td>
</tr>
<tr>
<td>C.T.</td>
<td>512</td>
<td>18.0</td>
<td>3,210</td>
<td>4.7</td>
<td>123,000</td>
<td>7.0</td>
</tr>
<tr>
<td>Others</td>
<td>109</td>
<td>3.8</td>
<td>2,730</td>
<td>4.0</td>
<td>64,000</td>
<td>3.6</td>
</tr>
<tr>
<td>Total:</td>
<td>2,849</td>
<td>100</td>
<td>68,424</td>
<td>100</td>
<td>1,758,000</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Based on (Thielen 1988, p.175)

The development of the cooperative sector was somewhat slow to get started, but picked up speed by the mid-eighties. The formation of cooperatives was promoted by the government, among others by means of information campaigns through the farmers' organisation UNAG and the offer of credits. Moreover, the 'contra war' that had been started by a militant counter-revolutionary movement supported by the USA, had begun to threaten the security of many rural families. Especially in some of the remoter regions of the country, the cooperatives therefore also gained importance as defence units. Another aspect that may contribute to a fuller understanding of the strong promotion of cooperative development by the government was their political and ideological function in the Sandinista development project. The cooperatives, thus, were perceived not merely as production units but also as mechanisms for political organisation and entry points for state intervention into rural society.

Peasants or rural proletariat?
The Sandinista agrarian reform, apart from being forced to deal with many aspects of the given situation in a rather pragmatic way, obviously reflected a political-economic interpretation of the history of rural development in Nicaragua. Jaime Wheelock, the Sandinista Minister of Agriculture and one of the principal architects of the agrarian reform, expressed this theoretical view in an analysis of the historical social transformation brought about by the expansion of coffee production beginning in the 19th century:

“/La formación de las grandes plantaciones (café, banano, azucar) hubo de pasar por la expropiación de los pequeños propietarios, quienes separados de su medio de
Coffee production and social transformation processes

producción y su forma de subsistencia se vieron – y fueron – obligados a vender su fuerza de trabajo y vivir del trabajo asalariado. Las tierras expropiadas y la fuerza de trabajo se convirtieron en la base originaria del capital.”

(Wheelock 1980, p.191)

This orthodox political-economic position has later been challenged by other historical interpretations (Dore 1995; Charlip 1999; Samper 1999). Samper in his historical analysis of coffee sector development in Central America gives a rather more nuanced picture of the transformation processes invoked by the introduction of coffee, pointing towards the different forms of production and labour relations that co-existed in the region during the period:

"Si por una parte la actividad cafetalera fue fundamento del control directo e indirecto del capital sobre el trabajo rural en el Pacífico centroamericano, por otra parte recreó constantemente formas de producción y relaciones laborales muy distintas a las de un clásico capitalismo agrario, y cuyo contenido no ha sido siempre transparente ni unívoco.”

(Samper 1999, p.31)

Based on her analysis from Diriomo referred to above, Dore also counters the argument of a marked process of proletarianisation, stating that the rise of coffee did not expropriate an existing peasantry. Instead, she argues, the peasantry was created in the process of privatising common property agricultural land into privately owned plots (Dore 1995, p.303). Dore concludes:

"Capitalism involves separating producers from the land, undermining bonds of patronage, and generalizing commodity relations. The coffee revolution in Nicaragua did none of these. It created a heterogeneous peasantry, fortified relations of clientelism and institutionalized forced labour.”

(Dore 1995, p.304).

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19 The formation of the large plantations was brought about by the expropriation of smallholders who, separated from their means of production and their subsistence base, saw themselves – and were – forced to sell their labour and live off wage labour. The expropriated lands and the work force were converted into the material base of origin of capital.

20 If on the one hand the activity of coffee production was the basis for the direct and indirect control of capital over rural labour in the Central-American Pacific, on the other hand it constantly recreated forms of production and labour relations very different from those of classical agricultural capitalism, and the content of which has not always been transparent nor unequivocal.
Dore poses the conclusions of her analysis against the interpretation of the development of the agrarian sector on which the Sandinista government had based the Agrarian Reform carried out during the 1980s. She argues that the Sandinistas’ interpretation of the rural poor as proletarians demanding better wages instead of land-craving peasants had a strong influence on the course and outcome of the agrarian reform process. Thus, she explains the change of strategy in the second half of the decade, from an outspoken prioritisation of the state farms towards granting lands to individual families, as a correction of a mistaken perception of the peasant population and their aspirations in the first place.

Along the same lines of critique Charlip in her analysis of coffee and land in Carazo has observed how, contrary to the assumption made by Sandinista agricultural minister Jaime Wheelock, the aspirations of the rural poor appeared to be towards the acquisition of land:

“Wheelock expected to find landless workers interested in collective landholding or a guaranteed wage on state farms. Instead, he found smallholders in unexpected numbers and a desire for land even among the proletarianized or semi-proletarianized workers.”

(Charlip 1999, p.93)

Another point of critique of the initial approach of the agrarian reform strategies has been raised by researchers from Nitlapán, holding that the strong focus on a “modern” state and cooperative sector downplayed the economic potential of small and medium sized family farms and ignored the economic and social rationality of traditional ways of organising agricultural production:

“(…) no sólo se subestimó su importancia económica, sino se sancionó moralmente su racionalidad económica, tachándola de individualista, egoísta e incompatible con el “hombre nuevo”.”

(Nitlapán 1994, p.20)

The position of Nitlapán regarding the productive potential of small-scale family farms finds parallels in the small-farm literature referred to in Chapter 2, represented by Netting. Characterisations of the traditional agricultural techniques, it is further held, were based on value judgements rather than on technical and

21 (….) not only was their economic importance underestimated, but their economic rationality was also morally sanctioned, blaming it for being individualistic, egoistic and incompatible with the ‘new man’.
Coffee production and social transformation processes 91

economical assessments of their functioning and rationality (Nitlapán 1994, p.20). Government policies towards the coffee sector in the 1980s, in contrast, were strongly focused on modernisation, as will be outlined in the following section.

Besides the ideological reasoning behind the agrarian reform strategies, however, the practical difficulties encountered in trying to change an agrarian structure formed by centuries of polarised development deserve to be considered. After the nationalisation of the Somoza dictatorship’s properties, the existing large-scale production units, thus, were what the Ministry of Agriculture had in its hands and production had to be kept up to support the national economy. Moreover, regarding the critique raised by both Dore and Charlip, the special regional characteristics of the Meseta de los Pueblos, which both their analyses are based on, should be taken into account. If a certain mismatch between the original agrarian reform strategies and the aspirations of the target group was to some extent felt in other regions of the country, Enríquez, thus, suggests some specific regional characteristics of the Meseta region that impeded wider acceptance of the cooperative idea (Enríquez 1997, p.66). In the Department of Carazo the unorganised campesino sector (consisting of peasant, small- and medium scale producers) represented as much as 90 percent of the producers in 1971 (Enríquez 1997, p.66). In the 1980s, the cooperative movement advanced also in the Meseta region, but later on, it became clear that some resistance existed among the target group of poor rural dwellers. This was among others expressed in a high turnover among cooperative members and reluctance to join a cooperative as long as even a very small piece of land of their own was available. Enríquez characterises the population of the region as largely politically conservative which is partly explained by the strong influence of the catholic church and partly by their mercantilistic relations with urban markets (Enríquez 1997, p.66).

The obvious need for a strategy towards the campesino sector lead to a certain reorientation of the Sandinista agrarian reform strategy towards the mid-1980s. In the Meseta region, this reorientation entailed, among other things, an increased redistribution of land to individual beneficiaries and initiatives to increase small-scale producers’ production of vegetables and fruit for the domestic market. The initiatives had the multiple purpose of giving small-scale individual producers the possibility to benefit from the redistributive policies of the Sandinista government, to gain increased political support among the rural population, and to support the provision of foodstuff to the urban areas (Enríquez 1997, pp.58-59). The greater focus on the small-scale agricultural sector, moreover, came to include an aim of recampesinación (repeasantisation) as a counter movement to the increasing rural-

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22 For an analysis of the project Los Patios in Carazo see Enríquez (Enríquez, L. J. (1997)).
urban migration flows. Migration, principally to Managua, had been steadily increasing during the agro-export era and started accelerating after 1979. The reasons for the increased migration towards the city were primarily armed conflicts in the rural areas, and a rural-urban gap in terms of social services and living standards in favour of the urban areas (Enríquez 1997, p.67).

3.2.2 CONARCA – modernisation of the coffee sector

During the revolution against Somoza, agricultural export production had suffered considerably. Cotton had not been sown during the fighting, and most of the large cattle owners had either quickly slaughtered and sold their cattle or driven their herds to the neighbouring countries, Honduras and Costa Rica, from fear of expropriation or out of protest against the new regime. Of the three most important lines of agricultural export, the coffee sector was the only one left more or less intact. Coffee, thus, became the key export crop to support the national economy in the years after the revolution, contributing more than a third of the national export earnings in 1980.

The importance that was assigned to the coffee sector by the Sandinista government was reflected in a large-scale modernisation programme carried out between 1980 and 1984. To this end, the National Commission for Coffee Modernisation (CONARCA) was formed:

“Decree No. 286 stated that since “property should coincide with a social function ... for reasons of the (national) social interest ... a national commission (...) would have as its principal objective to carry out an emergency plan of renovation of coffee holdings within the quarantined area where the promotion of coffee and the eradication of coffee leaf rust (...) was taking place (La Gaceta, 1980)”.

(Rice 1990, p.61)

The objectives of the programme were, firstly, to control the coffee leaf rust disease, secondly, to increase coffee production to generate export earnings, thirdly, to compact the coffee growing area, and finally, to create jobs for the many rural workers in need of an income. The leaf rust disease had started spreading in Nicaraguan coffee plantations since the mid-1970s. Replanting of the coffee areas had already been proposed by Brazilian experts during the Somoza regime as a measure against the disease. However, it was not until the launching of CONARCA by the Sandinista government, that a strategy was put in action to this end.
Implementation was to be started in the department of Carazo with the replanting of 12,000 mz of coffee. During the lifetime of CONARCA 14,000-15,000 labourers were employed to carry out modernisation activities. The total cost was estimated at 57 mio. US$, which, considering the critical economic situation, indicates the high priority the coffee modernisation efforts were given by the Nicaraguan government (Rice 1990, p.65).

The idea of CONARCA was a radical modernisation, eliminating all the existing coffee plantations to replace them with new varieties managed with high-input technology. Instead of the dense canopy of shade trees covering the old coffee plantations coffee was to be grown exposed to the sun planted in broad alleys to permit the use of technical equipment and application of chemicals.

The target was to replant all coffee holdings in the department of Carazo of over 5 mz including the state and the cooperative coffee farms. However, with regard to the private sector several obstacles hindered smooth realisation of the plan. Firstly, it turned out that a large majority of the coffee producers had only very small plots, much less than the 5 mz minimum limit set by CONARCA. Often coffee growers had only a few hundred plants in their homegarden (patio), to supplement their mainly subsistence based household economies with some cash income. The farming technology foreseen by CONARCA had been designed for large-scale production units, and was not very well adapted to the small amounts of coffee grown by the local producers. On the other hand, leaving out the small coffee farms was considered a risk regarding the spreading of leaf rust. Faced with this problem, it was decided not to spend time and resources on trying to modernise the small-scale coffee plantations, but instead to make producers replace coffee with other cash crops, such as fruit to be sold on the local market (Rice 1990, p.63). In spite of the modernisation and substitution strategies in the study area many small-scale producers continued to grow coffee. Compared to the producers of the reformed sector, individual small-scale producers were not very actively included in the modernisation efforts.

Secondly, CONARCA was met by a great deal of scepticism by the middle and large private coffee growers that were to be included in the modernisation programme. Thus, already during the first information meetings, coffee growers were reported to have argued against the removal of the dense canopy of shade trees in the coffee areas, predicting that it would have a negative impact on the agro-ecological conditions of the region. Another factor that provoked many coffee producers was the rigid manner in which the modernisation efforts were implemented. If producers did not cooperate their plantations could be taken over
for a year or more and returned only when the replanting was completed. The cost of replanting that was to be born by the producers had been under-estimated to begin with, and the original price of 18,000 C$/mz soon was raised to 33,000 C$/mz. Moreover, during the elimination of the old shaded coffee plantations, large volumes of high value timber were extracted by CONARCA without compensating the producers (Rice 1990, pp.64-67).

In addition to the problems of implementation the concept of the CONARCA programme as such turned out to be problematic, and today it is widely recognised that CONARCA was a failure. The targeted production increases were not fulfilled and the local production conditions, ecology and microclimate suffered considerably from the clear felling of large areas of shaded coffee plantations. Nonetheless, the CONARCA programme had transformed a large part of the coffee sector in the region in accordance with the green revolution concept. The modernisation by CONARCA did not affect the three study villages equally. In Fátima, where there were various cooperatives that had been established on lands formerly belonging to the Somoza group, a thorough modernisation had been realised as a result of which practically all the cooperative coffee plantations were replanted. The majority of former cooperative members included in the sample of the study, the parceleros had worked in modernised coffee production. According to the zonification map of CONARCA, most of the San José area was not designated for replanting because it was considered marginal in terms of the size of production units. Thus, while large production units including the cooperatives and state farms were directly replanted by the programme, the majority of small producers were left out. Some of the large coffee producers in the community of San José chose to replant on their own initiative, although not participating in the CONARCA programme. The farms studied in San Juan de la Concepción, were mostly small-scale private farms and had not been included in the CONARCA programme.

Coffee production in the cooperatives was mostly based on collective labour arrangements, although to varying degrees, depending on the type of cooperative. Work was organised entirely collectively with wages paid to the members in the CAS, but less so in the CSM and CCS. In addition to cooperative production, cooperative members were often allowed to cultivate food grains for family consumption on a part of the cooperative land. In these cases, coffee cultivation would be carried out by the cooperative members, mostly male heads of household, but other family members participated in the production of food grains.
During the Sandinista government, production within the reformed and state sector was to a large extent centrally planned. Thus, the Ministry of Agricultural Development and Agrarian Reform (MIDINRA) made the overall production plans that were then executed by the extensionists and financed with credits provided by the state owned National Development Bank (BANADES). A complex state regulation mechanism was used to stimulate agricultural production in accordance with overall Government policies. The instruments included guaranteed producer prices, and the regulation of volumes and interest rates of credit that was given through the state banking system.

Credit for coffee production comprised 22 percent of the total credits given to the agricultural sector, peaking in the middle of the decade. Small and medium sized coffee producers received only around 25 % of the credit given, although they represented 40 % of total coffee production (Romero and Hansen 1992, p.97). However, because of the overall volume of credits this segment of the coffee sector also received more credit in the decade of the agrarian reform than they had ever before or would have in the years to come. In a situation of increasing inflation rates and falling producer prices in terms of real prices and bank’s real interest rates farm production started to depend more and more on the amount of credit offered rather than on productive capacity. The control of prices for agricultural input and machines contributed further to a transformation of the financial strategies of the agricultural production units (Romero and Hansen 1992, p.97).

In the reformed sector, the extensionists would attend a seminar arranged by the MIDINRA before the growing season started, where a delegate indicated the production plans and budgets for the year. In the case of coffee the planning principles were somewhat similar. However it was not MIDINRA that was responsible but the state owned company ‘Mauricio Duarte’. Mauricio Duarte thus managed the state coffee farms and gave technical assistance and credit to the cooperatives under the CONARCA programme. The coffee cooperatives also rented machinery from Mauricio Duarte (Int.Somarriba 2001).

Some cooperatives in the study villages had also received technical assistance through the service cooperative CORCO (La Cooperativa Regional de Caficultores de Oriente). The CORCO had come into existence as early as 1977 as a way of trying to compensate for the lack of service and credit offered to small and medium sized coffee producers. It was founded, on the recommendation of BANADES, by a group of around 70 private small-scale coffee producers with holdings of 5-15 mz.

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23 This does not include credit given to commercialisation enterprises, which received another substantial share of agricultural credits.
The CORCO was based in Masatepe and covered an area of 75 km² including, among others, the villages of Fátima and San José. In 1986, the number of members rose to 1,200 because agrarian reform beneficiaries with holdings of between 1-3 mz joined the CORCO. (Nitlapán 1992, p.56; Int.Quintero 2000). As a result of the large number of new members, frictions arose within CORCO. The private small-scale coffee producers who had founded the CORCO, were not very enthusiastic about the new members, the agrarian reform beneficiaries, who before 1979 had been farm workers on the big haciendas or other coffee farms, among them the founders of the CORCO themselves:

“Con la incorporación de los “nuevos socios” a la CORCO, los “viejos socios” argumentaron que aquellos no conocían de café, y que harían una mala recolección del grano que se mezclaría con el de ellos.”

(Nitlapán 1992, p.60)

It may be hypothesised that the tension between original members and agrarian reform beneficiaries, at least partly, had to do with the fact that more members would have to share the resources and services offered by the CORCO. However, the argument that the cooperative members lacked sufficient knowledge about coffee cultivation to produce good quality coffee as such is interesting in relation to the question about differences in the production strategies and practices of the two historical groups of small-scale producers raised in the research objectives. This question will be more thoroughly analysed in Chapter 7.

In the context of Nicaraguan coffee production the pair of terms technified (tecnificado) and traditional (tradicional) are the most widely used terms to characterise the farming systems, both among state and other institutions within the field and among the producers themselves. For instance, in the official reports of the Nicaraguan coffee growers association Unicafé, these terms are still commonly used, with the recently added category of organic production (Unicafé 1998).

The concepts of traditional, technified and semi-technified as an intermediate level were used in the carta tecnológica, the standardised recommendations developed by the Ministry of Agriculture in 1984. The objective of the classification of different technological levels was principally to create an instrument for the distribution of credit by the national development bank. The three categories were defined in

24 With the incorporation of the 'new members' to the CORCO the 'old members' argued that the former did not know about coffee, and that they would make a bad collection of the coffee beans that would be mixed with theirs.
terms of productivity, variety, plant density, and the use of agro-chemicals, although it should be added that the criteria were not always rigidly applied. Technified coffee production was defined as a yield of 22 qq/mz of coffee, more than 3,300 coffee plants/mz, a maximum of 25-30% shade coverage, a variety of low growth (e.g. Caturra or Catuai), and relatively high input levels of 18 qq/mz of fertilizer, 8.5 litres/mz of herbicides, 8 kg/mz of fungicides, and insecticides. Labour input was estimated around 88 MD/mz (excl. harvesting). Traditional coffee production in turn was characterised by yields of around 5 qq/mz. The plantation would have a density of 900-1000 coffee plants/mz of high growing varieties like Borbón or Typica, and a density of shade trees of 190 trees per mz. It was assumed that management practices would not involve the use of chemical fertilisers and minimal use of fungicides, and labour requirements were estimated at 21 MD/mz. Semi-technified production was defined at an intermediate level between the two i.e. yields of around 15 qq/mz, plant densities around 1,500-2,000 plants/mz, 10 qq/mz of fertilisers, 2.5 l/mz of herbicides, 2 kg/mz of fungicides, and some use of insecticides. The estimated labour requirements were 61 MD/mz. This classification was used to direct credit distribution and extension, which were oriented towards intensive production with high input levels:

“As concluye que la política de crédito fomentó un uso muy elevado de fertilizantes y plaguicidas (Hruska, 1990; Rice, 1990). Paralelo a esta política hubo otros instrumentos de políticas para subsidiar el uso de estos productos. Hubo una política activa para incidir en los precios relativos por ejemplo a través de las tasas de cambio múltiple, con tasas bajas para la importación de insumos. Los servicios de extensión fueron enfocados hacia un uso intesivo de químicos.”

(Clemens and Simán 1993, p.10)

As a rule, the planning and direction of cooperative production was carried out in a top-down manner. Thus, the extensionist from the state coffee enterprise would advise on application of chemicals on the basis of ‘recetas’, literally recipes, indicating the type and amount of fertiliser and pesticides to be applied. The extensionist would pass by twice a month, one of the former cooperative members said, once to supervise and once to assess the state of pest infection in the coffee (CaseStudy2 2000).

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25 It is concluded that the credit policy created high levels of fertiliser and pesticide use (Hruska, 1990; Rice, 1990). Parallel to this policy there were other political instruments to subsidise the use of these products. There was an active policy to regulate the relative prices, for instance through the multiple exchange rates, with low rates for the import of inputs. The extension services were focused on intensive use of chemicals.
As described above, the design of the coffee plantations had been determined by CONARCA, the concept being that of mono-culture with very limited use of trees as shade, except for a few species used as windbreaks. Several of the former cooperative farmers interviewed commented on the monoculture approach of the cooperative coffee farms. For instance, one of them, Alejandro, said that he had not agreed with the extensionists’ recommendations to concentrate on the single crop of coffee at all. For him it was important to have an alternative and not depend on one single product. In the cooperative, the extensionist had not allowed the growing of fruit trees and plantains in the coffee plantation, and according to Alejandro, in those times you had to obey the extensionist, or else you would not receive your credit. However, Alejandro had grown some citrus trees on the borders of the coffee plot along the path, a location that he now lamented, because of many incidents of theft of fruit from his trees. When technical assistance ceased to be offered in the beginning of the 1990s, Alejandro, like many of the other cooperative farmers interviewed, started to include trees in the coffee production system (CaseStudy2 2000). The considerations and strategies of the cooperative farmers regarding the combination of trees with coffee cultivation is a point I will return to in chapters 7 and 8.

3.3 Concluding remarks

Social transformation processes
The introduction and expansion of coffee in the 19th century set in motion important social transformation processes, the historical influence of which is reflected in contemporary agricultural structures in south-western Nicaragua. The introduction of coffee and the liberal policies accompanying the development of this export crop lead to privatisation of land and enclosure of the commons from the mid-1880s. The process of coffee expansion was mainly driven by larger landholders. In the course of this process and the associated intensified integration of the regional economy in the world market, however, a group of small-scale producers emerged who obtained individual plots of land, often even with formal land rights, and started to participate in coffee production. Historical studies of these transformation processes conclude that a peasantry came into being, the evolution of which was associated with social differentiation. Subsequent phases of land concentration entailed a historical tendency towards reduced farm sizes among small-scale producers and, for some, entire loss of their access to land.

During the decades of the Somoza dictatorship polarisation of the agricultural sector was further exacerbated. The progressive concentration of land and capital in the hands of the Somoza family resulted, on the one hand, in tensions between the Somoza family and other groups of the agricultural bourgeoisie and, on the other hand, lead to increasing marginalisation and impoverishment of large parts
of the rural and urban population. That more people did not lose access to land in the study region during this period was due to income supplements from seasonal wage labour and an emerging urban market that offered small-scale producers the possibility to generate additional incomes from the production of vegetables and fruit on their small farming plots. Moreover, migration to agricultural frontier areas to a certain extent functioned as a safety valve to the increasing pressure on the land. During the agro-export boom of the 1950-60s, economic growth could temporarily mask the growing tensions created by the predatory regime, but in the 1970s social pressure and growing discontent among the Nicaraguan population paved the way for the Sandinista revolution against the dictatorship. In spite of a long historical tendency towards land concentration in the agro-export sector, today a relatively large share of small producers participate in coffee production, consisting of both historically family-owned holdings and beneficiaries of the Sandinista agrarian reform, who regained access to land in the course of the 1980s.

Different models for understanding the outcome and meaning of these historical processes have been presented in the academic and political debate in the context of recent Nicaraguan history, bearing some resemblance to the different theoretical approaches to agrarian change outlined in Chapter 2. A clear political-economic position underlay the Sandinista agrarian reform. The orthodox political-economic view, as expressed by the Minister of Agriculture Jaime Wheelock, was that the emergence of coffee export production lead to a transition towards (dependent) capitalism, whereby the peasantry was expropriated and proletarianised. The formation of state and cooperative farms with wage earning farm workers was a logical answer to this perception of the rural poor at the time.

This position was later challenged both practically, by the craving for individual farming plots by landless and small producers towards the end of the 1980s, and theoretically by researchers such as for example Dore (Dore 1995), Charlip (Charlip 1999), Samper (Samper 1999; Samper 1999) and researchers from Nitlapán (Maldidier and Marchetti 1996). Opposed to the dualist perception of a differentiation of the rural population into a class of accumulating capitalist producers and a proletarianised mass an historical picture was presented of the emergence of a socially differentiated peasantry. Considerable numbers of these producers obtained access to individual land in the process of land privatisation and participated in export production of coffee. Even during the increasing polarisation of the agricultural sector during the first half of the 20th century, the production of coffee and other market-oriented activities related to emerging urban markets, often combined with temporary wage labour, permitted many small-scale producers to uphold their access to land and some to accumulate, albeit on a modest scale.
On the other hand, the theoretical position presented by Netting suggesting a constant social category of smallholders who, due to the comparative advantages of the family farm and local adaptation of their farming systems, were able to maintain access to land does not seem to be entirely supported either. The analyses of the social transformation processes in the study area from the introduction of coffee, through the agro-export period under the Somoza dictatorship and the Sandinista agrarian reform years show that small-scale coffee producers currently exist as a result of processes of social struggle, most clearly manifested in the Sandinista revolution and the agrarian reform. These processes of social struggle entailed, for many, gaining, losing and regaining access to land in a changing historical context in which economic conditions and political trends at local, national and international levels played a role. The concept of peasantisation and de-peasantisation in this respect was a useful way of framing the social change processes that small-scale coffee producers had undergone in the study region.

*Technological aspects of coffee expansion in the Meseta*

The expansion of coffee in the study region towards the end of the 19th century lead to a fixation of the local, semi-permanent agricultural systems, which was partly a result of the permanent nature of coffee cultivation and later increasingly became a consequence of the expansion of cultivated lands into fallow and forest areas. The production methods initially imported from the Caribbean were based on the plantation system worked by slave labour. The Caribbean model did not include the use of shade trees, but cultivation practices were gradually adapted to the different local conditions of the Central American coffee regions. This lead to the integration of different types of shade trees into the coffee plantations by planting them or by leaving some standing forest trees as shade for the coffee.

Later, the practice of inter-planting shade trees in the coffee plantations was partly replaced by modern production methods based on external inputs of fertiliser and pesticides. In Nicaragua, this change was introduced by a few large coffee producers from around the 1960s onwards and in the 1980s, in a more massive way, within the reformed sector under the modernisation programme CONARCA. The original strategy of the Sandinista agrarian reform was focused on large-scale production units, state farms and production cooperatives, and technological modernisation, especially in the export sector. The coffee modernisation programme CONARCA entailed radical elimination of the existing coffee plantations and shade trees and their substitution with technological packages of high yielding varieties and chemical inputs. Replanting and inputs were financed with credits from the national development bank and management decisions were taken in a top-down fashion through the extension system. Also among the group
of small-scale producers a certain use of chemicals started to take place as credit became more widely available, but quantities were much lower than in the state and cooperative farms and the host of small and medium sized coffee producers continued to maintain shade cover on their plantations.

In sum, it can be concluded at this point that changes in the production methods used for coffee in the study region cannot be characterised as a unilinear development from a so-called ‘traditional’ production system of shaded coffee to modernised, unshaded plantations. Rather, what seems to characterise the historical technological change processes is the adaptation of imported production methods to local natural and socio-economic conditions and the coexistence of different practices. Agricultural policies had some impact on the technological change processes in coffee growing in the study region, but had differing impact on different sub-sectors.
Chapter 4  De-collectivisation, deregulation, ...de-agrarianisation?

Chapter 4 deals with the period of political and economic restructuring in the years following the change to a liberal government in the 1990 elections. The chapter outlines some of the key changes in the economic, political and institutional conditions defining the broader context of the small-scale coffee producers in the study region. This includes the general conditions that historically private and parcelero producers were facing as well as the special circumstances characterising the transition of cooperative members to individual coffee producers. Moreover, some general economic and demographic tendencies are discussed regarding small-scale producers’ access to land, rural sector income and employment trends.

Among the changed economic and political conditions of production that small-scale coffee producers faced were reduced possibilities of obtaining credits, inputs and technical support as a consequence of the general deregulation of the Nicaraguan economy. While state-led modernisation had characterised coffee sector development in the 1980s, coffee sector institutions, such as the national extension services, withdrew in the 1990s. Both domestic markets and access to international markets were liberalised. Climatic variability has always been a risk factor for producers in the region. Fluctuating coffee prices became another important one after the breakdown of the international coffee price regulation mechanism in 1989.

By the end of the 1980s, the group of small-scale coffee producers who had been cooperative members had acquired individual plots of land but lost the strong state support in terms of credit, inputs and technical service that had been given to the reformed sector during the Sandinista government. In this sense they found themselves in a situation similar to the situation of the historically private small-scale producers. Debts inherited from the cooperative, the lack of infrastructure on the allotted farming plots and a modernised and specialised production system, however, were some of the features that distinguished the parceleros from the group of private producers. Thus, outlining the situation of the two groups of coffee producers included in the study, the present chapter provides the background to the analysis of their livelihood and production strategies in the following sections of the dissertation.

The chapter also discusses the demographic and social change processes going on in the study region. To this end, the concepts of re- and de-peasantisation and de-agrarianisation are drawn into the argument. From the available data it is concluded that the impact of the re-distribution of land under the agrarian reform stretched into the mid-1990s, although there was a tendency for reform
beneficiaries to sell out. This was mainly due to accumulated debts that turned into a serious problem for many agrarian reform beneficiaries when the financial system was privatised. It is suggested, however, that due to the characteristics of the cropping system, coffee producers were in a better position than food grain producers.

Employment and income data from Nicaragua show that rural households increasingly depended on off- and non-farm work as the afore-mentioned tendency towards land sales and fragmentation of holdings by inheritance lead to decreasing access to land for small-scale producers. Looking at the relative importance of agricultural and non-agricultural employment for the rural work force this could be taken as an indication of an ongoing de-agrarianisation process in Nicaragua. In absolute terms, however, the agricultural sector absorbed large numbers of rural workers during a period of considerable population growth from the 1970s to the 1990s. This chapter does not give a comprehensive discussion of de-agrarianisation, as some important aspects are more appropriately dealt with in the analysis of household livelihood and production strategies.

4.1 The dismantling of the agrarian reform (1990 –)

The agrarian reform of the Sandinista government meant a major change for many rural families in the Meseta region, where land scarcity and minifundio were – and still are – pronounced features. Before the revolution, demographic pressure on the land, fragmentation of land holdings and an increasingly unequal distribution of land had lead to an abundance of producers with very small plots, often only a patio of no more than a few hundred square metres.

The Sandinista agrarian reform entailed the redistribution of land to landless or near-landless rural workers. This redistribution of land implied a process of re-peasantisation of considerable segments of the Nicaraguan rural population, especially during the later years of the revolution when land was increasingly assigned as individual farming plots and later when cooperatives where split up among their members. The possibility of obtaining land, combined with supportive government policies with regard to credit, subsidised farming inputs and technical advice and favourable world market prices constituted an important pull effect towards coffee farming.

After years of contra war, economic crisis and US-trade embargo a broad coalition of mid-right parties (UNO) led by Violeta Chamorro, took over power from the Sandinistas in the elections of 1990. Hereafter, yet another drastic transformation of
the Nicaraguan agricultural sector was initiated. The political changes of the 1990s implied a dismantling of the agrarian reform including processes of de-collectivisation, privatisation and deregulation of production and markets. Adjustment measures, which had started to be implemented by the Sandinista government towards the end of the 1980s due to growing external and internal economic pressure, were followed by a package of much more serious structural adjustment policies during Chamorro’s tenure of office.

4.1.1 The land situation in post-revolutionary Nicaragua

The cooperative sector underwent a rapid process of individualisation in the course of the 1990s. Already by the middle of the decade, most of the farmland that had been collectively owned during the Sandinista regime had been given over to individual producers in one way or another (Nitlapán 1994, p.18). There were several reasons for the rapid disintegration of the cooperative sector. Probably most importantly the UNO Government declared that under the new regime individual claims for land titles would be granted within a period of five years, while the situation for legalisation of cooperative land titles was left open. Other factors that contributed to the breaking up of cooperatives were that the support programmes were stopped, which together with the access to land had been important motivating factors for cooperative participation. Furthermore, the unifying effect of the war and the war economy had disappeared, and dissatisfaction with the operation of the internal structures and leadership of the cooperatives influenced decisions to go for individual ownership of land (Int.Meyer 2000).

Privatisation of state property and de-collectivisation of cooperatives, however, implied a great deal of insecurity in terms of ownership rights. Problems arising from the (lack of) legal status of the land of cooperatives and individual beneficiaries were an additional threat to the livelihood security of these groups. Such farmers were already struggling to adjust to the new economic situation with liberalised markets and without the favourable credit systems and subsidies available during the Sandinista period.

To carry out the Sandinista agrarian reform, at least 2,523,181 mz (5,362 landholdings) had been acquired under the decrees of confiscation. Further, approximately 300,000 mz, which initially were intended to be temporarily occupied, had become de facto permanent occupancy over the years (Stanfield 1994, p.4). The expropriations and occupation of land that had taken place throughout the 1980s had, of course, been disputed by the former owners. The number of land conflicts, however, exploded after the UNO Government took over. Between 1990
and 1992 a number of violent confrontations arose when former owners started to evict the present occupants from ‘their’ land.

Shortly after having won the elections, the Chamorro government issued the decree No. 11-90, forming the basis for the National Commission for the Revision of Confiscations (CNRC). The mandate of the CNRC was to revise all property acquisitions that had taken place under the Sandinista government and to decide in which cases the land was to be returned to the former owners and the levels of compensations that were to be given. The principles to be followed in the revision process were, in brief, to return any landholding that had been obtained illegally by the state or had been illegally occupied by a third party, and to pay compensation for any confiscation of land carried out during the Sandinista agrarian reform, except those confiscated in accordance with the decrees providing the expropriation of the Somoza group’s properties (Stanfield 1994, p.7).

The revision process exposed serious insecurities. Thus, more than 70 % of the agricultural lands that had been taken over from private owners under the Sandinista government (about 3,750 holdings) was not officially recognised (Stanfield 1994, p.5). This is not necessarily to say that the transactions were not in conformity with the law existing at the time. Sometimes the land acquired had just not been formally registered as state property in the national Property Register. Consequently, in 1992, it was estimated that 40 % of Nicaraguan families were involved in situations of competing land claims and threatened by actual or potential conflicts arising from these (Stanfield 1994, p.5).

In the case of the splitting up of cooperative land, procedures of legalisation frequently were not able to keep up with de facto development. Thus, in a study of the de-collectivisation processes in the Department of Masaya, it was estimated that by 1996, 90 % of the families belonging to the cooperative sector managed their farming plots as individual production units, but still did so under a collective

26 Apart from the CNCR, the OOT (Oficina de Ordenamiento Territorial) and the OCI (Oficina para la Cuantificación de las Indemnizaciones) were among the national institutions involved in the revision process.

27 The process of sorting out property rights turned out to be rather complicated and slow, partly because the statute implied the revision of all cases of reallocation of land under the Sandinista government instead of limiting investigations to cases in which a legal claim had been made by former owners. The legal procedure followed by the CNRC has been criticised for this approach, and also for, so to speak, putting the onus of proof on the defendant. In recognition of the negative effects of the uncertain property situation on the national economy and the great number of individual landholders involved, a number of programmes have since been launched to complement government efforts to clarify property rights and solve land conflicts. The programmes are supported by a broad range of international institutions, comprising the World Bank, the European Union and the UNDP, foreign donors and national NGOs (Stanfield, J. D., M. Molina and R. Guevara (1994)).
property regime (Marín 1996, p.11). Such a situation can affect producers negatively in several ways. The lack of a legal title makes it difficult for the producer to obtain loans or sell her/his land. High rates of interest and low sale prices may be a consequence. Moreover, in cases where cooperative land was sold off it has been observed that deals were often made directly between the cooperative board and the buyer without consulting the ordinary members. Another commonly assumed consequence of tenure insecurity is that it affects producers’ motivation for long-term investments in their production system (Nitlapán 1994, p.18). As shall be discussed further below, however, this did not seem to be the case for the parcelero coffee producers in the study area.

However severe the problem of legal insecurity, it has been observed that the renewed tendencies towards land concentration were more often mediated through the market rather than the result of legal actions against beneficiaries of the agrarian reform or forced eviction of smallholders by former landowners (Nitlapán 1994, p.98; D'Exelle and Bastiaensen 2000, p.98).

4.1.2 The debt shock

The Nicaraguan cooperatives were seriously affected by the new set of principles ruling the economic game after the change of government in 1990. Subsidies were stopped and - while the state-owned bank in the 1980s had been rather relaxed about repayment of loans - repayment of all accumulated debts was now demanded. A process of rapid de-capitalisation followed, as many cooperatives had to sell off collective property, such as machines and part of the land, whereafter they distributed the remaining land to the members. In the worst cases, debts kept accumulating until the cooperative was forced to sell their entire land.

A problem related to the transition process from cooperative to individual tenure and management of farming plots was that loans originally raised by the cooperatives were not paid back. Part of the explanation is that many small producers were under heavy economic pressure and just did not have the money to pay back loans. Another reason why individual producers were reluctant to pay back their share of the collective debt, even if they had the resources to do so, was that they either did not feel personally responsible for the debt of the cooperative, or that they feared that as long as everybody did not pay their share the mortgage would not be cancelled anyway. This meant that the land taken over by the parceleros often remained heavily mortgaged, which made it difficult for them to raise new loans (Nitlapán 1994, p.20).
De-collectivisation, deregulation, ... de-agrarianisation?

Debt haunting farm families from their time in a cooperative and the behaviour of producers used to the favourable conditions for obtaining loans under the previous government, thus, resulted in a debt squeeze. As land started to be required as collateral for loans the situation for many parceleros ultimately resulted in the loss of their land. The problem of debt was further accentuated by the sudden rise of the price of agricultural inputs when subsidies were stopped and prices rose, due to less import-friendly foreign exchange rates.

4.1.3 From re-peasantisation to de-peasantisation?

At the time of the study, the dismantling of the land reform was an on-going process. According to Nitlapán, by 1994 about 14 % of the land belonging to the reformed sector had been sold (Nitlapán 1994, p.17). Similar changes in land distribution were found in the study by Stanfield:
Table 4.1 Land tenure in Nicaragua 1978-1994

<table>
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<tr>
<td></td>
<td>Area (mz)</td>
<td>%</td>
<td>Area (mz)</td>
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<tr>
<td>Private:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- &gt; 500 mz</td>
<td>8,073,000</td>
<td>100.0</td>
<td>4,398,090</td>
<td>54.4</td>
<td>5,576,722</td>
<td>69.8</td>
</tr>
<tr>
<td>- 200-500 mz</td>
<td>2,920,000</td>
<td>36.2</td>
<td>524,745</td>
<td>6.5</td>
<td>750,511</td>
<td>10.5</td>
</tr>
<tr>
<td>- 50-200 mz</td>
<td>1,311,000</td>
<td>16.2</td>
<td>925,507</td>
<td>11.4</td>
<td>1,412,077</td>
<td>17.4</td>
</tr>
<tr>
<td>- 10-50 mz</td>
<td>2,431,000</td>
<td>30.1</td>
<td>1,701,591</td>
<td>21.0</td>
<td>2,129,917</td>
<td>26.0</td>
</tr>
<tr>
<td>- &lt; 10 mz</td>
<td>170,000</td>
<td>2.1</td>
<td>137,404</td>
<td>1.7</td>
<td>137,404</td>
<td>1.7</td>
</tr>
<tr>
<td>Reformed:</td>
<td>-</td>
<td>-</td>
<td>3,674,910</td>
<td>45.6</td>
<td>2,496,278</td>
<td>30.7</td>
</tr>
<tr>
<td>- companies</td>
<td>-</td>
<td>-</td>
<td>755,000</td>
<td>9.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- cooperatives</td>
<td>-</td>
<td>-</td>
<td>895,000</td>
<td>11.0</td>
<td>662,997</td>
<td>8.2</td>
</tr>
<tr>
<td>- individuals (/squat.)</td>
<td>-</td>
<td>-</td>
<td>1,459,996</td>
<td>18.0</td>
<td>1,104,441</td>
<td>13.6</td>
</tr>
<tr>
<td>- indiv. Communities</td>
<td>-</td>
<td>-</td>
<td>170,914</td>
<td>2.1</td>
<td>170,914</td>
<td>2.1</td>
</tr>
<tr>
<td>- individuals</td>
<td>-</td>
<td>-</td>
<td>425,000</td>
<td>5.2</td>
<td>255,000</td>
<td>3.1</td>
</tr>
<tr>
<td>- private beneficiaries</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>302,926</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Source: (Stanfield 1994, Anexo p.1)

It can be seen from the table that the share of private farms of more than 500 mz was reduced from 36% to just above 6% of total agricultural land as a result of the agrarian reform in the 1980s. Although the percentage had risen again after 1990, in 1994, at 10.5%, the share of very large farms was still considerably lower than before the revolution. Moreover, it is probable that the privatisation of the state farms in the hands of the ATP contributed to the increase of land in large production units between 1990 and 1994. The second and third category in terms of farm size showed similar tendencies, with a reduction of their share in the 1980s and increasing importance in the first half of the 1990s. The share of land of small and medium sized private farms did not change remarkably during the same period.

Maybe most importantly it can be observed that in 1994, a third of agricultural land was still in the hands of agrarian reform beneficiaries i.e. producers who generally had not had access to farmland before the revolution. Although the changes between 1990 and 1994 may not seem that impressive in absolute numbers, however, the question is whether the changes are to be interpreted as a phase of restructuring limited in time or whether they are the expression of a trend towards renewed concentration of land on the one hand and on the other, the dispossession of the agrarian reform beneficiaries. Up through the 1990s, the process of re-
peasantisation seemed to be reversing, but recent regional or national level data on land distribution were unfortunately not available at the time of the study.

Land transactions in the study area

In order to get an impression of the situation of the cooperatives in the study area a former cooperative leader in Fátima was interviewed. According to his information, about a third of the members of the five CCS cooperatives in the area had sold their parcels by the year 2000. The two CAP existing in Fátima were still complete, which may have to do with their organisational structure, with collective ownership, and with the legal situation of the property, which did not allow for individual land transactions (Int.Mejía 2001).

As has been described above, in many cases accumulated debt was the reason for selling parcels received through the agrarian reform, or parts of them. During the study, various examples of this were encountered. One was a parcelero from San José, who had been overwhelmed by his debts, partly taken on from the cooperative and partly more recent personal debts, and forced to sell out. In an interview some months after he had sold his farm he told me that he was now working as a paid labourer on coffee farms in northern Nicaragua. He was earning extra money by organising groups of labourers from the village who would go by truckloads to a hacienda in the north with which he had an agreement. His contacts from the cooperative served as the basis for the groups he organised (Int.Canda 2000).

In the study area of Masaya and Carazo different situations of land transactions were observed. As mentioned above, debt was among the most frequent reasons for parceleros’ selling their land. Cases of land transfers to outsiders, among them urban-based Nicaraguans or foreigners, were common in the study area. The relative proximity to the expanding capital city and the good properties of the land for coffee growing and horticulture made land in the area attractive to investors and had driven up land prices considerably during the 1990s. Apart from the push effect presented by debts, the rise in land prices for some parceleros functioned as a pull effect towards selling their land.

But not only outsiders bought up land from the indebted parceleros. Local producers accumulating on a small scale also bought land from other members of the communities. One example was encountered in the case of Andrés, a near landless coffee producer from San José, who had bought a farming plot from an indebted parcelero producer. Andrés related how the parcelero who sold him the

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28 Cooperativa Agropecuaria Productiva, collectively managed cooperative form formerly known as CAS.
land was one of a group of neighbours who were in a very precarious situation. They were all food grain producers and had taken up loans to buy inputs the previous year. In order to obtain the loan they had had to give their land as collateral and since hurricane Mitch destroyed their entire investment, they were in great danger of losing their plots. In view of this situation, Andrés was considering expanding his property by buying the adjacent plot. Only one of the neighbouring parceleros had been able to survive, because he cultivated coffee on a part of his land and therefore had been able to survive the season (CaseStudy3 2000).

**Structural causes or contingencies**

Discussing the orthodox political economic perspective that assumes that the expropriation of peasants is a consequence of an expanding modern, capitalist sector Jansen in his study of social processes in Honduran small-scale agriculture states that:

“The direct causes of dispossession of the means of production are generally not a function of the development of a modern sector. When people describe the loss of the means of production they refer to personal dramas and contingent processes.”

(Jansen 1998, p.140)

That individual crises or conflicts were often the direct cause of the loss of producers’ access to land was supported by the case studies, where the majority recounted that their family had owned land in the past, but how they had lost it due to contingent problems, legal conflicts, or because they did not get their share of an inheritance. This, however, does not necessarily mean that structural dynamics are unimportant for small-scale producers’ loss of their access to land. The phrasing ‘direct causes’, thus, points towards the existence of the antonym of *indirect* causes. As Netting rightly observes (Netting 1993, p.230), dispossession is not necessarily a situation of ‘exploitative capitalists and predatory politicians’ expanding into the agricultural holdings of peasant communities (although this was definitely going on in Nicaragua at the time of the study). However, the structural dynamics of *capitalism* at work in the historical social processes of agrarian change may well influence the changes in land distribution and possession.

Andrés, who was mentioned in the example above, although obviously employing a strategy of accumulation, did not represent large-scale, capitalist production interests. Capital accumulation in his case took place on a small scale, based on family labour and a diversified livelihood strategy. The case could probably be interpreted as an example of the outcome of nickel-and-dime capitalism as Jansen has characterised the processes leading to intra-community social differentiation.
As the *parcelero* producer who sold his plot to Andrés was not included in the study sample, the more specific circumstances of the household were not known. It can be said, however, that their situation was also strongly influenced by wider structural conditions, such as the political economic changes in the Nicaraguan agricultural sector after 1990 that had made credit under market conditions a risky business for small-scale producers, and to which the climatic shock effect of a hurricane added the decisive momentum forcing them to sell their land.

The conclusion that the case studies appear to indicate is that although the direct causes of dispossession are often due to contingencies either personal (death, illness, family or legal conflicts, etc.) or, as in the mentioned examples, a natural disaster, the state of vulnerability of a household before the decisive event conditions the outcome. It is therefore relevant to look at the *indirect* causes of dispossession, including the conditions leading to vulnerability of the household. The example of the food grain growing *parceleros*, who had been forced to sell their land as a consequence of the losses experienced during hurricane Mitch shows how vulnerability, in this case brought about by indebtedness, for some households involved the loss of access to the means of production, while others succeeded in struggling on.

As has been documented in other studies, the tendency to sell their farmland was generally more pronounced among *parceleros* than among historically private producers (Nitlapán 1994, pp.10-11; Stanfield 1994, p.30; Broegaard 2000, p.134). Moreover, the interview data indicated that *parceleros* who had received land planted with coffee were somewhat less prone to selling out than those cultivating annual crops. This can be explained by the fact that coffee generally speaking gave higher revenues and that coffee, once established, does not require investment for replanting every year. Coffee is more resistant to erratic or deficient management in terms of inputs, and less risk prone in such climatic adversities as hurricane Mitch.

Although a general process of concentration of land was obviously going on in Nicaragua and many agrarian reform beneficiaries and other smallholders were losing access to land, at the end of the 1990s, the large majority of coffee producers still consisted of small and medium scale producers.
Having outlined some of the aspects of perennial cropping systems with coffee that contribute to making small-scale producers’ economy more robust, it should be mentioned that these production systems were, of course, also prone to variability in external conditions, natural as well as market related. In the growing season 2001/2002, international coffee prices reached an historically low level and, at the time of writing, the Nicaraguan coffee sector was in deep crisis. Whether the crisis will continue and what its impact on different groups of Nicaraguan coffee producers will be in the future lies beyond the scope of the present study. The analysis in Chapter 7 of the ways in which small-scale producers have responded to fluctuating coffee prices and other factors of uncertainty, however, may offer some perspectives on the discussion of risk.

### 4.2 Agricultural policies, markets and coffee producers in the 1990s

#### 4.2.1 New credit policies

Because of the national economic crisis, towards the end of the 1980s the Sandinista government had to start taking some severe adjustment measures in order to rescue the Nicaraguan economy. With the change of Government this process was reinforced with, among others, the privatisation of the banking system and a liberalisation of interest rates, which rose to 21 % already by 1992. The volume of credit was reduced drastically. Between 1991 and 1992, credits given to coffee production fell by 72 %. The reduction had a notably skewed effect. Thus, small and medium scale producers were left with a share of less than a fifth of the total credit volume. The uneven distribution of credits at least partly reflects the fact that large-scale export-import companies were considered safer clients by the banks (Romero and Hansen 1992, 98-99).
The new credit situation gave the agro-export companies an advantageous position. Presenting one of few alternatives for credit meant increased bargaining power vis-à-vis the coffee producers. This, among other factors, lead to binding arrangements obliging the producers to sell to the company that had supplied credit and a re-emergence of the practice of the so-called venta de futuro. Both of these modes implied a tendency to reduced producer prices compared to international price levels (Romero and Hansen 1992, p.102).

4.2.2 Coffee price development and climatic effects

Within the same period during which major political and economic re-structuring were taking place in Nicaragua, international coffee prices started to fluctuate drastically on top of a general downward trend. This was partly a result of the breakdown of the international price agreements under the International Coffee Organisation (ICO) between 1989 and 1994 (Ponte 2001, pp.5-6). For the small coffee producers of Nicaragua the resulting loss in this period was estimated to be a third of previous income levels (Romero and Hansen 1992, p.17 and p.117).
At the beginning of the 1990s the parceleros found themselves in a situation where they not only had to learn to produce under liberalised market conditions, but also had to do so in the face of multiple adversities. Besides fluctuating coffee prices at the beginning of the 1990s, the Nicaraguan coffee producers were affected by a series of natural shock effects and phenomena, some of which took place just when prices had gone up again around 1997. Among the adverse natural effects were El Niño, acid rain due to forest fires in Central America and hurricane Mitch in 1998. Production losses were considerable. For instance, Unicafé estimated that in the Pacific region between 27 % and 100 % of the coffee harvest was lost in the season 1998/99 due to the El Niño phenomenon, and that farms in Carazo and the Mombacho area had been affected most severely (Bolaños 1999, p.15).

4.2.3 Support institutions

As if these external constraints were not enough, after the change of Government the parceleros were also more or less abandoned by the organisational structures that had previously supported the cooperatives. Thus, after 1990 the agricultural workers’ union, ATC, confined itself to the management of those former state farms that had been transferred to their ownership, while the national farmers’ union, UNAG, concentrated its efforts on middle and large producers (Int.Meyer 2000).

The new conditions also meant a drastic change for the national coffee growers’ association Unicafé, who had had a central role in technical assistance, training and
research within the coffee sector during the agrarian reform period under the former name of Concafé. While the organisation had previously relied on state support, with the privatisation policies from 1990 onward it started to depend more on member contributions. Among the consequences of privatisation were that the financial basis of the organisation became very critical and that it became necessary to refocus the services offered, matching them to the needs of paying clients. This meant that servicing of small-scale producers had to take new forms, if it was continued at all. One attempt, according to the Unicafé extensionist responsible for the San José area, was to work more with larger groups of producers than with individual extension service. In their characterisation of the new focus of Unicafé, determinants of financial constraint merged with the discourse of participation in development. In recent years externally funded projects have become another important economic source. Thus, donors such as US-AID, the Inter-American Development Bank and DANIDA, were financing extension work carried out by Unicafé, mainly with emphasis on small-scale producers and components of reforestation (DANIDA 1999; Int.Gonzáles 2000; Int.Somarriba 2001).

4.2.4 Traditional models for the next century?

In Nicaragua, as in many other places, a host of NGOs and development projects partly filled the void after the state and para-statal institutions that had dominated the agricultural scene during the 1980s. In contrast to the prevalent modernisation-oriented approach to coffee sector development in the decade of the agrarian reform, the notions of sustainable agriculture and environmentally friendly production were starting to gain importance (Int.Gonzáles 2000; LaPrensa 2000). This trend was also apparent at the local level, where NGOs and projects active in San José and Fátima were either explicitly directed towards, or at least had a component concerned with, sustainable agricultural methods (Int.Tapia 2000). The discourse of sustainability also influenced the rhetoric and orientation of the national institutions within the coffee sector. For instance, the multi-strata coffee agroforestry system practised in the country for over a hundred years was reinvented as the ‘model of coffee cultivation for the next century’ (‘Modelo de caficultura del próximo siglo’):

“Este modelo de Caficultura, se concibe como contemporáneo, sostenible, sustentable y competitivo, eje de la economía nacional y que el aumento de la producción de materia primas (grano verde) pueda satisfacer las necesidades del
mercado, la producción de divisas para el país, la generación de empleo y el mejoramiento de las condiciones ambientales.”29

Iironically, while the ‘traditional’ coffee production systems were re-labelled and declared ‘contemporary’ and ‘sustainable’ in the discourse of the managers of national organisations, among producers, extensionists and administrators at the local level the existing ‘traditional’ low-input coffee agroforestry systems were still widely perceived as outdated and ‘technified’ production methods regarded as desirable.30

4.2.5 Parceleros at a disadvantage?

In the literature on recent historical developments within the Nicaraguan coffee sector it is widely held that the parceleros had a disadvantageous starting position in the post-revolutionary situation compared to the historic family owned small-scale coffee producers in several aspects: often they were indebted, caught in insecure tenure situations, lacked infrastructure on their individual plots (houses, water, electricity), etc. Moreover, they were left with a technified coffee system but without the financial and technological support they had been used to in the cooperatives.

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29 This model of coffee cultivation is conceived as the contemporary, sustainable and competitive, the axis of the national economy (based on the idea that) an increase in the production of raw material (green beans) may satisfy the necessities of the market, the creation of foreign currency for the country, the generation of employment and the improvement of environmental conditions.

30 Several times during the initial interview round, it happened that farmers wonderingly asked me why I wanted to see their coffee farm. Their production was traditional, if I wanted to learn about coffee production, why didn’t I rather go and look at the two large coffee producers in San José who had a modern (tecnificado) farming system?
“Por su historia recente, y la fuerte intervención estatal que prevaleció tanto en su nacimiento como en su desarrollo, tienen rasgos que los diferencian del conjunto de los campesinos históricos o tradicionales (...). Son distintos en las formas de producción, de organización, de comercialización, en sus niveles de capitalización, que estuvieron vinculadas a los planes estatales de inversión y de planificación regional de la producción, el acopio, y la transformación tecnológica.”

(Maldidier and Marchetti 1996, p.149)

Apart from the obvious tangible differences such as farm infrastructure or access to credit, it has been argued that the parceleros were badly prepared for the 1990s in terms of other, more personal, aspects related to the producer, to do with knowledge, attitude and management skills. For instance it has been argued that the parceleros had, so to speak, been alienated from traditional farming methods during their time in the cooperatives (Int.Meyer 2000). The lack of knowledge of traditional coffee-agroforestry practices for successful farm management under the new conditions is indicated in the following quotation, holding that the cooperative farmers had ‘forgotten’ the traditional production techniques:

“(…) Las cooperativas llegaron a esta hora de cambio afectadas, además por problemas legales sobre la propiedad de la tierra que generan gran inseguridad a los campesinos, y sobre todo, habiendo olvidado las técnicas de producción campesina, única alternativa apropiada a los paquetes tecnológicos importados a que los acostumbró el modelo sandinista.”

(Marin 1996, p.11)

The historical individual coffee producers were, of course, also affected by the new political and economic situation after 1990, but it can be argued that, for several reasons, the changes did not affect them to the same extent and were not felt as abruptly. Among other reasons they did not experience the same change of organisational and property regime that the parceleros had. They had already established individual production systems and, because they had not depended on

31 Because of their recent history and the strong state intervention that prevailed in their origins as well as their development they have features that distinguish them from all other historical and traditional peasants (...). They are different in their forms of production, their organisation, marketing, in their levels of capitalisation, that were linked to the state investment plans and the regional planning of production, storage and technological transformation.

32 (...) The cooperative farmers who arrived at this time of change were affected, [experiencing] legal problems of land property that created great insecurity for the peasants, and above all, having forgotten the peasant techniques of production, the only appropriate alternative to the imported technological packages they had been accustomed to in the Sandinista model.”
state support to the same degree, were better prepared to respond to the conditions of the free market, relying on their own resources. The typical characteristics of the historical family farmers used to acting as individual producers with diversified, low-input production systems have been viewed as an important precondition for their capacity to adapt to the changed conditions after 1990. On this grounds, various sources argue that historical or traditional family farms should be a model for the parcelero producers (Maldidier and Marchetti 1996, p.3; D’Exelle and Bastiaensen 2000 p.109; Int.Meyer 2000). How the coffee producing parceleros in the study area had been able to adapt their livelihood and production strategies to the post-reform conditions forms part of the analysis in the following chapters.

4.3 Towards de-agrarianisation?

The Nicaraguan population almost doubled within two decades, from an estimated 2.1 million in 1970 to 4.1 million in 1995 (UNDP 1998). The annual growth rate at the time of the study was 2.4 % (UNDP 2001). This demographic development has contributed to a growing pressure on the land and to an increase of the share of the population seeking employment outside the agricultural sector. Unemployment figures for Nicaragua are somewhat uncertain, varying between an officially registered percentage of 12 % and estimates of real unemployment closer to 40 % (DANIDA 2002). It was evident, however, that economic development in other sectors had hitherto offered only limited employment possibilities to the rural population. The industrial sector, thus, was relatively poorly developed, representing only 22 % of the national economy compared to 34 % for the agricultural sector and 44 % for the service sector (DANIDA 1998, p.29).

During the field studies it could be observed that fragmentation of the small farming units in the study area was a pronounced tendency, as the dominant trend was to divide the land among children at inheritance. Up to the time of the study, the trend towards fragmentation was obvious especially in the group of historically family owned farms. This trend was not as pronounced among the former cooperative members, because individual property rights had existed within the reformed sector for less than generation. Because of the fragmentation of land holdings, people increasingly had to seek other ways of making a living, as farm labourers or outside the agricultural sector, because the holdings could not support several sons’ and daughters’ families. In a growing number of cases the result was that agriculture was no longer a viable livelihood option, because all the family land was divided and taken up by the houses of the family members, leaving at best a patio with small-scale crop and animal production for household consumption.
An analysis of rural non-farm incomes in Nicaragua by Corral and Reardon (Corral and Reardon 2001) supplied interesting background information for the study of rural livelihood strategies in Carazo and Masaya. The research by Corral and Reardon was based on nationally representative data from the second Living Standard Measurement Study carried out in 1998 with the support of national and various international agencies. Among the main findings were that rural non-farm income was of great importance in Nicaragua, making up as much as 41% of rural household incomes. The average percentages were highest in the Department of Managua and the rest of the densely populated pacific region, within which the study villages were located. At the national level, rural non-farm income was found to be more important for rural households than income from farm-wage labour. Moreover, it was found that wage employment was more important than self-employment, such as small enterprise, and three quarters of wage labour took place within the service sector (Corral and Reardon 2001, p.427).

As to the socio-economic determinants of participation in rural non-farm work Corral and Reardon concluded that education, road access, and access to water and electricity were important and that non-farm activities were concentrated in the upper income quartile of the rural population. This indicates that high entry barriers and capital requirements prevented poor households from engaging in non-farm economic activities (Corral and Reardon 2001, p.427).

The growing importance of non-agricultural work indicated in the data on rural incomes was also encountered in the employment statistics. Thus, in the Department of Masaya only 42% of the economically active rural population worked within agriculture according to the census of 1995 (OIM 1999, p.20). In the country as a whole there was also a trend towards a decrease in the relative number of people working in the agricultural sector, though to a somewhat lesser extent than in Masaya:
Table 4.3 Rural Workforce by Sectors, Nicaragua

<table>
<thead>
<tr>
<th>(1000 and %)</th>
<th>1971</th>
<th>%</th>
<th>1995</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural work force (RWF):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- male</td>
<td>260.7</td>
<td>100</td>
<td>542.6</td>
<td>100.0</td>
</tr>
<tr>
<td>- female</td>
<td>236.1</td>
<td>90.6</td>
<td>461.2</td>
<td>85.0</td>
</tr>
<tr>
<td>RWF, agricultural:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- male</td>
<td>209.7</td>
<td>80.4</td>
<td>415.2</td>
<td>76.5</td>
</tr>
<tr>
<td>- female</td>
<td>201.8</td>
<td>77.4</td>
<td>391.9</td>
<td>72.2</td>
</tr>
<tr>
<td>RWF, non agricultural:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- male</td>
<td>51.0</td>
<td>19.6</td>
<td>127.4</td>
<td>23.5</td>
</tr>
<tr>
<td>- female</td>
<td>34.3</td>
<td>13.1</td>
<td>69.3</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Source: OIM (OIM 1999, p.42), based on official census data of 1971 and 1995

The table shows that, although still considerable - with more than three quarters of the rural work force - the percentage of the rural population working in agriculture decreased by about 4 % between 1971 and 1995, while non-agricultural occupation increased accordingly. However, in the same period the total rural work force had more than doubled, as had the number of people employed in the agricultural sector in absolute terms, from 209,700 in 1971 to 415,200 in 1995. It may be remarked that women's (official) share of the work force had increased considerably, most markedly in the non-agricultural sectors.

The fact that non-agricultural income sources had greater weight in the income data than in the employment statistics may be explained by the fact that revenues in general were higher in the type of activities outside agriculture.

But what can these figures tell us regarding the relevance of the concept of de-agrarisation to explain the change tendencies related to employment and income in the study region? Both the income statistics and the change in the shares of the rural workforce engaged in the agricultural and non-agricultural sectors show a relative tendency towards non-agricultural occupation. However, at the same time, the absolute number of people working in the agricultural sector had increased considerably. Moreover, the aggregate data do not tell us if the tendency towards increased non-agricultural employment and incomes means that an increasing number of entire households depended on non-agricultural incomes or if more individuals contributed to agriculturally based households with non-agricultural incomes. Nor do the national and regional level statistics indicate whether non-agricultural employment was permanent or whether jobs outside agriculture were temporary or supplementary to farm income. In the following chapters these questions will be taken up in the analysis of coffee producer households’ livelihood strategies. This includes an investigation of the income
composition of the households, the way family labour and other assets were employed in the livelihood strategies of the coffee producer households and a study of the dynamics that had lead to changes in livelihood strategies over time.

### 4.4 Concluding remarks

During the decade following the change of government in 1990, small-scale coffee producers in Nicaragua faced a number of challenges. The political shift towards rapid and thorough liberalisation of the agricultural sector and privatisation of the state banks left smallholders with limited access to finance, inputs and technical assistance. Moreover, increased fluctuations in international coffee prices and climatic adversities affected revenues considerably. Apart from these general changes, the agrarian reform beneficiaries, who had been organised in cooperatives and other collective production units, experienced a radical change in their situation when the reformed sector dissolved.

The *parceleros* came out of the agrarian reform of the 1980s with land, but with different conditions than the historically private producers in several aspects. Debts inherited from the cooperative time, a contested land tenure situation and a lack of farm infrastructure were among the constraints faced by many *parceleros*. Moreover, the *parceleros* experienced a harsher shift from a heavily state subsidised production system based on modern technology, with easy access to credit and technical assistance, to a situation without these privileges. The *parceleros* were, thus, left with farmland planted with coffee in the monocultural design of CONARCA, but without the means to continue the technified production methods they had been used to.

The small historically private coffee farms, in contrast, had generally continued to be managed as diverse agroforestry systems and with lower input levels, although access to chemicals and credits was also easier for this group during the 1980s than it was at the time of the study. The impact of the restructuration of the agricultural sector and the new liberal policies in the 1990s were thus not felt to the same degree by the historically private producers as by the *parceleros*. Apart from the tangible differences between small historical coffee producers and the *parceleros*, such as farm infrastructure, design of the coffee plantation *etc.* it was held by some researchers and NGOs within the field that the *parceleros*, due to their experience of working in the cooperative sector, were at a disadvantage compared to the family producers in terms of knowledge of traditional farming methods, managerial skills and attitudes.
It has been one of the aims of the analysis in the following chapters to investigate how such historical differences were articulated in the context of coffee production in San José, Fátima and San Juan de la Concepción. Against the background of the processes of historical change outlined above, the analysis in the following chapters deals, *inter alia*, with the question of how the two groups of small-scale coffee producers, historical family producers and *parceleros*, had adapted to the changed conditions of the post-reform context. Could the differences between the two groups’ production systems and practices be traced at the end of the 1990s? Thus the analysis takes up some of the questions and conclusions pointed to in the literature on smallholders in the Nicaraguan agricultural sector, aiming to contribute with insights into the situation 10 years after the revolution, in the specific case of coffee production in Carazo and Masaya.

Two distinct dynamics lead towards decreasing access to land for different groups of small-scale producers. One was the fragmentation of family farms when handed over from one generation to the next, within the decade following the agrarian reform primarily encountered in the group of historically private farms. The other was the selling of land by agrarian reform beneficiaries due to difficulties faced in the transition from cooperative members to individual producers. Among those *parceleros* who had given up their land, debts were the most common reason, but often in combination with another acute reason, as for instance the impact of the hurricane. For those who had had to sell off their entire farmland the consequence would typically be to seek for a livelihood as wage labourer. For those who were left with small and sub-subsistence plots of land it had, in many cases, become necessary to seek additional income sources.

Whereas earlier generations of poorer rural dwellers tended to seek off-farm work within the agricultural sector, in the 1990s there was a tendency towards increasing employment in non-farm and urban sectors. This is not to say that the agricultural sector employed less people than before, but rather has to do with the fact that the work force had increased considerably within the past decades. Income data showed that rural households depended increasingly on off- and non-farm employment. Especially non-farm employment appeared to have gained importance in rural households income, but, as national level studies concluded, access to better paid employment of this kind was restricted by entry barriers *inter alia* in terms of education and capital availability.

The shift in the relative importance of agricultural employment vs. that of non-agricultural work could be interpreted as an indication of de-agrarianisation. However, as discussed in Chapter 2, de-agrarianisation is understood as a complex process, and the data presented in this chapter are not sufficient to draw a general conclusion in this regard. Other important aspects for the discussion of de-
agrarianisation are investigated in the following chapters, among others the question of the role that off- and non-farm work played vis-à-vis farming in the livelihood strategies of coffee producer households and how they themselves perceived this.
Chapter 5  Livelihood strategies of the Carazo and Masaya coffee producer households

Chapter 5 has three major purposes. One is to give a brief introduction to the study area and a characterisation of the coffee producer households of the sample. Secondly, the chapter initiates the analysis of how the producer households of the study responded to the changes that had taken place in their economic, political and institutional environment in the course of the 1990s. Livelihood diversification and de-agrarianisation are two of the key concepts used in the discussion of the ongoing processes of change. Finally, the analysis of the producer households’ livelihood strategies and their changes, the chapter prepares for the analysis in the following chapters of social differentiation and the dynamics between changes in livelihood strategies and production strategies.

The preceding chapters showed how, through the redistribution of land and a relatively supportive policy environment for small-scale producers, the agrarian reform had promoted re-peasantisation of segments of the Nicaraguan rural population. The restructuring of the Nicaraguan agricultural sector - de-collectivisation of the reformed sector; privatisation of banks and service institutions; de-regulation of the economy and fluctuating international coffee prices during the 1990s changed the conditions for small-scale coffee producers considerably from the previous decade. Meanwhile, at the regional level, population growth and the pressure on the land were increasing. On the one hand, this was accompanied by reduced landholdings among small-scale producers and the sale of land in the cooperative sector. On the other hand, growing population densities and urbanisation in Carazo, Masaya and Managua entailed a greater demand for agricultural products and thereby offered market and other income opportunities for producers in the study area.

Based on the observations of the increased engagement in non-agricultural employment that among the rural population, the question was posed in the previous chapter as to whether this trend indicated an on-going de-agrarianisation process. In the present chapter an analysis of the dynamics expressed in the tendencies of livelihood diversification is carried out with a discussion of the implications as seen from the perspective of the household. The change processes going on at the household level are investigated by studying the livelihood strategies of coffee producer households in three selected villages in Carazo and Masaya. The chapter looks at the assets available to the producer households, among others access to land, family labour and cash, and how these assets are employed in their livelihood strategies. This includes household members’
engagement in off- and non-farm economic activities and other ways to access cash, 
_inter alia_ credit and remittances from migrating family members. The analysis also 
includes a discussion of the considerations and visions that influence households’ 
decision-making on the use of their labour and resources, and the importance of 
_intra_-household relations, gender and generational differences.

Among the findings of the chapter are that the interviewed respondents had a 
strong social identification as producers and invested in their coffee production 
systems as far as possible with the limited capital available to many of them. In the 
1980s, during the Sandinista agrarian reform, credit had been easily accessible, also 
to small-scale producers. Since the state bank was privatised, however, this source 
of capital had become very limited and expensive. As a consequence, the relative 
importance of off- and non-farm employment grew as a means to generate capital.

Due to the limited employment opportunities and low wages in Nicaragua, people 
engaged in many different kinds of jobs, including casual work and self-
employment, petty business and trade, and seasonal migration. While earlier 
generations’ seasonal migration tended to be confined within the national 
boundaries, temporary and more permanent migration to Costa Rica had become a 
very common option. While the land owning generation at the time of the study 
identified very clearly with the ideal of the family farm, young peoples’ 
perspectives were more ambiguous. On the one hand, their chances of getting 
access to farmland were in many cases doubtful and, on the other hand, 
employment opportunities for rural people in Nicaragua were very restricted, 
although some of them hoped to get jobs outside agriculture.

Before embarking on a characterisation of the coffee producer households of the 
sample and the analysis of their livelihood strategies, Chapter 5 gives a brief 
introduction to the study area and the villages of San José de Monteredondo, 
Fátima and San Juan de la Concepción.

### 5.1 The study villages and their geographical setting

The coffee growing region within which the study area was located is known as 
the _Meseta de los Pueblos_ in the Departments of Carazo and Masaya. The three 
villages selected for the study were called San José de Monteredondo, Fátima and 
San Juan de la Concepción. The area has a heterogeneous structure with some large 
and many very small landholdings, a common structural feature being the so-
called _minifundio_. Apart from coffee and food grains, a variety of fruit, banana and 
plantain and some vegetables were grown in the area. The _Meseta_ with its fertile
volcanic soils and elevation of 450-700 metres offers natural conditions which are generally considered appropriate for coffee cultivation, although not optimal, mostly due to the hot dry climate and relatively short rainy season.

With 120 inhabitants per square kilometre, population density in the region of Masaya and Carazo is among the highest in the rural areas of the country. By comparison, the national average was 15 inhabitants per square kilometre in 1993-94 (OIM 1999, p.18). An extensive grid of dirt roads and paths connected villages and settlements in the densely populated area, while paved roads mostly linked municipal centres. Public transport was widely available between towns and cities, and also to some extent from the villages, though more sporadically and in more rustic forms.

The village of San José is located 7 km south of the municipal centre of Masatepe and belongs to the Department of Masaya. The village is connected to both Masatepe and Jinotepe by dirt roads. There are approximately 6,000 inhabitants in the area of San José (Tapia 2000). San José has a school and a church and a small medical centre. The principal economic activities are agriculture with cultivation of beans, maize, coffee, citrus and other fruits. A wide range of other economic activities complemented farm income including small-scale home-based craft production and home industry (wood, leather, textile, basket weaving and food) and petty commerce oriented towards the markets of the nearby towns of Jinotepe, Diriamba, Masaya and Managua.

According to information from base-line surveys carried out by the community organisation ACOSJ (Asociación Comunitaria de San José) about 80 % of the families in the San José and Fátima area worked as seasonal wage labourers. The average monthly income of the families was approximately 540 C$ (Tapia 2000). Comparing this information with the table on land distribution in San José below indicates that seasonal wage labourers were found among both landless and small-scale producer households.

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33 At the time of the study, the transport situation to and from San José had recently deteriorated, because the trucks previously used for passenger transport had been forbidden for safety reasons.
Table 5.1 Land distribution in San José

<table>
<thead>
<tr>
<th></th>
<th>Percent producers:</th>
<th>Percent (area, mz):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landless:</td>
<td>9.3 %</td>
<td>0 %</td>
</tr>
<tr>
<td>&lt; 10 mz:</td>
<td>89.3 %</td>
<td>94.0 %</td>
</tr>
<tr>
<td>10 – 49 mz:</td>
<td>1.4 %</td>
<td>6.0 %</td>
</tr>
<tr>
<td>Total:</td>
<td>100 %</td>
<td>100 %</td>
</tr>
</tbody>
</table>

*Source: (Dauner 1998, p.74)*

The neighbouring village of Fátima was a bit smaller than San José, with approximately 3,500 inhabitants (Tapia 2000). The village belonged to the municipality of San Marcos, Department of Carazo, and was located close to the paved road between San Marcos and Masatepe. The centre of Fátima, although smaller than San José, also had a primary school and a small church. The economic activities of the community of Fátima resembled those of San José. However, the patterns of settlement and economic activity appeared more oriented towards the main road than towards the centre of the community.

The study villages were not independent administrative units and formed part of the municipalities of the nearest towns. In San José the local association ACOSJ had been formed in 1996 in order to work together with Plan International as local counterpart in a development project. The association had an office in the centre of San José where meetings and activities took place. The principal target group for the project of Plan International was children, with a strong focus on education and health issues. At the time of the study, however, the ACOSJ was seeking to diversify their funding and work with a broader range of local development issues, including a new project on sustainable agriculture. Although not part of the hierarchy of the national administrative body, ACOSJ assumed important economic, social and political functions at the village level. Cooperation with Plan International had led to a similar organisational set-up in Fátima.

San Juan de la Concepción was located some 5 km from the centre of the Municipality of La Concepción, Department of Masaya. The population of the community of San Juan was a bit larger than the other two villages, estimated at around 10,000 inhabitants (Monterrey 2002). The major areas of settlement belonging to San Juan were concentrated on the main road from La Concepción towards Ticuantepe and Managua, where also most public facilities were located (school, shops, sports ground, public telephone, etc.) Another, older centre was located a few kilometres down a dirt road. As in the municipality in general, transport and commerce in San Juan de la Concepción was oriented towards Managua. Compared with the other two study villages coffee was not as dominant
among the cash crops grown in San Juan, where citrus and some horticultural growing made up a larger share of agricultural production.

In San José a Japanese development aid project had supported drinking water supply to almost the whole of the community a few years ago. Electricity was available by sectors. In the community of Fátima, the situation was comparable. However, parcels of the former cooperatives often lacked water supply as the families did not live – or had not been living - on the land. The area with the least access to drinking water and electricity was probably the old centre of San Juan de la Concepción. Water is not only important for family health but also for farm productivity. Access to water, for instance, is crucial for creating a plant nursery or for cultivating vegetables.

5.2 Producer households and their farms

The average number of family members living in the survey households was six, two of whom were children younger than 16 years, two adult women and two adult men. The composition in terms of family relations varied, often including a husband and wife, maybe a mother or father of one of them, younger children, and in some cases adult children. Adult children who had founded a family normally sought to establish their own household, but in some cases resided together with parents due to lack of land, resources or for other reasons. In several cases, single or divorced mothers lived with their parents together with their children.

In San José, most of the families visited lived on their farms, while the majority in Fátima and San Juan lived in the village with their farmland located in other places for different reasons. The households in Fátima and San José that did not live on their land were generally agrarian reform beneficiaries. In the collectively managed cooperatives, members had not lived on the farmland but had stayed on in their houses in the nearby villages or roadside settlements. After the splitting up of the cooperatives, some had moved to their plots, many however, had not. In San Juan, farmland was in many cases located in areas of difficult access on the slopes of the Masaya volcano. The families lived in the village where infrastructure was better, but had to accept long walks to get to their fields, in several cases more than an hour there and back.

With regard to farming it was a clear advantage to live on the farmland. Most importantly, crops could be permanently guarded against theft, a serious barrier to crop diversification in the area, especially with higher value crops. Moreover, living on the farmland could facilitate more efficient use of family labour, because
less time was used to walk back and forth between house and farm. However, there are also obstacles and disadvantages to moving the household out on the farmland, *inter alia* the lack of infrastructure, roads, water and electricity. Moreover, it has been pointed out that moving away from the village nucleus often meant increased isolation, especially for women (Schultz 2001, p.84).

Housing standards in the area varied somewhat, from landless workers’ poorly knocked together huts of a few wooden poles, bamboo, plastic and straw, to wealthier producers’ concrete constructions. Most common among the families of the sample was a small one- or two-room house made of wooden boards with a dirt floor and a zinc roof.

The level of formal education among the respondents was generally quite low. Almost 47 % of the respondents had received 2 years or less of primary school education, and could, thus, be considered functionally illiterate. This means that the literacy rate among the respondents, at 53 %, was somewhat lower than the national average of 66 % (UNDP 1998, p.149). The relatively high average age, 56 years, of the group of respondents could be an explanatory factor.

According to the survey data, 48 (79 %) of the respondents considered the farm the most important income source of the household, plus 5 (8 %) who considered the farm and another income source equally important. Other income sources, however, played a considerable role for the producer households. Two thirds of the respondents stated that the household had between one and four other income sources apart from the farm. The economic activities mentioned most frequently were paid farm labour in 17 cases, petty commerce in 14 (*e.g.* a *pulpería*[^34^], sale of bread, ornamental plants or seedlings), commercialisation of fruit in the local market in 10, and wage labour outside the agricultural sector in 7 cases. In addition to the more or less permanent jobs, it was common that family members engaged in a range of occasional economic activities to supplement incomes. As such minor and occasional economic activities can be difficult to keep account of, the survey data might understate the range and number of activities engaged in by the sample households.

The charts below illustrate the principal activities of the members of the households included in the survey of the present study:

[^34^]: A 'pulpería' or 'venta' is a small home-based shop or kiosk with a limited supply of daily articles.
Not surprisingly, the activities of women were predominantly tasks within house and yard and childcare, while men mostly dedicated their time to farm work. What is interesting, however, is the extent to which women engaged in off- and non-farm work. Moreover, in view of the widespread problem in many developing countries of girls’ lack of access to education, it may be noted that the percentage of girls and young women undergoing education was the same as that of male household members. According to the survey data, the ‘typical farm’ was worked by 1-2 male family members, whereas only one woman in every three farms worked on the farm. However, the chart only shows the principal occupation of the family members, which means that there was probably much greater participation in specific tasks within the farm.

Of the 62 farm families included in the survey, 27 (43 %) had received land through the Sandinista agrarian reform. The remaining 35 (57 %) of the farms had been obtained by inheritance or purchase. About a third of the properties were of mixed origin, 10 households having bought land in addition to a plot received through the agrarian reform, another 10 having purchased land in addition to an inheritance, and two agrarian reform beneficiaries who had also inherited land. To
facilitate comparison between the two groups in the analysis, all households that received land through the agrarian reform are considered ‘parceleros’ and the remaining group labelled ‘historically private producers’.

The average size of the 62 farms included in the sample was 6.9 mz. However, the range was quite wide (0.35 – 115 mz), which means that the median value of 3 mz gives a better impression of the ‘typical’ coffee farm of the study villages. While coffee was generally grown on the coffee cultivator’s own land, annual crops, mainly food grains such as beans and maize, were sometimes cultivated on rented land. In 1999, ten families had rented additional land for this purpose. The average area planted with coffee was 3 mz, corresponding to 64 % of the farm, but the relative importance of coffee in the total land use varied somewhat between farms.

Asked directly about the importance of the different crops they cultivated, the majority of the respondents said they considered coffee their principal product. Fruit also plays an important role as a farm product. The importance assigned to the different crops reflected their function as products for sale, the most frequently mentioned cash crops being coffee, mentioned by all respondents, and citrus fruits, mentioned by 34. Other crops that were used for sale were avocado, mentioned by 24, other fruits by 15, plantains and bananas by 21, food grains by 13 respondents and vegetables in 3 cases.

5.2.1 Household incomes

Incomes from the coffee agroforestry systems and production costs formed part of the field data of the study. In the 1999 survey coffee yields for the three-year period 1996-99 and production costs were documented, and production of coffee and tree crops were included for the season 1999/2000. It should be noted, however, that although coffee was the main cash crop for most producers in the sample, in some cases other farm products cultivated outside the coffee agroforestry system contributed to the household economy e.g. staple crops, citrus fruits, plantains or a few head of livestock. Moreover, money earned by off- and non-farm work added to household incomes to varying degrees. A complete mapping of these elements of the household economies in quantitative terms was not possible within the scope of the study, but the survey and case study material include data on the composition of the households’ different income sources and the relative importance assigned to them by the respondents.

The data on income from the coffee agroforestry systems found in the present study correspond fairly well to the farm income levels found in other studies of
small-scale agriculture in the region (Maldidier and Marchetti 1996, pp167-168; D’Exelle and Bastiaensen 2000, 107; Davis, Carletto et al. 2001, p.172). Coffee productivity among the sample group was modest to low compared to other regions, and incomes from coffee production were variable not only due to varying yields but also due to fluctuations in international coffee prices during the 1990s. It should be mentioned, however, that producers with coffee cultivation or other diversified cash crop production mostly had higher income levels than small-scale food grain producers or farm labourers.

The coffee harvest 1999/2000 gave the sample producers an average net income of about 15,000 C$ (N=39)\(^{35}\). It should be noted that incomes varied considerably and that this was considered a good year in terms of yields as well as in sale prices. For comparison, the sample producers’ average income from coffee was calculated at only 600 C$ (N=61) for the season 1998/1999, where both yields and prices were lower\(^{36}\). Besides coffee production, income from other components of the agroforestry systems earned an additional average of approximately 3,500 C$ in the season 1999/2000, not counting products used for home consumption. This gave an average of 18,500 C$ cash income from the coffee agroforestry system. As shall be discussed in more detail in chapters 7 and 8 there were noteworthy differences between the incomes of the producers in the sample.

In some cases, incomes from coffee production obviously were the economic basis of the household. In other cases the amounts of cash generated by the farm were very small and had to be supplemented with other types of income. In these cases it might seem surprising that respondents still considered the coffee farm the most important income source of the household. Several possible explanations come to mind here. One is that the figures are simply an indication of the generally low income levels of the households. Another possible explanation for the high relative importance that the respondents assigned to the mostly very small and often not that productive coffee farms, could be sought in the complex and variable composition of the livelihood strategies of the households. The off- and non-farm activities that poor people engaged in were often temporary and too insecure to make up a reliable basis of a household livelihood strategy. The farm could therefore appear to be the most constant, and in that sense most important, element in the livelihood strategies of the households, even if another economic activity at a given point in time contributed more income than farm production. Finally, the

\(^{35}\) The results are calculated as production multiplied by an average sales price set at C$ 1000,/qq, minus the costs of input and hired labour for coffee production stated by the respondent. In reality, however, prices could vary within one harvest period and moreover depended on the individual agreements made between the producer and the buyer.

\(^{36}\) The average sales price calculated for the cycle 1998/99 was 790 C$/mz.
aspect of social identification, as suggested by Bryceson (Bryceson 1997, p.4) as one of the central dimensions in the question of de-agrarianisation, obviously played a role for the importance that respondents assigned to their coffee farm.

The contradiction between the actual economic importance of farming and the ways that rural people perceived themselves is also noted by Enríquez in a study of peasant producers who had participated in the Los Patios project carried out in Carazo during the agrarian reform:

“Thirty percent of the informants had participated in the urban wage labor force at some point in their lives. This panorama contrasted strikingly with the labor histories of their parents, whose experience as wage laborers was limited and as urban wage laborers, almost nonexistent. What is illustrated by these labor histories is the extent to which, with each new generation, the peasantry was being pushed out of agricultural production. Their ties to the land remained alive, in the sense that they were loath to move permanently away from their places of origin. But their ability to sustain themselves from their own production was becoming a dream of bygone days.”

(Enríquez 1997, p.70)

The importance of the farm was, thus, mostly not purely economic. Many respondents in the study obviously took pride in being coffee producers. For many rural families, the farm was also their home, and social identification played a role for the way that members of rural households perceived their livelihood. It was apparent in several cases that, even if the present situation did not seem to match their image, respondents continued to perceive themselves as producers if they used to be and aspired to be producers in the future.

Regarding the relative importance of different income sources for the household it should be mentioned that perceptions varied depending who you asked and when you asked. A comparison of interviews made with the same respondents in different years showed that the relative importance of income sources could change from year to year depending on the coffee harvest and the success of other off- or non-farm activities. One producer from San José who was interviewed in two consecutive years about the importance of different income sources for the household expressed a quite dramatic change in this respect. The first year he had

37 The Los Patios project was launched after the strong political effort directed towards collective sector production in the first years of the agrarian reform. The project targeted the minifundio sector in the Carazo region aiming to help small-scale producers to substitute and intensify their production with marketable cash crops for the urban markets, viz. vegetables and fruit (Enríquez, L. J. (1997)).
shown me his coffee and bean fields and had given a long and enthusiastic talk on what his coffee production meant to him and how he loved to see his beans grow. A couple of months later, his harvest was seriously affected by hurricane Mitch as were many others in Nicaragua. Probably as a consequence of this loss, he had learnt from his wife how to bake bread and had taken up selling the bread they produced in the village a few times a week. Asked in a second interview about eight months later, he answered that bread baking was without doubt the most important income source for the household and hardly cared to talk about his coffee.

The case studies moreover revealed considerable differences in the perceptions among household members along, among others, gender lines. The following case of Alejandro and Magdalena shows a striking difference between the perceptions of the husband and the wife. Household income was based on a diverse range of farm products, Magdalena’s work in a sowing workshop and Alejandro’s temporary part-time job for a neighbour. The couple were asked separately to rank the different income sources of the household according to their importance. While the husband ranked coffee first and the wife’s wage income last out of six income sources, she ranked her wage earnings as most important, and thereafter followed more or less the same ranking sequence as her husband. This differing perception was repeated when asked about the uses of the different sources of income. While the husband stated that she used all her income for personal purposes, the wife herself stated household spending to be the main destination of her earnings, mentioning the children’s schooling as the most important single expense. Otherwise, the couple coincided in their perception of the household economy though the husband mentioned that he sometimes lent out money to a friend when he was paid for the coffee harvest. The example illustrates that there exist important differences in the control over household resources and prioritisation of and responsibility for expenses, based on gender relations and position within the household.

5.2.2 Household spending and investments

We shall now turn to the way household income was spent in the sample households. In the survey (N=62) respondents were asked which expenses they paid first with the income gained from coffee production. About half of the respondents (28) mentioned repayment of loans, almost a third (18) gave first priority to household necessities, while only 9 mentioned farm investment as the first priority. It should be noted, however, that much of the credit was taken to buy
chemical inputs for farming, and it should therefore probably be considered production costs.

Since coffee was the largest income-generating crop, the case studies showed that farm investments, if undertaken, were mostly based on the sale of coffee. Production of other crops such as food grain, fruit and other tree crops was in all but one of the cases directed towards family consumption, either directly or as cash income used to purchase goods. One explanation for the different uses of income from coffee and tree crops may be that the former was the only crop generating an annual income large enough to permit investment, while the inter-cropped fruit trees and plantains in most cases generated moderate to minor amounts of money spread out over the year. Gender also here played a role, as women often harvested and sold fruit on the market when household needs were pressing. In the case of coffee, on the other hand, commercialisation was mostly undertaken by the male head of household and, moreover, was often agreed on with the buyers beforehand.

During the focus group discussion with the case study producers they were asked what they invested in when they made a surplus from coffee production. Most participants agreed on livestock. As expressed by César:

“Well if I had a surplus and didn’t have a breeding cow, I’d buy a cow, I’d buy a pair of oxen, and my wife should buy a few pigs and more chicken. Now that the issue is to augment the value of the farm.”

César, (FocusGroup 2000)

Andrés agreed strongly on the need to invest in the farm:

“Yes, because if you leave the money in your pocket you would have to be joking to believe that it would stay there. Within one month there would be nothing left! It is important to invest it, and to know how to invest it in something that will serve you in the future.”

Andrés, (FocusGroup 2000)

Only Pedro, who lived alone on his farm, did not see investing in livestock as an option, as there was nobody to help him guard the animals from theft. He told about his bad experiences with poultry raising in this regard (FocusGroup 2000).

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38 For an analysis of gender aspects in Nicaraguan coffee agroforestry see Schibli (Schibli, C. (2001)).
An illuminating story regarding investment patterns was told by Álvaro:

“One year I had a good harvest, and I bought a cow that cost 700 C$ at the time. (...) It had a calf (...), and after that calf I led it to the bull, and a new production arrived, and after that another one (...) until I had 5 heads. But then, what happened? At the moment I got them, they escaped me! (...) And how did they escape me? Well, I had a daughter who was studying at that time, and then I had to start paying for her studies, her transport, and everything from the shoes and up! And then, when the little I had was spent we sold a head of cattle. And from then on the struggle continued. The next year we sold another one, and another one, and another one - the farm I didn’t touch, it’s still there, it’s still there! (...) Just as the last head of cattle was gone, the woman graduated and married. I went through with it, I paid and upheld my effort. But, of course, she mistook her profession, she married and didn’t make use of it, because she married and her husband told her to stay [at home]. But then, any time she would be able to find some job, and she wouldn’t sit there with her arms crossed.”

Álvaro, (FocusGroup 2000)

Álvaro’s story about his daughter’s education is interesting in different ways. Firstly, it demonstrates why small-scale producers choose cattle as investment objects. The advantages for the producer are that a cow is an affordable investment in a year of a good harvest, and also the timing of the coffee harvest at the beginning of the dry season meant that there were few investment possibilities in agriculture when the cash came in. Moreover, a breeding cow is a multipurpose and flexible investment. Breeding calves is a means of accumulation, the milk is a direct benefit for the family, and the cow is flexible capital, allowing for realisation of its value into cash any time it should be needed. However, in the study area, access to pasture was a strongly limiting factor for smallholders’ investment in livestock.

Secondly, the quotation tells us something about the importance that Álvaro assigned to education. Although he was clearly a bit disappointed about the outcome of his and his daughter’s joint effort to give her an education, Álvaro still regarded the money well spent as a long-term investment in human capital, so to speak. Although his daughter did not have a job at the time of the study, she still had the possibility to find work later. Thirdly, indirectly, the example hints at the increased economic burden laid on the families with regard to children’s education since the strong government support given to education during the Sandinista period had ceased.
The case studies from Fátima and San José suggest that off- and non-farm income, including that from temporary migrant workers, was mostly used for consumption rather than productive investments. However, one of the characteristics of family farms as those of the sample is precisely that the components of production and consumption are not independent. This could mean that the satisfaction of household needs by means of off- and non-farm incomes permitted higher degrees of productive re-investment of farm income that otherwise would have had to be used for consumption purposes. Assuming that higher coffee yields were a result of investment in the coffee production system, this hypothesis could indirectly be supported by a quantitative analysis. Thus, a comparison of the coffee yields of producer households with additional income sources and households depending entirely on farm production showed a statistically significant difference between the two groups.\(^{39}\)

According to the survey data contributions from family members not belonging to the household were relatively rare. Among the sample group of 61, only in 11 cases were cash contributions mentioned. Nine respondents reported labour contributions and in two cases contributions in-kind were given. However, it should be noted that data on this issue seem somewhat uncertain. Contributions of this type were mostly not received on a regular basis and could be difficult to keep account of. Moreover, in some cases it was obvious that pride played a role in the answers. Thus especially male heads of household seemed to prefer the image of contributing to the livelihoods of their children rather than the reverse. On the other hand, several producers who complained about their children not helping them more with the farm work indicated that they did expect some kind of support from their offspring.

Of the case study households some did not receive any contributions from children who had moved away from the parental household, while others were supported in different ways, in the form of cash, labour, or in-kind contributions. On the other hand, the interviews also revealed that some parents supported children seeking to establish a livelihood outside the farm e.g. by lending them money for the journey to Costa Rica to seek work or, in another example, helping a son to buy equipment to get established as a wood cutter (CaseStudy1 2000; Int.Jovenes 2000).

The somewhat unclear picture derived from the data suggests that an in-depth household economic study would be necessary to map these complex and variable relations of household incomes and spending, including the links with family variables that would become part of future research.

\(^{39}\) Based on a t-test the difference was found significant at \(p < 0.05\).
members living temporarily or permanently outside the household. It can be at least concluded that there did not appear to be very fixed patterns for intra-family support, and that contributions could go both ways between parents and children.

5.3 Livelihood diversification: economic compulsion or opportunity?

The study showed that engagement in off- and non-farm employment was motivated by a range of conditions, some of which are discussed in this section. In some cases farm production was not sufficient to maintain the household and additional incomes were necessary to meet consumption needs. Generation of capital for farm investment was another function of off- and non-farm work, especially since the good credit possibilities for small-scale producers available in the 1980s had ceased to exist. Some young people hoped for a future in skilled or professional jobs, while for others, off- and non-farm employment and migration were a response to the lack of prospects of inheriting land for farming. Apart from the asset situation of different households and the opportunities of employment and education, intra-household relations *inter alia* along the lines of gender and generation influenced the ways that decisions on household labour allocation were made in different households.
5.3.1 Difficult credit possibilities

In the 1990s, as described in Chapter 4, it had become increasingly difficult for small-scale producers to obtain credit in Nicaragua, especially formal credit at reasonable interest rates. In the 1980s, credit to small-scale producers was mainly given by the state bank. Although not to the same degree as in the collective sector, credit was widely available to small-scale producers and the terms were favourable, which meant that many producers started to depend on this source of finance. After privatisation, the banking system virtually ceased to be a source of capital for this group of producers. A lot fewer small-scale producers, thus, had access to credit than before. Another important change for producers wishing to obtain credit from the bank was that land was now required as collateral. Moreover, the high interest rates meant that some producers did not want to get indebted because of personal bad experiences or because they had observed the consequences in other cases.

In half of the sample cases (N=62), credit for farming purposes had been raised in the season preceding the survey. Of those producers who had taken up credit, inputs were the most frequently mentioned purpose: 23 had invested it in input for coffee production and 6 for food grains. Less frequent purposes were fruit trees and livestock, both mentioned by two respondents\(^40\). Half of the sample (31) had not taken up any credit for farming.

The data of the study are supported by a larger survey carried out on rural financial markets in Nicaragua between 1990 and 1995 (Dauner 1998). Surveys were conducted within 4 regions of the country, San José de Monteredondo being one of the study sites. The credit sources encountered were grouped into 5 different types: 1) public or private commercial banks regulated by the ‘Superintendencia de Bancos’, 2) non-regulated credit institutions (e.g. credit cooperatives, foundations, etc.), 3) development organisations (i.e. public institutions, NGOs or other organisations that offer credit in order to support broader development goals and programmes), 4) individual money lenders such as family and friends or usurers, and 5) merchant money lenders. Other existing practices employed in situations of capital scarcity were share cropping, buying products on credit and the so-called venta de futuro, pre-harvest sale of products.

In San José the Dauner study found that 44 % of the sample producers had received some kind of credit in 1995. Credit was not necessarily taken every year but often in a rather sporadic manner. Most credits had been received from non-

\(^{40}\) The numbers sum up to more than sample size because some producers had invested in more than one crop.
regulated credit institutions (28 %), followed by commercial banks (22 %) and merchant money lenders (22 %), individual money lenders (14 %) and a local bank founded by a national NGO (6 %). Compared to other regions, in San José there was a relatively high incidence of merchant money lenders. This was explained by the presence of coffee production in the area, and the common practice of money lending and pre-harvest purchase among coffee export companies (Dauner 1998, p.33-35). Regarding the terms of the loans given, the Dauner study found that they were generally short, less than 6 months in almost 50 % of the cases, and 6 to 12 months in 40 %, while only a little more than 10% had terms of more than 12 months (Dauner 1998, p.30). The lack of access to longer term credits was mentioned by several respondents as a limitation for improving farm productivity, e.g. investment in perennial crops that required more than a year to reach their state of productivity. Interest rates varied considerably between the different credit sources, between 0 and 20 % per month, with an average of 3.63 % per month. San José had the highest average interest rate of the four study areas, which was explained by the frequency of individual and merchant money lenders among the reported credit sources (Dauner 1998, p.55).

In the present study it was found that personal relations and social networks played a role for the access to credit. In the focus group discussion it was revealed that different kinds of facilitating networks existed. Thus, among the participants there were proponents of three different ways of obtaining credit: through an agro-export enterprise, a credit cooperative and an individual money lender or middleman. All three, however, emphasised the importance of having personal contacts. An extract of the discussion is translated to illustrate the different arguments given. Álvaro told how the agro-export enterprise CISA was a reliable source of credit, once you had become a regular client with them:

“Cisa gives [credit] to those they know, to their old clients. (...) For instance, when they make the contracts, if you have a previous contract you can maintain it. (...). But they don’t give [credit] to everybody.”

Álvaro, (FocusGroup 2000)

In response to the above, Alejandro expressed his preference for a credit cooperative, “La Armonía”:

“At the moment, I have a loan, I am associated with La Armonía. In La Armonía they give you loans. (...) And there, with the confidence I enjoy [they tell me]: Yes, of course! Take your documents, bring me a (...) guarantor – my own daughter is the guarantor – and come back on Wednesday. (...) Only when the first money
comes [from the coffee harvest], or at the end of December, I have to go and pay back the money. If I don’t have any at that time, I just go and lay down my case to them, “Look what happened is - …”, and they’d let me go with a certain amount, right? There they manage things, waiting to see how much you have, how your harvest is going,… It’s a cooperative that (…) well, you feel a member.”

Alejandro, (FocusGroup 2000)

César, in turn, strongly advocated personal credit channels, giving the example of a private money lender he knew, Julio Castro:

“Listen, this Castro is better. With him there is no need to look for a guarantor or anything, you won’t have to worry so much about anything. He already has his contract. There is no need to wait even a moment. The only thing I’d have to do is to say: Look don Julio, here I have a recommended [man], he will be able to harvest at least 30 fanegas. [Then he would say:] How much do you want? (…) Sign here! This one doesn’t ask you for a guarantor or anything, and doesn’t go around controlling your harvest or anything.”

César, (FocusGroup 2000)

César especially stressed the absence of bureaucratic procedures as an advantage of the private credit system. Moreover, he obviously positioned himself carefully stressing his influence with important, wealthy local people such as Julio Castro, encouraging the other focus group participants to ask him the favour of a recommendation to the money lender. Presuming that this would have implied the favour to be expected returned at a later point in time the situation could probably be interpreted in terms of local patron-client type relations.

The group’s discussion of credit indicates how different kinds of social networks had become increasingly important to obtain credits for small-scale producers since their credit possibilities were strongly reduced by the 1990 structural changes in the agricultural finance system. Difficult access, however, was not the only problematic aspect of credit for the small-scale coffee producers. The conditions such as short terms and high interest rates were also a constraint. Furthermore, taking into account the fluctuation of climatic conditions and market prices, credit entailed a serious risk now that land was required as collateral.

Credit was also found to be an important variable in the quantitative analysis of factors related to coffee production. Hence, the group of producers who had received credit for coffee production had higher yields than the group who had not
received credit.\footnote{Based on a t-test the difference was found significant at \( p < 0.01 \).} This could be interpreted in two ways. The explanation that probably comes most directly to mind is that credit is used for productivity-enhancing investment, either input or longer term improvements of the coffee production system. Another explanation, however, could be that those producers who generally had more resources and were therefore in a position to manage their coffee at more optimal conditions were also those who had the best access to credit. The ways in which access to capital played a role in the management of the coffee agroforestry systems are discussed in more detail in Chapters 7 and 8.

5.3.2 Migration and remittances

Another way of seeking access to additional cash was seasonal migration of family members, which was common among the rural households of Carazo and Masaya. Migration in search of income and employment was no new phenomenon in the study area, but the destination and type of work had changed through the years. Local sources report that seasonal migration from the study villages to other regions of Nicaragua took place already in the 1940s. The first migration flows were directed towards the rapidly growing cotton production in the north-western plains of Nicaragua, and later, during the 1980s, towards the north of the country when labour shortages in the coffee sector occurred. Migration of female villagers to Managua to work as housemaids started around the 1950s, though in limited numbers (Int.López 2000). In the 1990s, typical destinations for seasonal migrants were the northern coffee-growing region of Nicaragua and not least the neighbouring country of Costa Rica. The Costarican GNI of 3,810 US$/capita compared to 400 US$/capita in Nicaragua in the year 2000 indicates the relative strength of the economy of the former country (WorldBank 2002).

The attraction of the Costa Rican labour market for Nicaraguan workers was partly the availability of work, which was very critical in Nicaragua, and partly higher average wages. Thus, a recent study of seasonal migration from rural Nicaragua to Costa Rica stated that daily average net income of migrant workers was 28 C$ compared to only 10-15 C$ for farm labourers in the study region. However, it should be mentioned that living costs in Costa Rica were considerably higher, estimated to make up 30-35 % of the migrants’ gross income. It therefore only paid to migrate if the migrant was able to work hard and living expenses were kept as low as possible. This meant that seasonal migrants mostly left their families behind.
Those who migrated most were younger men. However, women before and after child rearing age also took part. (Ton 2000, p. 211-223). A recent study carried out for CEPAL (Pritchard 1999) found an increasing percentage of women taking part in work related migration from Nicaragua. Pritchard’s study found that being a labourer was the most common occupation among migrant workers of both sexes. For migrating women another significant work type was domestic service. The remaining work types of migrants were spread over a broad range of economic activities (Pritchard 1999, p.11).

Exact data on the number of Nicaraguans working and living in Costa Rica were not available due to a high proportion of illegal immigration. It is estimated, however, that between 250,000 and 300,000 illegal immigrants should be added to the official number of 250,000 Nicaraguans who had sought permission for their stay in Costa Rica (Pritchard 1999). Nicaraguans seeking work in Costa Rica were mainly employed in the agro-export sector with the traditional export crops of coffee, sugar and banana, and more recently non-traditional export products such as fruit and flowers, or in construction. Female migrant workers often found employment in domestic service in the metropolitan area. Besides seasonal migration there existed permanent and semi-permanent migration. Some migrants stayed in Costa Rica for some years and thereafter went back to Nicaragua, a cycle that sometimes was repeated one or several times. Others established themselves with a family in Costa Rica and settled there for good.

Migration to Costa Rica had hitherto functioned as a kind of safety valve regarding the increasing social imbalance in Nicaragua created by a growing rural population with limited access to agricultural land, on the one hand, and insufficient capacity in other sectors to absorb the increasing work force. However, with around half a million workers already in the country it seemed possible that the labour demand could become saturated at some point in time. Nicaraguan immigrants were a politically hot issue in Costa Rica and it appeared that popular acceptance was declining and restrictions on immigration on the increase (Ton 2000, p.212).42

The information encountered on how Nicaraguan households used remittances from migrant workers was limited and contradictory. The above mentioned CEPAL study (Pritchard 1999) showed that households receiving remittances from family members working abroad used 75 % of the cash received for household

42 The potential of political conflict associated with Nicaraguan migrant workers in Costa Rica was emphasised in a noteworthy way in the context of an ongoing border disagreement about the Rio San Juan. Conscious of the economic importance of Costa Rican wages for many Nicaraguan households, the Costa Rican foreign minister put forward a threat of starting to tax remittances to Nicaragua, estimated in the order of 80-90 million US$, if the boarder conflict was aggravated (ElNuevoDiário (24.11-2001)).
consumption, with as much as 60% spent on food alone. Another 12% of remittances were used for expenses related to health and education, only 9% were used for productive investments and 4% were destined for savings (Pritchard 1999, pp.30-31). A diverging picture was given in a study carried out by Ton (Ton 2000, p.224) concerning seasonal migration from the area of Condega near Estelí to Costa Rica. Ton found that a large proportion of the remittances (33%) was used for agricultural inputs and other means of farm production. Opposed to the aforementioned study, only 10% of remittances were used on food and 34% on clothes.

As stated above, case study data from the present study indicated that off- and non-farm incomes, including remittances, were generally used for household consumption rather than farm investment, and thereby supported the conclusions of the former of the two surveys cited. However, again, as is the case with other off- and non-farm income, remittances used for household consumption normally would imply that more of the farm income was available to be re-invested.

5.3.3 The (fading) ideal of the family farm

The focus group discussion carried out with the case study producers made evident that, among the small-scale coffee producers, a united family and a farm based on family labour instead of employed labour was seen as the ideal. Presented with the examples of two different families, one living off their farm and dedicating all available family labour to farm production, and the other pursuing a strategy of income diversification, reactions showed a strong need to identify with the first example. César, thus, considered it better to employ family labour than to use hired labour:

"(...) because the wage of a farm hand consumes more money. If it were my son, who is studying and helping with the farm, who bought his clothes and his shoes [with that money], but this money [paid to a farm labourer] disappears and doesn’t come back. (...) If the farm hand doesn’t work sufficiently and leaves, he will cost me three times more."

César, (FocusGroup 2000)

César proudly told how his sons were carrying out all the farm work, even the one who was already married. The father’s role is crucial for family unity, he stated, and his rules were rigid. He told his children: "If you are living on this farm but don’t want to work, go and see where you can eat!" He even used the national legislation to tell them that parents had no legal obligations towards their children above the age of 18: "Look there is this law, if you don’t work on this farm, you will be left with nothing."
Work a little and the farm is yours” (FocusGroup 2000). The quotation shows very explicitly how children’s labour contribution is expected in return for the promise of inheriting the family farm in the future.

Opposed to the case of César, Alejandro lamented the situation in his household because he did not receive more help from his family in the management of the farm:

“We are struggling, struggling to conserve what we have, although most of us who are here [participating in the group discussion], don’t have help from our children. (…) Even my wife does not stay in the house. I look after the house and the animals, look this is our case!”

Alejandro, (FocusGroup 2000)

However, Alejandro seemed somewhat ambivalent about the activities of his wife and children. As the following quotations demonstrate he did not disagree when another participant pointed out the advantages of having his wife selling fruit in the market. Thus, later on in the discussion he consented:

"Isn’t it better that she goes to sell [the fruit] instead of some importunate speculator? (…) And brings back sugar, or some other goods that you need? Just what I say is that success principally depends on those two people, the woman and the man, on the husband and the wife.”

Alejandro (CaseStudy2 2000)

Also with regard to his children Alejandro appeared to be somewhat ambiguous. On the one hand, he wished that they would support him more on the farm, on the other hand, he was preparing them for a different future:

“Well, my idea is that my children should get an education. One of them is educated, another is educated but is already married and has established his life somewhere else. (…) So now we’re struggling with the other two who remain, the little one (…) and my daughter. What the coffee gives me helps me.”

Alejandro (CaseStudy2 2000)

Regarding children’s helping with the farm work there appeared to be a difference in the expectations towards sons who had achieved a professional job:
"In this sense I do think that the child has a right to collaboration (...) Because with my son (...) now that he is educated the situation changes, now he doesn’t like to take off his shirt and join [me with the farm work] anymore. (...) So I tell him, well ok, help me then, economically or in other ways.”

Alejandro (CaseStudy2 2000)

The quotation shows how the achievement of a professional career was fully accepted by the father as a reason for the son not to help him on the farm. The son, now belonging to a different social class, could not be expected to get his hands dirty in the field. From the father’s viewpoint, this did not mean that expectations were dropped, however, but rather changed towards other types of contributions than labour e.g. in terms of cash or material goods.

Taking up the comparative advantage of family farms in terms of effective allocation of labour within the household production unit pointed out by Netting, the different examples give rise to discussion. It might, thus, be said that those households in which household labour allocation and decision-making appeared to take place in a more corporate manner seemed to function well in economic terms. The households of César and Andrés could be mentioned as examples. In both cases family labour allocation appeared very planned and the corporate manner of decision-making was obviously a result of a strong patriarchal regime at the household level. César held a firm grip on his offspring and only allowed them to live in his house if they were willing to contribute to the farm work and generally submit to his decisions. Andrés told me how he had sent his adult daughter to work in domestic service in Managua in order to contribute to household income. Both of these patriarchs were interestingly eager to depict their family as very united as expressed in an allegory used by Andrés of a cart that one alone is not able to push, but that will move in the right direction when the whole family combines forces.

It could be hypothesised that households with a central control over and structured use of family labour were in a better position to accumulate surplus and make the family farm function well economically. However, whether such a patriarchal model is desirable for all household members would be another question. Compared with the other households in the sample, moreover, the corporate household decision-making model seemed more the exception than the general rule, at least with regard to the labour of grown-up children. Although a more comprehensive investigation of intra-household decision-making processes did not lie within the scope of the study, it clearly appeared from the case studies and interviews that decisions regarding the allocation of family labour were taken in
different ways in different households. In most households young people seemed to take decisions to go and look for work outside the farm rather autonomously, as in the following example:

"No, they don’t ask for permission (...). They just say, I’m leaving for this or that place now, but with their father’s acceptance. A father never..., - well, if you don’t have any money yourself, sometimes your father would have the possibility to lend you some, and he’d help. And once they return they’d pay back the money"

Rafael, (Int.Jovenes 2000)

The quotation stems from an interview with Rafael, the son of a coffee producer in San José. The youngster told me that he, like many others, had a brother working in Costa Rica. His brother had been there for two years at the time of the interview. Asked about his brother’s plans, if and when he would return, Rafael just shrugged ‘who knows’. Decisions regarding the sons’ migration appeared to be an individual affair in his family. It also seemed that adult children who worked and lived outside the family farm only helped with farm work occasionally, if at all, as indicated in the following quotation from the interview with Rafael:

"Now that they’re independent, my brothers almost don’t help [with the farm work]. Well maybe, in the rainy season they’ll come and they’ll help with the weeding in the coffee."

Rafael, (Int.Jovenes 2000)

The respondents of the parent generation appeared to experience an internal conflict of interest on this issue. On the one hand, they saw the traditional family farm where everyone filled in their role as an ideal, the wife looking after the house and yard and the children as they grew up contributing with their labour, prepared to take over the farm after their fathers. On the other hand, at the practical level, the advantage of women’s or children’s off- and non-farm activities was recognised, and it was obvious that most parents wished their children to educate themselves and get a good job if possible.

The concept of inter-generational reciprocity and differentiation that forms part of Bryceson’s discussion of de-agrarianisation appears relevant in this context (Bryceson 1997, p.250). It is suggested that the inter-generational economic ties in rural families in some places were in the process of dissolution. In areas with high pressure on the land and fragmentation of land holdings, the children’s generation could in most cases no longer rely on an inheritance of land to form the base of
their livelihood. As inter-generational transfer is a two-way process, it is argued that this could imply that the other side of the social obligation, children’s contributions in terms of labour, shares of their income from off- and non-farm work and remittances, was becoming less binding (Bryceson 1997, p.250).

This analysis seems to fit well with the dynamics observed in the study area in Nicaragua. The example of César showed very explicitly the working of reciprocal obligations. In contrast to the majority of the households the producer in this case owned a considerable amount of land and had most of his adult sons working with him on the farm. If they worked on the farm they were maintained as part of the family and the promise was inheritance of the land. If not, they were to leave and fend for themselves. In a great number of cases, however, youths no longer had the prospect of inheriting (enough) land to be able to depend on farming, or even on flexible diversified livelihoods with a strong foothold in farming, as their parents might have had. The loosening of the reciprocal ties of inter-generational transfer may, thus, be an explanation for most youth’s seeking ways of making a living independently.

In cases in which possibilities of handing over family land to their children are limited, some parents, as also observed by Bryceson, are able to give their offspring a non-agricultural inheritance instead of land, that is, if they can afford it. This could consist of education, capital or contacts that could help them to establish a non-agricultural livelihood (Bryceson 1997, p.250). In the present study there were examples of parents using farm income to invest in their children’s future in different ways: with education, equipment to set up a small business or by covering their travel expenses for migration to Costa Rica. The consciousness that inter-generational economic reciprocity could in most cases no longer be based on land could also be a contributing factor to the eagerness to support their children in getting an education as expressed by many respondents.

Prospects of the young generation
The general trend among young people seemed to be to seek employment outside the family farm when they grew up and to move away from their parental home. Most of the non-agricultural jobs poor rural dwellers engaged in were as unskilled workers, within domestic service, or they were self-employed within service, petty commerce, etc. Some had better options due to better capital endowments or education. An example was Nelson, a young man from San José. In a group interview he said that it was very rare to see a young man opting to follow his father’s footsteps. He himself had been working as a watchman and – with some help from his father - was about to set up a dance bar in the village – the first one in
San José as he proudly told me. “Because here, everybody who grows up (…) seeks how to make himself independent” (Int.Jovenes 2000).

Although low-income and unskilled jobs were the most common employment options open to members of the sample households, some of the families included in the survey had adult sons or daughters who had studied and worked as profesionales, meaning people with an academic degree or formal technical training. There was an obvious difference of attitude towards off- and non-farm work among the respondents, depending on the type of work in question. The general attitude seemed to be that unskilled off-farm work, e.g. as a farm labourer or domestic maid, could be necessary to generate income for the household, but it was not a desirable future for a young producer’s son or daughter. A professional, technical or academic career, on the other hand, was seen as desirable and a legitimate reason to leave farming. This is expressed clearly in the following quotation of César:

“I’ve got [a son who is] an agricultural engineer, one who is studying business administration, I’ve got three students […] There are no merchants, no domestic maids.”

César, (FocusGroup 2000)

The perception of the older as well as the younger generation, however, seemed to be somewhat contradictory regarding the issue of young people leaving agriculture. On the one hand, both saw it as the ideal for the young to study and get a professional career. On the other hand, the producers interviewed were clearly hoping that their children would carry on the farm after them. The contradiction between wanting to study and get a job as a professional and the desire to continue maintaining the family farm was also reflected in the interviews with young people. Two 18-year old secondary students who I talked with in San José had ideas about how to solve the dilemma in a satisfactory way. Their vision was that they themselves study and become a lawyer and an accountant respectively. If they succeeded and got professional jobs, the idea was that their elder siblings, who had not studied, would stay on the farm and manage it on behalf of the whole family. In case they found themselves unemployed at some point in time, this arrangement would allow them to fall back on farm income (Int.Jovenes 2000).

An important aspect to be taken into account regarding the prospects of the younger generation in the households studied to achieve a career as professionals was the changed political and economic situation in the country. Thus, most of
those of the adult children in their 30s or 40s who had done so probably owed the possibility of having a career to the Sandinista education policies. With the liberalist government policies of the 1990s, heavy cuts were made in the public sector and costs of education were to a large extent privatised, which again limited access to education that children from poorer families had enjoyed in the previous decade. Thus, it can be questioned whether the upward social mobility encountered within some of the case study families will be a prolonged trend or should be regarded as an historical exception.

5.4 Concluding remarks

At the time of the study, livelihood diversification was a widespread characteristic of the coffee farm households in Carazo and Masaya. Degrees of product and income diversification were generally quite high, with family members engaging in a broad range of economic activities. The limited and decreasing access to farm land that many producer households were facing, low productivity and fluctuating coffee prices, limited access to credit, and adverse climatic effects were among the reasons that motivated household members to seek off-farm and non-farm occupation. Formal employment opportunities were very limited in Nicaragua due to a generally weak national economy. Besides contributing to pressure on the land, increasing population densities and urbanisation in Carazo, Masaya and Managua, however, also meant a growing demand for different kinds of goods and services, e.g. perishable products, presenting income opportunities to the producer households.

But did the tendency towards livelihood diversification indicate that producer households as those of the sample were on their way out of agriculture? Among the producers of the sample group this did no appear to be the case. Some features of interest in this regard that were discussed in the present chapter were the role that the farm played in the household economy and for the producers’ social identification, the issue of household investments and the livelihood prospects of the young generation. Compared to other economic activities farming was still considered the most important element of the livelihood strategies by far the majority of the respondents. Even young people who aspired to an education and career outside farming seemed to be anxious not to lose their foothold in farming entirely.

The family farm and a farm-based livelihood were generally seen as the ideal by the respondents. This was reflected in the way they perceived diversification in their economic activities. While crop diversification within the farm was perceived
as a desirable development, among other reasons in order to minimise risk, livelihood diversification was not characterised in this way by the respondents.

The importance that producers assigned to the farm was also reflected in the answers and discussions about investment patterns. It seemed that producers re-invested in their farms when surplus was available. To provide a more comprehensive answer to the question of de-agrarianisation as a possible implication of livelihood diversification, however, a closer analysis of the dynamics between processes at the household level and at the level of the production system are required. More detailed investigations of the investment and production strategies at the level of the coffee agroforestry system are carried out in the course of the following chapters e.g. the objects and time horizons of productive investments, and the producer's considerations regarding this.

Incomes from off- and non-farm work could contribute importantly to making investment in the farm possible, especially since small-scale producers credit access had been reduced under the new economic policies in the 1990s. Respondents distinguished between different types of jobs. Farm-wage labour and work in domestic service were considered inferior and merely considered a means to survive and generate cash to secure household consumption needs, while skilled or professional employment possibilities were seen as more desirable for the young generation. As the preceding chapter showed, however, education and capital presented considerable entry barriers for the rural youth to engage in the latter type of jobs.

Livelihood strategies were influenced by intra-household relations and decision-making processes in several ways. Gender roles and the associated differences in household tasks and responsibilities influenced perceptions and priorities in economic decisions. Another aspect has to do with inter-generational household relations, especially regarding the question of sons’ and daughters’ labour, whether to stay and work on the farm or seek off-farm work or migrate. In both gender and generational intra-household relations there seemed to exist considerable differences between the households studied, some where the decisions were strongly influenced by patriarchal hierarchy, and others where allocation of household labour and resources followed more pluralistic or individualised decision-making patterns.

The questions regarding the future of their children and their farms revealed some ambiguity among the producers. On the one hand, they wanted their children to take on the family farm. On the other hand, they could see that the custom of dividing the land at inheritance would in many cases not leave sufficient land to
maintain the livelihoods of coming generations. Ambiguity was also reflected in the visions of the younger people who were interviewed. Their hopes to get an education and obtain skilled or professional employment were somewhat in conflict with the reality of the limited Nicaraguan labour markets. While aspiring to achieve employment in a non-agricultural profession, they appeared reluctant to the idea of cutting their ties to the land entirely, thinking of farming as a social safety net and fall-back option. A pressing question arising in this context is whether the future generations of rural people will increasingly be caught in what de Janvry has termed the ‘double underdevelopment squeeze’, the loss of access to land on the one hand and the absence of employment opportunities on the other (de Janvry, Sadoulet et al. 1989, p.396).
Chapter 6  Different types of livelihood strategies?

“We are poor and cultivate our farms, but if we study the lives of the different families, they are all seeking, and everyone takes a different path, seeking here, seeking there….”

César, (FocusGroup 2000)

It was demonstrated in the previous chapters that the farm was considered the most important element of the livelihood strategies in the majority of households included in the study. However, while in some cases households concentrated labour and capital investments on farm production, in others household members engaged in different types of off- and non-farm activities. The analysis of the present chapter inquires into the motives, dynamics and implications of the different types of livelihood strategies found among the coffee producer households studied, focusing especially on the role of livelihood diversification, and discusses how these can be framed theoretically.

In Chapter 2 divergent theoretical positions on the dynamics of social change in small-scale agriculture were presented. The modernisation and conventional political economy perspectives foresaw a process of, on the one hand, market lead specialisation and capitalisation of the agricultural production systems and, on the other hand, the formation of a landless work force to be absorbed in the rural and urban capitalist sectors. In the political economy approach special emphasis is given to dynamics of social differentiation and their impact on peasant farmers. Opposed to this view, the small-farm literature, represented by Netting, sees smallholders as a constant social category, emphasising the comparative advantages of the family farm with its reliance on family labour and the flexibility of the household as an economic unit that integrates production and consumption. Common to these approaches appears to be that they tend to see off- and non-farm work as a constraint to the intensification of farming, or at least do not have an explicit position on its impact. Other strands of thinking have more recently taken up the issue of livelihood diversification (Ellis 1998; Scoones 1998; Ellis 2000) and processes such as de- and re-peasantisation and de-agrarianisation (Bryceson 2000) that suggest a more empirical approach to the role of off- and non-farm work in the historical processes of agrarian change.

Netting’s concept of the family life cycle as explanation of differences in the socio-economic situations of small-scale producer households was an important inspiration for the analysis in this chapter. The dynamics identified in the present case differ from those described by Netting in several ways, however. Firstly, the
importance of family cycle dynamics was not limited to farm production, but included household members’ off- and non-farm economic activities. Secondly, the dynamics were not played out within a constant social category of smallholders, but involved losing and re-gaining access to land in the course of many producer households’ life cycles. Thirdly, the possibilities of completing the cycle by gaining access to land and establishing a viable farm production system, which could maintain the household, were not constant and not equal for all producer households.

It was already indicated in the previous chapter that livelihood diversification among the sample group was not generally to be understood as a step away from farming, and that most producers saw a farm-based livelihood as the ideal. Many of the small-scale coffee producers interviewed, however, had not inherited land, or at least not enough to maintain a household. In the present chapter it is shown how engagement in off- and non-farm work was not only a way of surviving for the households, but that livelihood diversification could contribute to investment in land and farm productivity and finally lead to the possibility to rely entirely on farming. The family life cycle dynamic was a useful concept to understand differences between the livelihood strategies of households of different ages as different stages in a trajectory from dependence on off- or non-farm income, followed by a phase with both farming and other economic activities while establishing the production system and, finally, an entirely farm-based livelihood.

For a household to be able to follow the trajectory outlined above in the course of its life cycle, however, required that the dynamic between off- and non-farm work and farm production permitted some degree of accumulation. This was not the case in all of the producer households included in the sample. It was found that livelihood diversification could form part of either positive or negative dynamics depending on the ways in which diversification of economic activities at the household level and management and production of the coffee agroforestry system influenced each other. In the cases in which incomes from off- or non-farm work were complementary to farm production, this permitted cross investment and gave the household a wider and more secure range of economic options. In other cases, involvement in off- and non-farm work did not generate an investable surplus and lead to labour constraints on the household farm, hindering the improvement of farm productivity and thereby resulting in a generally stagnant economic situation for the household.

The findings suggest that the characteristics of farm-wage labour made the occurrence of trade-off situations more likely, especially in households where the principal manager of the agroforestry system engaged in farm-wage work. The
producers who engaged in farm-wage labour mostly did so for reasons of economic compulsion and tended to be from the poorer households. In many cases, entry barriers in terms of education or capital for investment made jobs and economic activities that were income-wise more attractive or more compatible with farming inaccessible to them. In contrast to the households that had succeeded in small-scale accumulation by means of livelihood diversification, these households were caught up in a trade-off situation with badly paid and time consuming off-farm work and low farm productivity. This indicated a tendency towards progressive differentiation within the group of small-scale producers. The case study examples moreover showed how the possibilities of achieving and maintaining a farm-based livelihood were conditioned by the larger structural conditions in terms of markets, politics and demographic trends in different historical periods.

In order to investigate the reasons for, and implications of, livelihood diversification, the case study analysis in section 6.1 investigates the changes that had taken place in the households’ livelihood strategies in an historical perspective. Analysing the empirical material from a different angle, a typology presented in section 6.2 is used to compare socio-economic characteristics of producer households with different livelihood strategy types across the entire sample.

6.1 Livelihood diversification in the case study households

Five cases were selected to illustrate the dynamics and differences in the producer households’ livelihood strategies outlined above. Firstly, case study no. 1 (Pedro) is an example of a producer household depending totally on farm production, whereas the remaining cases illustrate different dynamics involving livelihood diversification. Secondly, the explanation of livelihood diversification as a phase in the life cycle of the producer household is illustrated by cases no. 2 (César and Mirna) and no. 5 (Andrés and Cecilia). The cases are examples of two different stages in the process, the latter a household engaging in livelihood diversification as a means to accumulate and invest in a farm, the former a household that had reached the stage of specialising in farming. Thirdly, case no. 4 (Alejandro and Magdalena), still a household in which livelihood diversification and farm production were part of a positive dynamic, was chosen to demonstrate the importance of intra-household relations in the allocation of household labour. The case shows that livelihood diversification is not always a result of collective household strategies but can also be an outcome of the decisions and actions of individual household members, in this case the wife. Thirdly, case no. 3 was selected in order to illustrate a situation where livelihood diversification was
expressed as a trade-off situation between low farm productivity and more permanent dependence on farm-wage labour.

Finally, one aim in the selection of case study households has been to include both parcelero and historically private producer households. Cases no. 1 and no. 4 are parceleros and the remaining are historically private producers. In the context of the present chapter, the examples of the parceleros are interesting with regard to the historical circumstances under which they gained access to land. In many other aspects, however, the criterion is considered of minor importance as the analysis did not show any marked differences between the two groups.

In table 6.1 some key farm and household characteristics of the five selected cases are summarised. The area cultivated with coffee in the selected case study farms was within the same order of magnitude, but the total size of César’s farm (case no. 2) with 8 mz was a bit larger than the other producers’, who all had around 3 mz of land.
The case study excerpts presented in the following include information on the households’ histories as producers, the ways they had gained access to land and established their farms, a brief characterisation of the household members and their principal activities, and an account of the ways in which their livelihood strategies had changed over the years. The changes in the livelihood strategies were, inter alia, studied by means of a household life-history exercise. To this end, the respondents were presented with an historical matrix comprising four periods: the time of the Somoza regime (before 1979); the decade of the Sandinista revolution (1979-1990); the 1990s with liberal governments and the future. The matrix was filled in in the course of a discussion of what kind of economic activities the household members engaged in at the time. The results of this exercise are compiled with other data from the in-depth case studies and survey interviews to describe the role of diversification, how they had gained access to land and other important change processes that had taken place in the livelihood strategies of the studied farm households over time.
6.1.1 Case studies

Case No. 1: Pedro (64), Fátima

Establishing the coffee farm:
Pedro owned about 3 mz of land, which he had received during the agrarian reform. His father had inherited a part of his grandparents’ farm, but lost it because he did not have a proper title to the land. When Pedro was young he therefore went to work as a farm labourer on a coffee hacienda. Around 1970, he got a job at the dairy plant ‘La Completa’ in Managua, where he stayed for 16 years. But after the revolution things at ‘La Completa’ did not go so well anymore, probably because of the ongoing de-capitalisation of the cattle sector. When wages were lowered Pedro decided to leave his job and take up farming in the area he came from. He sold the family’s house in Managua and left for Masatepe to look for land. After a few unsuccessful attempts to buy land he was offered a plot in the cooperative ‘La Compañía’ in the village of Fátima. When he accepted the offer it had been an important condition for him that the cooperative did not work as a collective farm, but as a more individually organised CCS.

The coffee plantations of ‘La Compañía’ had been modernised by the CONARCA programme and Pedro’s plot had three-year old coffee plants when he received it. To begin with, the only product from his farming plot was coffee, but Pedro soon started to diversify his production system with plantains, bananas and fruit trees. At the time of the study, his possibilities of diversifying farm income with fruit and minor livestock such as chicken were somewhat restricted, however, because he had nobody to help him guard crops or animals against theft. He appeared to manage his coffee agroforestry system successfully, though, and achieved good returns from coffee production. Shortly before the time of the study, he had started to cultivate food grains on some rented land together with his son as a joint investment. He took up grain production because he had had the chance of participating in a credit programme promoted by the National Institute of Agricultural and Livestock Technology (INTA).

Household members and economic activities:
At the time of the interview, Pedro was living alone on his farm. His 4 children had grown up and moved to other places. His wife had left him for another man when his eldest son was in secondary school. His two daughters were married and had moved in with their husbands. The daughters both helped him with his housework, and the one living closest by also lent a hand during coffee harvests. The two sons worked in woodcutting. Both owned chain saws and they had a pick-
up truck, which Pedro said he had helped them to buy. Pedro’s eldest son had left secondary school just two months before graduation, which both Pedro and the son himself seemed to regret. Instead he had started to work. Among other activities, he had gone to Costa Rica thrice where he had done different kinds of jobs; in banana production, in a bakery, and within the tourist sector. In contrast to his younger brother, he came and helped Pedro with the farm work when he could. Pedro said that he and his children helped each other economically, but that it was mostly he who helped them. Asked about the future of his farm, Pedro was not very sure if one of his sons would take over one day or whether they would rather continue with their present work.

*Livelihood strategy and diversification:*

Pedro’s one-man household depended entirely on farm income, and could not be characterised in terms of livelihood diversification. His daughters were married and his two sons had started their own lives independently and worked in what seemed permanent self-employment. Pedro did not at any point express the wish to engage in other economic activities than work on his own farm. Had he wanted to, household labour would have been an obvious constraint. The most significant change had been from wage labourer to land owning producer.

**Case No. 2: César (57) and Mirna (51), San José**

*Establishing the coffee farm:*

César was originally from San José, his wife Mirna from León. His father had been one of the founders of the community of San José, César said. He had died when César was still a child, and had not left him any inheritance. As a young man César had left for the León region where he worked for 23 years, first as farm worker and later as foreman on large-scale cotton and fruit plantations during the export boom in the 1960s. In León he met Mirna, who worked as a self-employed cook preparing food for the farm workers. Her job was the most important income source for the family at the time. With their incomes Mirna and César paid their children’s schooling and saved to buy a farm. They were able to buy the farm in San José in 1968. A caretaker looked after the farm for the first years, while they continued working in the Department of León. To begin with, the farm only produced food grains, but little by little they planted plantains, bananas and fruit trees, and later on coffee. In 1981, the family moved to San José, but César went on working for an agribusiness firm until 1984. With his wage income, they maintained the family while income from agriculture was used to reinvest in the farm. Towards the end of the 1980s, another plot of land was bought, which they had first rented from the
service cooperative CORCO. Regarding the future of the farm, César said that he planned to go on intensifying production of coffee and citrus, and maybe buy some breeding cows. This would however entail renting land for pasture, which could turn out to be a problem as grazing land was very scarce in the area.

**Household members and economic activities:**
Including César and Mirna themselves, daughters, sons and daughters in law and grandchildren, 9 adults and 5 children under 15 years were living on the farm. One of the sons, who apparently was only César’s, lived with his wife and child on the family land as an independent household unit.

César himself reported that he dedicated all his labour time to farm work, but also spent some time on political and community work. He was an active member of the conservative party and represented the village of San José in the Municipality in Masatepe. Moreover, he was a member of the planning committee of the annual fiestas patronales, the celebration of the patron of San José. César stated that Mirna worked mostly with household tasks, but it was obvious that she also carried out some tasks on the farm, as I found her in the field during several of the visits.

The two eldest sons worked as professionals, one as an agricultural engineer in the local coffee-growers organisation the other as a teacher for mentally retarded children. The son who lived independently with his family on the same plot of land made a living as farm labourer, but occasionally also helped on the family farm when he had time. Two young adult sons studied part time and worked on the farm and did a few tasks around the house. The two adult daughters looked after the house and children and one of them studied part-time. The oldest grandson, aged 14, worked full time on the farm, the three granddaughters between 8 and 14 went to school, the eldest helping in the household and the youngest grandson was a toddler. During the conversations, César revealed that he had more children, apparently of a former relationship, who were living in a house he still had in León. César used to depict his family as very united and liked to emphasise that the farm constituted the basis of their livelihood:

“The farm supports us, it gives me my clothing, it gives me everything. (...) My whole family - we are 10! - live of the farm. And now we’re going up! There’s already arrived a grandchild, now the family will be even bigger. (...) The day I lose this labour, things will change, because I would have to pay a labourer, and then things would really change”
César, (FocusGroup 2000)

The abundance of male family labour was a crucial factor for the prospering of César’s farm, which he was well aware of.

Livelihood strategy and diversification:
The couple started out as wage and self-employed workers in the agro-export sector around the beginning of the 1960s. After having bought some farmland with their savings, from the early 1980s onwards a change towards concentration on farm production took place, as first Mirna and then César left their jobs to work on the farm. Simultaneously, at the farm level diversification had obviously taken place, from production of only food grains in the early 1970s diversifying with coffee and different kinds of marketable fruit. Having finalised their education, the two eldest sons started to work professionally in the 1990s. In the beginning, they might have contributed to the household economy. However, their employment should not be interpreted as a step towards increasing livelihood diversification of the parental household, as contributions to the parental household ceased as soon as the younger generation started getting families of their own.

Case study no. 3: Jorge (65) and Ana (59), San José

Establishing the coffee farm:
Jorge and his family had a farm of 2.5 mz. He had inherited most of it and bought an additional half mz around 1970. Jorge had planted the coffee and the trees on the farm himself. Apart from coffee, fruit and plantains the family cultivated some food grains for household consumption and raised some minor livestock, such as chickens. The range of products on Jorge’s farm, thus, was quite diversified. The degree of crop diversification did not seem to have changed during the past decades, and asked about his plans for the farm Jorge responded that he would like to improve the farm but maintain the same crop composition.

Household members and economic activities:
The household consisted of Jorge and his wife Ana, their adult son José Luís, another son of 7, and a grown-up daughter, Reina, with two children of 9 and 4. Jorge and Ana had 11 more children who were grown up and had moved to other places.
Jorge and his elder son were the ones who worked the farm, but both of them also worked as farm labourers. During the rainy season, both dedicated about half of their time to the farm, the rest was split between farm-wage labour and other tasks around the house and yard. While Jorge’s division of time between his own farm and paid labour was more or less constant throughout the year, his son dedicated more time to off-farm work in the dry season. The two women mostly dedicated their time to housework and childcare. Only during the coffee harvest did they help out on the farm. The two boys were in school and helped with tasks around the house. Jorge considered the farm the most import source of household income. Other sources were his and José Luís’ wages and contributions from the adult children living outside the household.

The coffee farm where Jorge worked had recently been bought by a German farmer. He commented that various Germans and US-Americans had started buying land in the area, a development he regarded as positive, as they ‘worked well’, as he said. However, asked about his prospects for the future, he said that he hoped to be able to work less as farm-wage labourer and live off his own farm. During the walks and talks with Jorge in his coffee plantation it also became obvious that time was a serious constraint to improving farm productivity. Jorge would come home from work on the hacienda in the early afternoon, but some days he went back to work an extra shift. Even though on the days he came in early he had, in theory, several hours to work on his own farm before sunset, which he always intended, he clearly was quite exhausted after the day’s work he had already done at the hacienda.

Livelihood strategy and diversification:
In the 1990s, as before the Sandinista revolution, farm income had to be supplemented by wage labour to maintain the household. During the decade of the revolution, Jorge said, the situation had been somewhat better. In those years it had been possible for him and his family to live on the income from the farm, and only occasionally had he had to work on other people’s land. Today, he added, they had to work more outside the farm because the prices of the products they bought had gone up so much. Due to the changes of market conditions and state policies in the 1990s, they had gone back to divide their time between their own farm and farm-wage labour. Livelihood diversification in this case was undertaken due to economic compulsion, i.e. farm-wage work was taken up because farm income did not suffice to support the family. Jorge was very explicit on this point in his comments both about the 1980s during which farm income was enough to make a living and regarding his vision of the future.
Asked about the future of the farm, Jorge answered that he expected that the family would continue to work the farm as one single unit as long as he was there. After that, every one of his 13 children would have his or her share, and whether they would choose to divide up the land or keep it as one farm he could not say.

**Case No. 4: Alejandro (56) and Magdalena (43), Fátima**

*Establishing the coffee farm:*

Alejandro had started working as a wage labourer on a coffee hacienda at an early age together with his father. His family had a small piece of farmland, but when Alejandro’s mother died, his father remarried and later left the land to his new wife and her children. Alejandro received land when the hacienda he worked on was turned into a cooperative during the agrarian reform. The cooperative, *Pedro Hernandez No.1*, was established as a CSM, meaning that the members had individual plots within the cooperative but to some degree were collectively organised with regard to work, credit, inputs and technical assistance. Alejandro was the president of the cooperative during the first years. He said that although he preferred to have his individual plot, he always liked to work together. During the time in the cooperative, Alejandro had worked part-time as lorry driver for the cooperative, which gave him an income apart from farming. Later he was appointed a commander (*comandante*) and sent to join the Sandinista army during the last years of the civil war.

When Alejandro received his plot in the cooperative, there was virtually only coffee and a few acacia trees planted as windbreaks. After the cooperative fell apart and he started managing his plot individually, he had planted a range of different fruit and timber trees, plantains and bananas. In 1996, he bought another half manzana of land by the road, where he had also built his house. This plot had almost nothing when he got it, Alejandro said, except a few mandarin trees. In the following years, however, Alejandro had turned it into a flourishing orchard including plantains and bananas, citrus, mango, avocado, dragon fruit, other fruits and vegetables. Apart from that, Alejandro had been engaging in apiculture for several years and recently the family had also started to raise pigs and poultry, and to produce ornamental plants and seedlings.

*Household members and economic activities:*

At the time of the study, Alejandro lived on the farm with his wife, Magdalena, and two of their 5 children, a daughter of 16 and a son of 7. Both children went to school. Besides the two children living with them, the couple had two more sons and a daughter, all of whom were grown up and had left home.
Magdalena worked in a US-American owned sewing workshop in the nearby town of San Marcos. She had no regular contract but was called in for periods of time whenever there were orders, which, however, seemed to happen quite frequently. She had used to work when she was younger, she said, but then stopped. Two years ago, she had started working again in the same factory. Moreover, she told me that during the season she went to Masaya to sell fruit about twice a week.

Alejandro carried out most of the farm work himself. He lamented that his wife and children did not help him more with the coffee farm, although according to him they knew perfectly well how to do the different tasks. The only farm work his wife did, he said almost complainingly, was picking fruit to sell in the market. He himself never went to the market. He continued to tell me: “I don’t even know where the market is!”

The only work Alejandro performed outside his own farm was a temporary part-time job he was doing for the owner of a neighbouring plot. This man lived in Managua and had acquired the plot for use as a *quinta*. The neighbour had first given Alejandro an offer for the plot that the family was living on, as he liked the way the garden and orchard had been designed. When Alejandro refused to sell, the former bought another piece of land nearby and asked Alejandro if he could create his new *quinta* in the same fashion. Alejandro agreed on the assignment, which for its duration included looking after his new neighbour’s property during his absence in exchange for a smaller payment. Alejandro explained that he had planned to use some of his time during the dry season to do the job, as there was not that much to do on his own farm. However, during the conversation it seemed that he regretted having agreed to the job, as he felt that he didn’t have enough time. He said that the need for permanent vigilance around his house and fields against theft was a major constraint on the use of his time, especially since his wife had started working again.

The eldest son was 32 years old and was employed as a journalist with one of the national TV stations. Alejandro told me that the son came to visit them now and then, and helped him among others by supplying him with clothes: “He dresses me from my underwear to my cap!” The daughter of 36 was a housewife, and the second son (20) was married and lived with his wife’s family. He worked with them in selling fruit in the local market, and did not contribute economically to the household of Alejandro and Magdalena.

*Livelihood strategy and diversification:*

43 A *quinta* is a kind of hobby farm, which many urban middle class families in Nicaragua maintained on varying degrees of a commercial basis.
Magdalena contributed to livelihood diversification at the household level with her job as seamstress. Moreover, her fruit selling in the market of Masaya contributed to the household economy as the direct sale of fruit without intermediaries meant that more income could be generated. While Alejandro obviously pursued diversification of farm products he no longer engaged in off-farm activities, apart from the temporary agreement with his neighbour.

Obtaining land during the agrarian reform had been the most important change for the household’s livelihood situation. Before that, Alejandro and Magdalena’s family were in a somewhat less secure situation. As Alejandro commented, as a farm labourer you did not have a secure future, when you grew old nobody would employ you. Although his answer was not that clear on the issue, it seemed that Alejandro was confident that the farm would continue to be the basis of the family’s livelihood in the future.

Case No. 5: Andrés (52) and Cecilia (43), San José

Establishing the coffee farm:
Andrés’ family used to have a small farm of 1.5 mz, on which he had worked since childhood. When his mother divided the land between her children he received a share of 0.6 mz. Andrés had later sold a piece of his land to a nephew in need of a plot on which to build his house. The remaining piece of Andrés’ inherited land contained his house and a homegarden with a few hundred square metres of coffee, plantains and fruit trees. At the time of the study, Andrés had recently acquired 2 mz of new land from a parcelero in the neighbouring hamlet of Mirazules, where he was starting to grow coffee. At the time of the interview he was thinking of buying a second plot from another neighbour and eventually move the household to his new property.

Household members and economic activities:
The household consisted of four generations: Andrés’ mother, his wife Cecilia and himself and 2 adult daughters, both single mothers with 5 small children between them. Another man, an elderly carpenter, lived on the premises of Andrés’ family but was economically independent. Three adult sons had left home and lived independently, one working in the nearby town of Jinotepe, another in Costa Rica and the third unemployed. Asked whether the sons contributed to the household Andrés said no, but he himself always sought to help them a little when he could.

Before the farm was divided between Andrés and his brothers and sisters, the family depended primarily on the income from coffee production. From an early
age, Andrés had also worked as farm labourer and when the farm was split up into smaller plots his wage was the most important income for his own family. During the 1980s, Andrés continued working as farm labourer in addition to farming, but less than before, and in the 1990s he left wage labouring all together. Instead the family had taken up a variety of income generating activities, among others selling fruit on the local market, a modest pulpería, and the preparation and selling of nacatamales\textsuperscript{44}. While the off-farm activities apparently were Andrés’ job, Cecilia took care of the preparation of nacatamales and other tasks within the household. Moreover, an adult daughter belonging to the household contributed what she earned working in domestic service in Managua.

Livelihood strategy and diversification:
Concerning the future, Andrés’ explicit strategy was to continue generating income with the different activities he and the other household members engaged in, while he was able to work a lot, and invest in the establishment of the farm with perennial crops such as coffee and citrus trees, and a few annual crops and tubers. Once the crops were established in this way, the idea was for him and his family to be able to live a more relaxed life, depending on the income from the farm. Andrés hoped\textsuperscript{45} that his children would continue working the farm after him. To sum up, the characteristics of the household livelihood strategy had been increasingly diversified but with the ultimate objective of concentrating on farm production. Surplus from off-farm and non-farm income had been invested in the purchase and preparation of new land for coffee production. Diversification of economic activities, thus, was used consciously as a means to change the livelihood strategy of the household in order to achieve independence from off- and non-farm work.

Presented with the matrix used for the interview about changes in the economic activities of the household over time, Andrés made some interesting comments. The matrix was structured around four time periods, ‘at the time of Somoza’, ‘during Sandinism’, ‘the 1990s’ and ‘the future’. These periods had worked fine in other interviews, maybe not surprisingly, as they had been based on historical fix points frequently used by the locals themselves. Andrés opposed this format quite vehemently, however, saying that the changes in farm management and economic activities of the household had nothing to do with the changes in the political system. He explained that the changes were due to personal maturity and the experience and knowledge that he had gained over the years. For instance, he

\textsuperscript{44} A popular local dish made of corn flour and pork wrapped in banana leaves.

\textsuperscript{45} Andrés used the Spanish verb ‘esperar’, which can mean both ‘hope’ and ‘expect’. In this translation the connotation of ‘hope’ has been chosen because it seems relatively uncertain from the context which of his children would be the one to follow in his footsteps.
added, when he began to manage the family farm he did not think of the possibility of diversifying production. During the 1980s, he started diversifying both the crops produced on the farm and other economic activities. The family is doing a lot better now, he concluded, but this is principally due to personal development and not external conditions.
6.1.2 Discussion of the case studies

The case studies illustrate different types of livelihood strategies and different kinds of dynamics expressed in the life histories of the producer households. One difference is between households that depended entirely on farming, as that of Pedro (case no.1), and those who combined farming with off- or non-farm work. Another difference was the nature of the dynamic characterising the relation between off-and non-farm work and farm production, which could be positive or negative. The life history approach used in the case studies showed that to understand the livelihood situation of a household the changes over time were of great importance, where dynamics related to the family life cycle as well as broader historical change processes played a role.

Jorge’s household illustrated a situation of more or less permanent semi-proletarianisation. Low farm productivity made it necessary to seek farm-wage labour, which in turn constrained the possibilities to undertake productive investments on the farm. Examples of households that had been able to accumulate surplus from a portfolio of different off- and non-farm activities were the cases of César and Mirna (no. 2), Andrés and Cecilia (no.5) and Alejandro and Magdalena (no.4). Engagement in off- and non-farm activities had allowed them to improve and consolidate their livelihood base by investing in farm intensification and land. César and Mirna and Alejandro and Magdalena, moreover, were the only ones among the case study producers with adult children who had studied beyond the level of basic education and worked as professionals. In both cases, the childrens’ education had taken place during the decade of the revolution. The livelihood strategies of the three households resembled each other with regard to the positive dynamic that the relation between off- and non-farm work was characterised by. At a more detailed level, of course, there were also differences between the assets and strategies of the three households, the motivation for diversifying, the timing and the way they had done it, as will be discussed in the following.

Livelihood diversification as part of the life cycle of producer households

At the time of the field study, the livelihood strategy of César and Mirna’s household was concentrated on farming. The case study, however, showed that this had not always been so. The household had moved from depending on wage labour and self-employment via a livelihood combining incomes from wage labour and farm income to an entirely farm based livelihood strategy. César had chosen to maintain his job as farm manager for an agribusiness company for some years in order to be able to invest in perennial crops and land, although the farm that the family had acquired would have sustained the household at an earlier point in time.
In Andrés’ case, the sub-subsistence size of his inherited plot of land had also forced him to seek farm wage labour when he was young. As he gained more life experience, to use his own explanation, Andrés quit farm wage labour and he and his family successfully managed to diversify their economic activities into a range of non-farm activities that allowed them to acquire more land and invest in the farm. The outcome of diversification with activities other than farm-wage labour, thus, left them in a qualitatively better situation than before. Andrés’ income from the coffee agroforestry system did not measure up to that of César and Alejandro at the time of the study, but it was apparent that the investment he was undertaking in his new farming plot would soon bear fruit. Andrés’ explicit strategy was to transfer the surplus from the many non-farm activities that he and his family were engaging in to farm investment, in order to be able to specialise in farm production in the future. This idea was very similar to the strategy of César and Mirna, though at an earlier stage.

*Importance of intra-household relations*

The case of Alejandro and Magdalena resembled the examples of César and Andrés’ households in the sense that livelihood diversification contributed to the household’s ability to undertake productivity-enhancing investments in the farm. The dynamics driving livelihood diversification, however, were somewhat different in this case. The livelihood strategies of César’s and Andrés’ households gave the impression of being the result of more or less corporate decision-making lead by the male head of household, where the ultimate goal was for the household to be able to depend entirely on farm income. The case of Alejandro and Magdalena’s household illustrated a different kind of intra-household relationship. Livelihood diversification in this household was principally the result of the wife, Magdalena’s, economic activities as seamstress and in selling fruit. From the interviews with her and Alejandro it seemed that the decisions to engage in these activities were basically hers, and not taken jointly by the couple. Rather than a means of achieving independence from off- and non-farm work by investing in the farm, her motivation was to earn money for her children’s education and to gain a certain degree of economic freedom for herself.

*Aspects of social differentiation*

As discussed in the previous chapter, households diversifying out of economic compulsion were generally more likely to engage in farm-wage labour and other badly paid jobs and therefore were less likely to generate a surplus for investment. The entry barriers restricting poorer producers from access to better jobs and income opportunities indicated a tendency of progressive social difference among the small-scale producer households.
A study carried out on parcelero and small-scale private producers in Masaya by D’Exelle et al. (D’Exelle and Bastiaensen 2000) shows how close returns in farm-wage labour and working on the producer’s own farm could be in cases with low farm productivity. Based on case studies from three small-scale farms with different levels of productivity D’Exelle et al. calculated that the revenue of a family labour unit was respectively 11 C$/day, 16 C$ and 21 C$ per day per worker. In the third case, not considering other aspects, it would seem unlikely that the producer would decide to engage in farm-wage labour. In the first two cases, however, returns from labour invested in their own farms were close to the average wage of 10-15 C$/day for a farm labourer (D’Exelle and Bastiaensen 2000, pp. 106-110). Among the sample of this study there were examples of households where this seemed to be case. In contrast to the producer households who had been able to accumulate and enhance their farm productivity and income, for instance, Jorge and Ana’s household (case no.3) was caught up in a far more stagnant or even deteriorating economic situation. Low farm productivity forced the male adults of the household to take up farm-wage labour. Farm-wage labour helped to meet household consumption needs, but was not sufficient to generate a surplus that could be invested in the farm. Farm-wage labour moreover resulted in time constraints with regard to managing and improving the coffee production system on their own farm. Farm-wage labour thus represented constraint to improve farm productivity and incomes, and thereby reinforced the economic compulsion to seek off-farm income.

In spite of a strained household economy at the time of the field study, the household of Jorge did not appear to be under pressure to sell their farmland, however, as it was not encumbered with debt and no larger investments were at risk. This meant that they had been able to maintain their land although it was not sufficiently productive to secure the livelihood of the household without a supplementary income from off-farm work, at least as long as no major unexpected costs occurred. The coffee price crisis that at the time of writing left many Nicaraguan coffee workers unemployed and at worst starving, however, highlighted the covariate risk associated with small-scale coffee producers’ supplementing incomes with wage labour on larger coffee farms.

*The influence of broader structural conditions*

Regarding Netting’s notion of social mobility being a characteristic of the social processes taking place within the smallholder category, it could be suggested that personal characteristics - related to skills, gender, personality or family life cycle - certainly influence the probability of an individual’s or household’s social mobility. Some people or households will always do better than their neighbours. Broader
structural conditions, however, also play an important role for their possibilities, and an enabling economic and political environment may allow for a larger proportion of producer households to be more successful in their agricultural production and livelihood strategies than a restrictive environment.

An important example of the way in which larger structural political and economic changes influenced livelihood trajectories was the redistribution of land as an outcome of the agrarian reform. Thus, successful small-scale producers such as Alejandro or Pedro might never have left wage working had it not been for the Sandinista agrarian reform. But also more generally it could be suggested that the favourable conditions for coffee production in the early 1980s, in terms of national agricultural policies and world market prices, allowed the coffee producers of the sample who owned land at the time to establish and invest in their coffee production system. The importance of the broader structural conditions was obvious in a general pattern among the households of the sample of increased concentration on farm production during the agrarian reform years. Even Jorge’s household had been able to live off their farm income and Jorge had been able to leave farm-wage labour for the time being. Support for the observed trend of less engagement in farm-wage labour among the sample group during the 1980s could be found in the literature. Thus, Rice mentions that successful agrarian reform was one of the factors contributing to a shortage of agricultural wage labour during the Sandinista period (Rice 1990, p.236).

Apart from the more general impact of the wider economic and political conditions on the producer households’ situation, it could also be of importance how the different phases in a producer households’ life cycle coincided with the broader historical tendencies. César and Mirna, for instance, had earned money in the agribusiness sector during the agro-export boom when they were young, while the establishment of their coffee farm coincided with the favourable economic and political conditions for farm production at the beginning of the 1980s.

The non-farm activities that Andrés’ household (case no. 5) and Magdalena (case no.4) engaged in were examples of the opportunities found in the newer economic tendencies in the study region. The increasing markets for agricultural and other petty products associated with the growing trend towards urbanisation around Managua and Masaya were opportunities that had helped Andrés and his family to accumulate money to buy additional land. Magdalena’s case pointed towards another more recent tendency influencing the employment patterns in Nicaragua’s rural areas: the emergence of maquila industry (textile assembling factories), mainly in the industrial free zones, where many younger rural women found employment.
In many other aspects, the economic and political situation of the 1990s, of course, also involved constraints on the possibilities for small-scale production and livelihood diversification. Unstable coffee prices and limited and risky credit options were important restrictions for coffee producers, while limited employment possibilities, low wages and drastically increasing land prices in the area made it difficult for those among the younger generation who aspired to become agricultural producers.

**Summing up the argument**

To sum up the findings of the case study analysis, Netting’s concept of the family life cycle offered an illuminating perspective in the analysis of the livelihood strategies of part of the coffee producer households of the sample, which was illustrated with the cases of César and Mirna and Andrés and Cecilia. The cyclical pattern that was identified among the trajectories of the studied producer households consisted of three stages. During the first stage, which all five case study producers had experienced, the young farmer’s sons, and sometimes also daughters, worked as farm-wage labourers, because they had lost access to land in the succession of inheritance or had inherited too little land to make a living based on farming. The next stage was that of the younger household who had gained access to some farmland, but continued with diversified livelihood strategies while establishing their farm. The third stage in this pattern consisted of concentration on farm production, when the farm had reached a level of productivity that was sufficient to maintain the household. Moreover, having reached the third stage in the described cycle the producer would typically be too old to continue selling his labour.

While Netting’s concept of the importance of the family cycle served as a valuable inspiration in this part of the study, the analysis of small-scale coffee producer households in Carazo and Masaya required modification of the concept in several aspects, which *inter alia* were associated with the role of income diversification in the producer households’ livelihood strategies. Firstly, in Netting’s model of analysis the family life cycle and the farming system are seen as being directly related via the variable of household labour. In the present case it became obvious that the importance of household labour for farm production could also be indirect in terms of generated income or labour constraints as a result of off- and non-farm activities. Secondly, the case of Alejandro and Magdalena showed that household labour allocation could be the outcome of different kinds of intra-household relations and decision-making processes, an aspect which does not seem to be given very much emphasis in Netting’s work. Thirdly, the different outcomes of livelihood diversification, accumulation if the dynamic was positive as in the cases of César, Andrés and Alejandro’s households, and stagnation of farm production
and continued economic compulsion to work as farm wage labourer as in the case of Jorge’s household, suggested a tendency of social differentiation among the producer households. Finally, a model of explanation focusing narrowly on dynamics at the household level does not grasp the influences of broader structural conditions and historical change processes on the producer households’ room for manoeuvre.

6.2 Discussion of different types of livelihood strategies and dynamics

6.2.1 Criteria and methodology

In addition to the qualitative analysis of the case studies, a typology was developed for grouping the coffee producer households of the sample according to their livelihood strategies. The groups were defined in order to investigate further the identified dynamics related to the family life cycle and to social differentiation in which different types of off-and non-farm work played a role. To this end, the households were first divided into two categories: one of households specialising in farm production *i.e.* with no other income sources than the farm, and one of households with additional off- or non-farm income, labelled ‘diversified livelihood strategies’. The hypothesis was that differences would be encountered in household size, age and farm investment given a move from a diversified livelihood strategy to concentration on farm production in the course of the family life cycle as was discussed above.

Based on the possible positive and negative dynamics associated with livelihood diversification in terms of motivating factors and impact on farm production, the second step was to sub-divide the second category according to the type of economic activity engaged in. Building on the different dynamics identified in the relation between farm production and different types of off- and non-farm work, the division was made according to the possibility to generate a surplus for investment in farm productivity and the compatibility of the type of work engaged in with work on the household’s own farm or, alternatively, the possibilities to compensate for time invested in other activities by hiring labour. Following this logic, farm-wage labour was singled out as the most typical and most frequently incompatible activity among the different types of off- and non-farm occupation.

The in-depth case studies demonstrated that farm-wage labour, on the one hand, considerably limited the time and energy that could be invested in work on the households’ own farm and, on the other hand, the low wage levels did normally not permit employment of hired labour to compensate for the reduced family
labour inputs. Time constraints are not only a major problem in the case of permanent wage labour but can also arise temporarily as a consequence of seasonal farm-wage labour. Thus, the possibilities for seasonal work on the large farms in the area generally coincided with peak labour demands on the small-scale producers’ own farms. Another feature concerns the question of risk. Work on coffee farms, a typical employment option for seasonal labour, thus, bears high covariate risk for small-scale coffee producers. This means that if off-farm work is sought because of a failing income from the coffee harvest due to climatic adversities or low coffee prices there is a high probability that labour demand on the large coffee farms is low for the same reasons.

As discussed in the previous chapter, the producers themselves distinguished quite clearly between different kinds of off- and non-farm jobs. While well-paid skilled and professional jobs were perceived as desirable and successfully seized trade or business opportunities were taken pride in, work as farm-wage labourer or in domestic service was merely seen as a means to make a living if there were no other options. That it is appropriate to make such an analytical distinction between different types of off- and non-farm economic activities of rural households can moreover be supported by the methodology and findings of other relevant studies, both from Nicaragua (Broegaard and Ravnborg 2001; Corral and Reardon 2001) and other regions e.g. a study by Birch-Thomsen et al. in Tanzania (Birch-Thomsen, Frederiksen et al. 2001)46. In the latter study, farm-wage labour was directly given negative weight in a typology of livelihood strategies forming part of the analysis.

In the present study, instead of assigning all households where farm-wage labour occurred to a ‘farm-wage labour’ category it was decided to define group no. 2 in terms of the occupation of the principal coffee agroforestry system manager only. Households where the principal coffee agroforestry system manager worked as farm-wage labourer were, thus, assigned to group no. 2. The off- and non-farm work of other household members than the principal coffee agroforestry system manager were not differentiated, as the survey data indicated that one permanent, full time worker with additional family or hired labour during peak demand periods was normally sufficient with the average areas managed.

The remaining group of households within the category of ‘diversified livelihood strategies’ (group no. 3) consisted of households with income from off- or non-farm activities where the principal coffee agroforestry system manager did not engage in

46 The methodology presented by Birch-Thomsen et al. contributed to inspire the elaboration of the typology used in the present analysis. The methodology, however, was adapted somewhat to make it relevant to the specific purpose and type of data of this study.
farm wage labour. Livelihood diversification in this group could be the result of other household members’ off- or non-farm work. The principal coffee agroforestry system manager in this category, however, could also be engaged in other economic activities that for different reasons were not – or to a lesser extent - considered incompatible with working on his or her own farm. These activities consisted of different types of work. One was self-employment (petty commerce, trade, crafts), which is normally more flexible than farm-wage labour as it can to some extent be adapted to the daily and seasonal working tasks on the farm. The other type of activity consisted of employment as professional or skilled worker, where income was assumed to be higher than in the jobs of group no. 2, making hiring of labour to work on the farm an option, or substituting labour with chemical inputs where possible. In sum, it could be said that the difference between livelihood strategies of group no. 2 and group no. 3 is that the former is assumed to be characterised by a trade-off between farm production and other economic activities, while the latter represents a situation of complementarity.

According to the argument that the possibilities of producer households to improve their farms and socio-economic situations were filtered by social heterogeneity, differences between groups no. 2 and no. 3 were expected in farm size, coffee agroforestry system income, investments (purchase of land, inputs and hired labour) and level of education.
6.2.2 Typology of livelihood strategies

In order to study differences between livelihood strategies, the coffee producer households of San José and Fátima (N=39)\textsuperscript{47} were grouped according to their income composition in the following way:

1) ‘Specialised in farming’: Farm only source of household income.
2) ‘Farm-Wage Labour’: Principal manager of coffee agroforestry system working as farm wage labourer.
3) ‘Diversified’: income from other household members’ off- or non-farm work or from principal coffee agroforestry manager’s non-farm economic activities, either self-employment in petty commerce, trade, crafts, etc. or professional / skilled work.

The aim of the typology was to investigate how the socio-economic characteristics of the different groups of households matched the family cycle concept and whether they supported the identified dynamics of trade-off and synergy between different types of off- and non-farm work and farm production identified above. The three groups of households were compared in terms of a number of key variables, among others farm size, coffee agroforestry income and investment data, household size and some personal characteristics of the principal coffee agroforestry system manager, including age and education. Moreover, the distribution of parcelero and historically private producers was included in the table to investigate whether differences in livelihood strategies were linked to the historical trajectories of these two groups.

Farm size and income from the coffee agroforestry system gave an indication of the households’ socio-economic situation at the time of the study. Household size was included to give an idea of the amount of family labour available. The producer’s age was assumed to be of importance in two ways: positively, in terms of the experience gained and labour invested over the years to establish a well-functioning production system, and negatively in terms of the producer’s decreasing working ability with older age. The variable related to land purchase was interesting with regard to differences in the investment behaviour of the households, which could be motivated by their stage in the process of establishing

\textsuperscript{47} The results from San Juan de la Concepción were not included, as they did not include data on the total agroforestry system income collected in the second survey carried out in the year 2000.
their farm or by differences in their means by which they accumulate cash for investment. Moreover, spending on chemical inputs and hired labour for coffee production were included as an indication of the amount of capital available for investment in the coffee agroforestry system. Finally, education was included as an indicator of the possibilities to obtain higher income non-farm work and of the general socio-economic situation of the household.
Table 6.2 Livelihood strategy types and key group characteristics

<table>
<thead>
<tr>
<th>(N= 39)</th>
<th>Group 1: Specialised in farming (n=15)</th>
<th>Group 2: Farm-wage labour (n=10)</th>
<th>Group 3: Diversified (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of principal coffee agroforestry system manager:</td>
<td>58.5</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td>Household size, members:</td>
<td>4.4</td>
<td>7</td>
<td>6.7</td>
</tr>
<tr>
<td>Producers’ education, years of schooling:</td>
<td>1.7</td>
<td>2.2</td>
<td>3.7</td>
</tr>
<tr>
<td>Farm size, mz:</td>
<td>3.1</td>
<td>2.4</td>
<td>5</td>
</tr>
<tr>
<td>Income from coffee agroforestry system, total, C$: (per manzana, C$/mz):</td>
<td>14,855 (8,460)</td>
<td>12,220 (6,253)</td>
<td>27,573 (9,146)</td>
</tr>
<tr>
<td>Input costs 1999/2000, C$/mz:</td>
<td>294</td>
<td>362</td>
<td>672</td>
</tr>
<tr>
<td>Hired labour, excl. harvest 1998/99, cases (% of group):</td>
<td>3 (20 %)</td>
<td>0</td>
<td>3 (21 %)</td>
</tr>
<tr>
<td>Had bought additional land within the past 15 years, cases (% of group):</td>
<td>5 (33 %)</td>
<td>6 (60 %)</td>
<td>9 (64 %)</td>
</tr>
<tr>
<td>Parcereros, cases:</td>
<td>10</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Historically private, cases:</td>
<td>5</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: Differences between group means could not be proved statistically significant. The fact that different types of dynamics influenced the livelihood strategies of the producer households is probably an important explanation. As will be discussed below, at least three different types of explanations played a role, related to the family life cycle, intra-household relations and social differentiation. Moreover, with regard to the suggested relationships between family life cycle dynamics and land access and farm productivity, the group of agrarian reform beneficiaries can be expected to blur the associations that may exist in the sample data.
Different phases in the family life cycle

A comparison of group no. 1 and the groups of households with diversified livelihood strategies (groups no. 2 and no. 3) in several aspects supported the explanatory concept of livelihood diversification being a stage in the accumulation strategy of households in the course of the family life cycle. According to this model of explanation younger households would use off- and non-farm income to buy land and invest in the establishment of a viable coffee production system over the years, until they were able to depend on farm income alone and could quit other economic activities. With the producers’ growing age, this process would, obviously, be accompanied by decreasing working ability implying limitations in their possibilities of taking on additional work.

Among the sample group of 62, only 23 respondents had inherited land. This, however, did not necessarily mean that they had been able to base their livelihoods on the inherited land. Some of the inherited plots were very small, sometimes just enough for a house and patio. In other cases, younger producer households had experienced periods without access to land before inheriting a plot at some later point in time. Among those producers who had not continuously worked on a family farm that was given over to them, but who had got access to land later in their lives (through inheritance, purchase or the agrarian reform), the average age was 41 when they acquired their first plot of farm land.

As can be seen in table 6.2 the age of the producers was generally quite high. Assuming that members of the younger generation also aspired to be producers this could be interpreted as that they had not yet got land of their own either because they lived and worked on their parents’ farm or because they were living off wage work and had not yet succeeded in gaining access to land. The table moreover shows that the producers in group no. 1 were somewhat older than the producers in the other two groups. Assuming that they had had a longer period of time to invest labour and capital in a gradual improvement of their coffee production systems this can explain how they achieved relatively high income levels without using many external inputs. This could further be supported by a correlation identified between producers’ age and average coffee yields achieved in the three-year period 1996-9948. Moreover, the households of group no. 1 had more land compared to the producers of group no. 2 and fewer producers of the former group had purchased land within the past 15 years. This could indicate that they already had enough land to maintain the household and did not have the need, but maybe not the capital either, to invest in more land.

48 A significant correlation was detected at (p < 0.05).
That producers of group no. 1 were generally older than the others also contributes to the explanation of the smaller number of household members in this category. Older producers were less likely to have young, adult children contributing to the household, as they would already have moved out and founded their own families. Family size was, thus, found to be lower in the group of households specialised in farm production, 4.4 household members compared to 7 in group no. 2 and almost 7 in group no. 3. This in turn could contribute some additional explanations as to why there was no diversification of economic activities in these households. Fewer household members meant that less labour was available to allocate to different economic activities. A smaller household with fewer mouths to feed could also imply that farm income was sufficient and there was not so much need to seek other income opportunities. The argument could moreover be substantiated by statistical tests indicating a significant correlation between variables related to household labour availability and engagement in off- and non-farm economic activities.⁴⁹

The numbers of historically private producers compared to parceleros within the three livelihood strategy types showed most difference between groups no. 1 and no. 3, indicating that parceleros more frequently specialised in farm production whereas historically private producers engaged more in non-farm activities. The notion of livelihood diversification being a means to gain access to sufficient land for a farm based livelihood could explain the fact that the parceleros included in the sample did not engage more in off- and non-farm work, as they all had received around 3 mz of land planted with coffee as agrarian reform beneficiaries. As a possible explanation for the higher number of historically private producers in group no. 3, it could be suggested that the variation in terms of farm size and available capital in the household was somewhat wider than among the parceleros. This in turn, meant that the most wealthy producer households, who were also the most likely to engage in higher status non-farm activities were found in this category.

*The question of social difference*

Another important question for the analysis was whether aspects of social differentiation played a role for the ways producer households in the sample adapted and changed their livelihood and production strategies. Among the cases where the principal coffee agroforestry system manager engaged in farm-wage labour, a trade-off was identified between livelihood diversification and the possibilities of improving farm productivity. This implied a tendency leading

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⁴⁹ Significant correlations were found between the variable ‘other sources of income’ and the variables ‘family size’ ($p = 0.001$) and ‘male household members aged 16-75’ ($p < 0.05$) by means of Pearson’s Chi².
towards socio-economic stagnation for households in which labour constraints of this type existed.

Table 6.2 indicates that the households of group no. 3, characterised by a diversified livelihood strategy, tended to have the most farmland and highest incomes from their coffee agroforestry systems, both in relative and absolute terms, while group no. 2 with farm-wage labour had the lowest average values. Better capital availability seemed a likely explanation for the high frequency of land purchase and the higher spending on inputs for coffee production of group no. 3. The frequency of land purchases was highest in the group of households with diversified livelihood strategies. Moreover, the data show that producers of group no. 3 most frequently hired labour to work in their coffee agroforestry system. In contrast, none of the producers of group no. 2, who all engaged in farm-wage labour themselves, hired labour apart from during harvest time. From the data included, this could be explained by limited farm income compared to group no. 3, by higher availability of family labour as family size was higher than in group no. 1, or a combination of both of these factors.

Average educational levels were somewhat higher in group no. 3, which fits well with the more frequent occurrence of higher income non-farm work in this group. It should be added that self-employment with activities in petty commerce and trade were more common among the sample households than skilled and professional work, however. The data of the present study, nonetheless, support the findings of the study by Corral and Reardon (Corral and Reardon 2001) pointing to education and capital availability as two important conditions for participation in more profitable non-farm economic activities.

Summarising the discussion
The discussion of the typology of livelihood strategies and the differences in the socio-economic and farm characteristics of the three groups led to two major conclusions. Firstly, the differences between the group with livelihood strategies specialised in farming (group 1) and the two groups defined by livelihood diversification gave further support to the role that family life cycle dynamics were found to play with regard to farm production and livelihood strategies. Secondly, however, a cyclical pattern based on the producer households’ stage in the life cycle and accumulated labour input into the family farm was not sufficient to explain the differences identified between the three groups. This was supported by the comparison of the characteristics of groups no. 2 and no. 3. While producers’ age and household size indicated a similar stage in the family life cycle, farm sizes and coffee agroforestry system incomes of the two groups marked the extremes of the sample. The concept of social heterogeneity filtering the possibilities of
different producer households and the identification of social differentiation as an aspect in the dynamics played out between farm production and different types of off- and non-farm work offered useful explanations for the differences between groups no. 2 and no. 3.

6.3 Concluding remarks

Among the cases in the sample there were examples of households specialising in farming and others with a diversified activity and income portfolio. Among the cases of livelihood diversification there were households where a positive dynamic had been reached between off- and non-farm activities and farming and examples where this relation was expressed in a trade-off situation. The question put forward regarding the reasons for and implications of livelihood diversification for the producer households links up to the debate between political economy proponents’ concept of social differentiation vs. that emphasising family cycle dynamics and individual mobility of producers and producer households, as suggested by Netting. Together with the qualitative analysis the comparison of groups in the typology presented leads to the conclusions that both dynamics related to the family cycle and aspects of social differentiation were important for the differences identified between the livelihood strategies studied. Moreover, it was found that the broader structural conditions that producer households experienced in different historical periods had influenced the room for manoeuvre within which their livelihood strategies were formed.

A concept building on the idea of family life cycle dynamics could contribute to the explanation of why some producer households concentrated on farming whereas others had diversified livelihood strategies. In this regard, the analysis was inspired by the explanations of changes in and differences between the socio-economic situations of producer households found in the small-farm literature. While Netting tends to concentrate on the function and use of household labour within the boundaries of the farm, however, this analysis called for an integration of household members’ off- and non-farm work into the model of understanding.

The analysis showed that almost all respondents stemmed from a producer family, but that many had started their adult lives without access to land and only at a later point in time had succeeded in re-establishing a farm-based livelihood. According to the explanation based on the family life cycle, producer households’ engagement in off- and non-farm work was used as a means of accumulating capital, albeit often small amounts, and for investing in the farming system until the farm could maintain the household without additional income sources.
The family life cycle model, however, could not explain all forms of livelihood diversification observed among the coffee producer households in the sample. In some cases engagement in off- or non-farm work had taken on a more permanent nature. In these cases employment or non-farm activities could present economic opportunities beyond the goal of establishing a viable family farm or be a result of personal aspirations of household members. The quantity, age and physical characteristics of household labour as such were, thus, not sufficient to explain the differences between households’ livelihood strategies. As the case studies showed, intra-household relations and decision-making processes were an important aspect to be considered to understand the way labour allocation in the households was organised.

In other cases, the explanation of more permanent engagement in wage labour was that the household had not succeeded in establishing a farm that generated sufficient income to maintain the household, which meant that wage labour was motivated by economic compulsion. The quality of the dynamic between, on the one hand, off- and non-farm work and farm production on the other, to a large extent was related to the type of economic activities engaged in. There was found to be considerable difference between farm-wage labour and other kinds of jobs such as self-employment (petty commerce, trade, etc.) or skilled or professional work in terms of income levels, covariate risk vis-à-vis coffee production, and flexibility with respect to on-farm labour demands. As was described in the previous chapter, social difference to some extent defined which kinds of jobs were accessible to people. Professional or skilled work, for instance, required education, and a minimum of capital was mostly necessary to set up a small business of some kind. Farm-wage labour was the job with the lowest entry barriers for the target group of the study. Llambi’s metaphor of social heterogeneity functioning as a filter was found useful to understand the ways in which small-scale farm households adapted their livelihood strategies.

The finding regarding social differentiation as a factor in the relations between livelihood diversification and farm production does not disqualify the argument of family life cycle dynamics. Rather, it contributes to the explanation of why some households did not succeed in reaching the state of an entirely farm-based livelihood. Dynamics of progressive difference were identified between those producer households who succeeded in using income diversification as a means of accumulating capital for investment and those who were caught up in a stagnant situation of low farm productivity and engagement in farm-wage labour due to economic compulsion. The group of households who were considered to have the best opportunities to reach a synergetic dynamic between off- and non-farm work
and farm production thus also had the highest average incomes from the production system, most frequently had purchased land, had the largest farms, and also included the producers with the highest levels of education. On the other hand, producers’ engagement in farm-wage labour tended to constrain improvement of farm productivity and, thus, lead to a trade-off situation.

The historical approach to the case study analysis, moreover, highlighted the influence of broader structural conditions and tendencies on the possibilities of producer households at different points in time. In Nicaragua very marked changes took place in the political and economic environment of the producer households during the period included in the study. The respondents had lived through the final years of the Somoza dictatorship, the Sandinista revolution and agrarian reform, and the post-reform era dominated by a trend towards liberalisation. These regime shifts involved a number of conspicuous changes in the agricultural and financial policies (e.g. concerning credit, input and product prices) and were accompanied by changes in product, labour and land markets in the study region as well as in international coffee prices. The timing of the different phases in the life cycle of households vis-à-vis the broader historical tendencies could have a decisive impact on the probability of success of their efforts to complete the trajectory towards a livelihood concentrated on farm production.

In this sense, the concept of de- and re-peasantisation was relevant to the study, because it shows that the conditions for staying and become a producer are not constant throughout history. Consequently, this indicates that the broader tendencies in rural populations’ involvement in and dependence on farming and peasant type livelihoods do not reflect a uni-linear process, but are influenced by changing configurations of different economic, political, and social forces and tendencies that at times counter, at times reinforce processes of social differentiation among small-scale producers. The Nicaraguan agrarian reform was a prominent example in this regard. Without the redistribution of land that had been carried out in its course many of the parceleros who were capable producers would probably never have gained access to land. Moreover, the supportive agricultural policies introduced by the agrarian reform and relatively stable coffee prices during the decade of the 1980s meant that it was easier for the small-scale coffee producers in the study area to live off their farm production than it was both before and after the decade of the revolution.

In brief, the analysis presented in this chapter found that family cycle dynamics were an important element in the explanation of the small-scale coffee producer households’ livelihood strategies and the role that off- and non-farm work played for regaining access to land and establishing a farm. Two other important
conclusions, however, were that the possibilities to complete the cycle and reach the stage of a farm-based livelihood were firstly, not equal for all households and secondly, not constant over time. Not equal, because social heterogeneity filtered the possibilities of small-scale producer households to generate surplus from off- and non-farm activities and succeed in gaining access to land and reaching a level of farm productivity that was sufficient to maintain the household. And not constant, because the economic and political conditions for generating off- and non-farm incomes, gaining access to land, and establishing and maintaining a farm-based livelihood were not the same in different historical periods.

Finally, a methodological comment regarding the way the empirical material has been used shall be made. The division of the producer households of the survey into different livelihood types on a quantitative basis showed some interesting general trends in the sample data that would not have been possible with the case studies alone. On the other hand, the analysis demonstrated the value of in-depth case studies to understand the change processes in households’ livelihood strategies. The historical perspective on livelihood strategies in the case studies made it possible to understand the ‘small’ historical change processes related to the family life cycle and also made it possible to grasp the influence of larger structural changes and the differential outcome of these influences on different households’ livelihood strategies. Without a historical perspective that is able to capture such dynamics it would appear that the focus could easily remain exclusively on individual producer or household characteristics as explanations of the differences between their livelihood strategies.
Chapter 7  Local adaptation and technological change

This chapter discusses the issue of technological change in an analysis of the coffee production systems in the study area. The questions raised in the theoretical discussion regarding the dynamics driving technological change in the small-scale agricultural sector have served as guidance for the investigation of the coffee agroforestry systems. Two of the central diverging concepts in this regard were the modernisation approach and that of local adaptation as proposed by Netting.

The chapter contains three major sections. The first section deals with the theoretical question of local adaptation by analysing the agro-ecological structures of the coffee agroforestry systems of the sample group within their local setting. The analysis includes a comparison of the shade tree component of the two historical groups of parceleros and private producers. The second section investigates the flows of cash and resources between households and production systems: on the one hand the outputs and benefits that the households gain from the production system, on the other hand the inputs in terms of labour and application of chemicals. Looking at the general change tendencies related to the coffee agroforestry systems of the sample group, the third section gives three examples of the influence of supra-local economic and political conditions and changes in the ways that the production systems in the study area were managed and adapted.

The issue of shade trees is a key issue in the discussion of technological change in coffee cultivation in general and in the study area in particular. Since modernisation efforts started some decades ago, the so-called traditional coffee production systems with dense and diverse shade covers such as those found in the study area have been considered as detrimental to raising productivity in coffee production. As described in Chapter 3, modernisation of coffee production was increasingly promoted in Nicaragua during the second half of the 20th century, culminating in the carrying out of the CONARCA programme in the Carazo coffee growing region in the 1980s. Among other measures, modernisation entailed removing the shade cover that used to be part of the coffee growing systems in the area.

When the field study was carried out, however, there was an astonishing abundance of trees in the study area compared to other agricultural areas on the pacific side of Nicaragua. Even the group of parceleros, who worked coffee production systems that had been totally modernised in the 1980s had, by the time of the study, re-established shade strata in their coffee plots that could virtually not be distinguished from the so-called traditional systems of the historically private
small-scale producers. Against this background, one of the aims of the present chapter was to investigate how the high density and diversity of shade trees in the coffee fields in the study area could be explained. Local adaptation was found to be of relevance to the understanding of the way that shade was employed in management strategies. The agroforestry trees had two major functions: One was to contribute to the creation of a favourable micro-environment for the coffee plants, which was of special importance in the, to come degree, sub-optimal growing conditions of the study region. The other was to produce a range of products for income generation and household consumption. Particularly small-scale producers tended to manage a wide variety of trees producing a range of products in addition to the main cash crop, coffee.

Investigating the general change tendencies among the sample group’s production strategies over time also leads to the conclusion, however, that the so-called traditional coffee agroforestry systems in the study area were not exclusively a consequence of local adaptation, but were also adapted in response to influences from historical processes of a political, economic and demographic nature reaching beyond the local setting. This is illustrated by examples of change tendencies related to input use, land use, intensification of coffee production and cash crop diversification.

### 7.1 Coffee agroforestry as local adaptation?

Local adaptation is an important concept in order to understand the use of shade trees in the study area. This is shown in the present section, which describes the local growing conditions, some general management principles and the function of shade in coffee cultivation. The section also presents a general characterisation of the sample group’s coffee agroforestry systems and the structure of the coffee and tree components. Based on this a comparison of the shade component of the two groups included in the sample, parceleros and historically private producers, is carried out, showing that the coffee plots that had undergone modernisation assimilated the coffee growing practices with shade trees used in the so-called traditional systems.

#### 7.1.1 Coffee growing conditions
The basic conditions determining the suitability for coffee growing of a given site are temperature, water availability, light and soil conditions. Other conditions such as altitude, latitude or topographical factors have a more indirect effect and only in as far as they influence the conditions mentioned above. Wind, however, may affect the growing conditions considerably. The most appropriate climate for *arabica* varieties is tropical tempered by altitude, two contrasting seasons, average rainfall of 1,500-1,800 mm, a dry season of max. 6 months, and average temperatures of 18-22°C (Cambrony 1992, pp.11-14; Guharay, Monterrey et al. 2000, pp.16-17).

In the study area the natural conditions required for coffee growing were met in some aspects, while in others they might be said to be sub-optimal. It should be noted that the data given on natural conditions are only averages and that micro-climatic conditions may vary slightly between and within the study villages due to the undulating terrain and differences in vegetation. The soils, to start with, were of volcanic origin with good fertility. They were deep, well-drained soils of medium to coarse texture and neutral to slightly acid pH values (Rice 1990, p.173). The study area had a pre-mountainous humid climate, but with averages of 1,000-1,400 mm/year and erratic patterns of distribution, rainfall was a limiting factor. In the regional experimental centre of Unicafé located between Masatepe and San José average precipitation was measured at 1,480 mm/year between 1993 and 1999, with variations as wide as 1,005 mm/year to 1,992 mm/year (CATIE/MIP 1993-1999). Moreover, the average temperatures of 23-27°C in the study area were somewhat higher than the ideal conditions for coffee growing. (Rice 1990, p.1; INIFOM/AMUNIC 1997, pp. 3-4; INIFOM/AMUNIC 1997, pp.3-4; INIFOM/AMUNIC 1997, pp.3-4; Dauner 1998, p.17).

The natural conditions can to a certain extent be modified by the management practices used for coffee cultivation. In the study area the use of shade had special importance, as shade trees mitigate the impact of extreme temperatures, can contribute to conservation of humidity and serve as windbreaks. Moreover litter fall from the tree strata is recycled within the coffee agroforestry system and supplies the soil with important biomass and nutrients, which is highly relevant for such low-input coffee cultivation methods as those practised in the study area. Shade cover, furthermore, is an effective protection against weed growth reducing the need for mechanical or chemical measures. Finally, the foliage and roots of trees provide protection against soil erosion. *See transect of a coffee agroforestry system in Appendix no. 5)*

The principal disadvantage associated with shade trees in coffee plantations, especially if shade cover is too dense, are lower yields because photosynthesis is
slowed down. On the other hand, the slowing down of the photosynthetic processes also contributes to enhance the plants longevity. Another aspect that is sometimes associated with dense shade cover is the risk of development of certain diseases in the more humid conditions. The issue of pests and diseases in shaded environments, however, is a complex issue as different pests and diseases have different preferences with regard to micro-climatic conditions. Further potentially negative effects are competition for nutrients and water and damage to the coffee plants by falling branches during winds. The impact of shade on the growing conditions for coffee, however, is to a large extent determined by the site-specific characteristics as mentioned above. Weighing the advantages and disadvantages against each other, thus, it is of great importance to consider the specific agro-ecological conditions and, as will be discussed in the course of the present chapter, the socio-economic situation of the producer households (Cambrony 1992, pp.66-68; Fernández and Muschler 1999, pp.75-76; Guharay, Monterroso et al. 1999, pp.80-83).

7.1.2 Management of the coffee agroforestry system

The cycle of coffee production in the study area started around the beginning of February with pruning the coffee bushes whereby unwanted and unproductive branches were removed and, later, selecting and removing new shoots. There are different ways to go about pruning, but one general objective is to keep the plant producing new growth within the reach of the coffee picker.

Depending on the technology used, January to March were also the months for stumping (recepo). Stumping involves cutting back the entire coffee plant every 4-5 years to allow for productive re-growth. On larger farms stumping was normally carried out in blocks or entire rows at a time. On smaller farms it is mostly carried out in smaller areas or selectively, plant by plant. Before coffee modernisation, other methods such as capping (café sostenido) were the most commonly used in the area. Capping entails cutting off the terminal bud of the stem, which causes lateral branching. In contrast to the more recently introduced method of stumping, capping allows for continuous production. During the field studies it was observed that several producers were carrying out experiments with the idea of reintroducing stumping.

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50 The interrelated dynamics of pests in shaded coffee and possibilities for ecologically based management methods have inter alia been studied by the Nicaragua based project CATIE-MIP/AF (see Guharay, F., D. Monterroso, et al. (1999)).
Replanting of coffee was done at the beginning of the rainy season around June-July. On most of the farms studied, replanting was carried out by individual plant or in small areas at a time, resulting in a very heterogeneous age structure in the coffee plantations. The reason for this practice given by producers was that they did not want to sacrifice a great part of their annual income. This would be the case when replanting large blocks or the whole plot, which was common on larger coffee farms. Another variation of such continuous replanting was observed in coffee plantations stemming from the CONARCA programme implemented during the agrarian reform. Under the CONARCA programme the design of the coffee plantations was hedge-type planting with wide alleys to permit semi-mechanised production methods. After individualisation of the cooperative land, the producers worked with less capital-intensive methods than they used to and many started to intersperse an extra row of coffee between the original plantings. When the new coffee plants started to produce, the old coffee could be stumped or replanted without a total income lapse. Some parceleros had also thinned the rows of coffee plants from the CONARCA planting, which they considered too dense.

As mentioned above, replanting took place in the beginning of the rainy season. The preparation phase, when using plants from an on-farm nursery, however, ideally would start 1½ years before planting out the coffee. The nursery would therefore have to be started before the harvest to get the plants ready for the next cycle, but it appeared that producers did not generally do this. An alternative was to buy the seedlings.

Shade regulation, that is the pruning of shade trees to permit more penetration of sun light, when carried out was performed between March and May. The activity, however, was not realised on an annual basis by all respondents, which partly depended on the type of shade on the coffee farm. While madero negro trees where pruned as good as every year, shade consisting of old guanacaste or chilamate trees were not pruned after having reached a certain height.
## Figure 7.1 Seasonal tasks in coffee management

<table>
<thead>
<tr>
<th>Activity</th>
<th>Month</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
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<tbody>
<tr>
<td>New shoot selection/removal</td>
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<tr>
<td>Pruning</td>
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<td>Stumping</td>
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<tr>
<td>Pruning of shade trees</td>
<td>03-05</td>
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<td>Fertilisation</td>
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<tr>
<td>Weeding</td>
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<td>Application of pesticides</td>
<td>08-09 10-11</td>
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<td>Harvesting</td>
<td>11-01 (08-09)</td>
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<td>Planting out</td>
<td>06-07 (not annual)</td>
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<td>Nursery establishment</td>
<td>09-12 (not annual)</td>
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Local adaptation and technological change
Fertilisation was usually carried out once or twice a year with different combinations of nitrogen and complete fertilisers, chicken manure or in some cases other organic matter. Both surface application and spraying was common. In the latter case fertilisers were often mixed with pesticides and applied as a tank mix of different chemicals. Manual practices as for instance removing coffee berries affected by coffee berry borer (*granipterus*) were also carried out, but their use, not being very common, was not quantified for the sample group.

Weeding was carried out by machete 2-3 times a year, and in some cases complemented with the use of herbicides. In all cases where pesticides were applied, manual spraying equipment was used. The necessity of weeding depends to a large extent on the degree to which the soil is exposed to sunlight. Thus, with the often relatively dense shade cover encountered in the study area, weed growth was reduced considerably compared to unshaded plantations.

The main harvest in the region took place between late November and January, but in some years a minor harvest ripened to be picked around August-September. (Rice 1990; Cambrony 1992; Fieldnotes 1998-2000; Bonilla 1999).

### 7.1.3 Structure of coffee and tree strata of the agroforestry systems

Based on the field data an agro-ecological characterisation of the coffee and tree components is undertaken in the following. To this end, measurements and inventories of shade and coffee plants were carried out in the coffee agroforestry systems visited. Data were taken from a 1000 m²-sample plot within the coffee agroforestry system of each of the 62 farms. These data included an assessment of the density and state of productivity of the coffee plants, measurement of shade percentages, and inventories of trees by species, numbers and size categories. Moreover, on three of the case study farms a complete mapping of trees in the coffee agroforestry system was carried out in order to get a picture of the horizontal structure of the coffee agroforestry systems.

**Coffee plants**

The most common coffee varieties grown in the study area were of the *arabica* species (*Coffeea arabica*). The most frequently found variety was *caturra*, which among others had been strongly promoted under the CONARCA modernisation programme in the 1980s. It was followed by the older variety *borbón*, and a few coffee producers cultivated *caturai rojo* and *caturai amarillo*. In most cases the coffee plantations comprised a mix of different varieties. Average plant density in the coffee fields was 2,900 plants/m². Average plant age was 12 years (recently planted
Local adaptation and technological change

The productive life of coffee plants depends on environmental conditions and maintenance. Thus, with favourable soil conditions and shaded management with lower productivity, a coffee plant can continue to produce far longer than with intensive cultivation under full sun exposure (Cambrony 1992, p.11).

Table 7.1 State of productivity of coffee plants (sample average)

<table>
<thead>
<tr>
<th>Average coffee plant density:</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,900 plants/mz</td>
<td></td>
</tr>
<tr>
<td>((\text{Std.dev: 1,130; \text{N=58}}))</td>
<td></td>
</tr>
<tr>
<td>Normal (category 1):</td>
<td>12%</td>
</tr>
<tr>
<td>Needing pruning (category 2):</td>
<td>18%</td>
</tr>
<tr>
<td>Needing stumping (category 3):</td>
<td>40%</td>
</tr>
<tr>
<td>Needing replanting (category 4):</td>
<td>5%</td>
</tr>
<tr>
<td>Young non-bearing plants (category 5):</td>
<td>20%</td>
</tr>
<tr>
<td>Absent plants (category 6):</td>
<td>5%</td>
</tr>
</tbody>
</table>

(See Appendix 1 for notes on method for data collection and calculation)

The table shows that on average only 30 % of the coffee plants, those belonging to categories 1 and 2, were considered to be in a good productive state. Adding up the categories 3, 4 and 6 it was found that as much as 50 % of the coffee plants assessed were in a non-productive state, requiring stumping or replanting. As shall be discussed further in the following chapter, different constraints in terms of capital and labour availability in the producer households contributed to the explanation of the generally poor state of productivity.

Shade trees

The trees growing in the coffee plots of the sample producers could be divided into different categories by their main function. Many of the trees could be characterised as multi-purpose trees, providing at least one additional product apart from their function as shade trees. In the following the trees are divided into the categories of fruit trees, timber trees, other trees and bananas and plantains\(^{51}\). All trees in the coffee agroforestry system in practice contributed to the shade cover, but the tree species had quite different qualities in terms of creating a favourable agro-ecological environment for coffee production. Some trees, as for instance the *madero negro*, were primarily grown for their beneficial effect on the coffee, while others, such as citrus or timber trees, were mainly grown for the

\(^{51}\) Although botanically speaking not trees, banana and plantain plants are dealt with in the same way as trees in the coffee agroforestry systems because they fulfil the same agro-ecological and socio-economic functions.
products they generated. The composition of shade trees in the majority of coffee agroforestry systems studied was mixed, including many plantains and bananas and fruit trees. Based on the 1000 m²-sample plots the following average shade percentages, number of species, and populations of shade trees classified by functional categories were found.

Table 7.2 Shade density and composition

<table>
<thead>
<tr>
<th></th>
<th>Mean:</th>
<th>(Std. dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shade percentage:</td>
<td>47 %</td>
<td>(12)</td>
</tr>
<tr>
<td>Number of species (1000m²):</td>
<td>9</td>
<td>(4)</td>
</tr>
<tr>
<td>Population (ind./mz):</td>
<td>576</td>
<td>(49)</td>
</tr>
<tr>
<td>- plantain/banana</td>
<td>368</td>
<td>(39)</td>
</tr>
<tr>
<td>- fruit trees</td>
<td>65</td>
<td>(8)</td>
</tr>
<tr>
<td>- timber trees</td>
<td>38</td>
<td>(7)</td>
</tr>
<tr>
<td>- other trees</td>
<td>104</td>
<td>(12)</td>
</tr>
</tbody>
</table>

The shade canopy in the coffee plantations of the study area was generally dense. Based on a measurement of the shade percentage during the dry season in each of the 62 sample plots, an average of 47 % was calculated\(^\text{52}\).

The tree inventory that was carried out in the coffee plantations demonstrated a wide range of species. The average number of tree species found per sample plot was 9, ranging from 1 to 18, and a total of 80 tree species was identified in the 62 sample plots (see complete list of tree species list in Appendix 4). The most frequently occurring shade species were different banana and plantain species and madero negro trees, although it should be emphasised that the most prominent feature of the agroforestry systems studied was the mixture of different types of trees. Table 7.3 shows the 30 most frequently found tree species out of a total of 80 species documented in the tree inventory and the uses that respondents assigned to them.

\(^{52}\) The calculation of shade percentages was based on measurement with a densiometer in four points of the 1000 m² sample plot, each consisting of four readings.
### Table 7.3 The 30 most frequent in shade species and their use

<table>
<thead>
<tr>
<th>Species:</th>
<th>Sum (sample) (N=62)</th>
<th>Use:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plantain, banana (<em>Musa</em> spp.)</td>
<td>2491</td>
<td>Fruit</td>
</tr>
<tr>
<td>Madero Negro (<em>Gliricidia sepium</em>)</td>
<td>443</td>
<td>Firewood, timber, posts</td>
</tr>
<tr>
<td>Laurel (<em>Cordia alliodora</em>)</td>
<td>231</td>
<td>Firewood, timber</td>
</tr>
<tr>
<td>Orange (<em>Citrus sinensis</em>)</td>
<td>152</td>
<td>Fruit, firewood</td>
</tr>
<tr>
<td>Acetuno (<em>Simarouba glauca</em>)</td>
<td>134</td>
<td>Firewood, posts, windbreak</td>
</tr>
<tr>
<td>Avocado (<em>Persea Americana</em>)</td>
<td>129</td>
<td>Fruit, firewood, timber</td>
</tr>
<tr>
<td>Mango (<em>Mangifera indica</em>)</td>
<td>120</td>
<td>Fruit, firewood</td>
</tr>
<tr>
<td>Cedro (<em>Cedrela odorata</em>)</td>
<td>63</td>
<td>Firewood, timber</td>
</tr>
<tr>
<td>Mandarin (<em>Citrus reticulata</em>)</td>
<td>60</td>
<td>Fruit</td>
</tr>
<tr>
<td>Gavilán (<em>Albizia lebbek</em>)</td>
<td>45</td>
<td>Firewood</td>
</tr>
<tr>
<td>Guanacaste (<em>Enterolobium cyclocarpum</em>)</td>
<td>27</td>
<td>Firewood, timber</td>
</tr>
<tr>
<td>Higuera (<em>Ricinus communis</em>)</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>Sonsonate (<em>Colubrina arborescens</em>)</td>
<td>24</td>
<td>Firewood, timber, windbreak</td>
</tr>
<tr>
<td>Chaperno (<em>Lonchocarpus parviflorous</em>)</td>
<td>22</td>
<td>Firewood</td>
</tr>
<tr>
<td>Lemon (<em>Citrus limon</em>)</td>
<td>22</td>
<td>Fruit, firewood</td>
</tr>
<tr>
<td>Chilamate (<em>Ficus sp.</em>)</td>
<td>21</td>
<td>Firewood, timber</td>
</tr>
<tr>
<td>Lavaplato (<em>Solanum erianthum</em>)</td>
<td>21</td>
<td>-</td>
</tr>
<tr>
<td>Guácomo (<em>Guazumo ulmifolia</em>)</td>
<td>19</td>
<td>Firewood</td>
</tr>
<tr>
<td>Capulín (<em>Muntingia calabura</em>)</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>Copel (<em>Amphipterygium adstringens</em>)</td>
<td>17</td>
<td>Firewood</td>
</tr>
<tr>
<td>Mamón (<em>Melicoccus bijugatus</em>)</td>
<td>15</td>
<td>Fruit, firewood</td>
</tr>
<tr>
<td>Acacia (<em>Acasia auriculiformis</em>)</td>
<td>14</td>
<td>Firewood, posts, windbreak</td>
</tr>
<tr>
<td>Genízaro (<em>Pithecellobium saman</em>)</td>
<td>13</td>
<td>Firewood, timber</td>
</tr>
<tr>
<td>Jocote (<em>Spondia mombin</em>)</td>
<td>13</td>
<td>Fruit</td>
</tr>
<tr>
<td>Guaba, Guabillo (<em>Inga spp.</em>)</td>
<td>12</td>
<td>Firewood</td>
</tr>
<tr>
<td>Mamey (<em>Mammea americana</em>)</td>
<td>12</td>
<td>Firewood, timber, windbreak</td>
</tr>
<tr>
<td>Ojoche (<em>Brosimum alicastrum</em>)</td>
<td>12</td>
<td>Firewood, forage</td>
</tr>
<tr>
<td>Guanábana, anona (<em>Annona spp.</em>)</td>
<td>11</td>
<td>Fruit</td>
</tr>
<tr>
<td>Guayaba (<em>Psidium guajava</em>)</td>
<td>11</td>
<td>Fruit</td>
</tr>
<tr>
<td>Papaya (<em>Carica papaya</em>)</td>
<td>10</td>
<td>Fruit</td>
</tr>
</tbody>
</table>

(See Appendix 4 for total list of 80 species counted in the sample plots)
As can be seen from the table, the great majority of the 30 tree species most frequently mentioned by the respondents were multi-purpose trees, contributing to the household economy with products for both home consumption and sale. Among the remaining species of the total list of 80, it should be added however, there were also a number of trees that did not have such a clear purpose, neither regarding their quality as shade trees nor in terms of useful products.

In order to find out how the species composition of the agroforestry systems studied had evolved, one of the interview questions concerned the origin of the trees growing in the coffee fields i.e. whether they were planted or had sown themselves naturally. The presence of fruit trees showed most obvious signs of planning, as they were normally planted by the producers. However, there is also management in the selection of seedlings resulting from natural regeneration, and their transplanting to other parts of the coffee field. Of 61 respondents, 50 (82 %) practised selection of naturally sown trees, eight of whom also stated that they transplanted naturally sown seedlings to more appropriate locations. Another 5 respondents (8 %) said that they let any trees that sprung up in the coffee field grow, or as one producer commented, let the trees fight it out themselves. Only 6 producers (10 %) eliminated self-sown seedlings indiscriminately. Producers’ practices and criteria regarding the selection of shade trees is of relevance to the discussion raised in Chapter 2 about the usefulness of the strategy concept to understand the ways that producers design and manage their coffee agroforestry systems. In Chapter 8, producers’ criteria for the association and selection of trees are discussed further, including examples of different opinions and ways of reasoning in this regard.

The respondents were also asked if the shade in their coffee plantations had changed during the past 5 years. Interestingly, only a quarter of the respondents (15 cases) stated that they had the same shade cover as 5 years ago. Moreover, among those who stated that shade cover had changed, two diverging tendencies existed. In 24 cases (40 %) respondents had reduced shade and in 20 (33 %) they had increased shade. Comparing the shade percentages of those who had reduced and those who had increased shade cover at the time of the study, no significant difference was identified. The 15 respondents who had not changed their shade, however, had a group average a bit higher than the total sample average, 53 % compared to the total sample mean of 47 %.

The most frequent reasons for reducing shade cover were in 12 cases adaptation of shade cover to the demands of the coffee plants, some of which were new varieties. In another 5 cases the need for timber and firewood and in 3 cases destruction of trees by hurricane Mitch in 1998 were given as the principal explanations. The
reasons for augmenting the shade coverage differed considerably among the respondents. On the one hand, there were 15 respondents who had decided to plant or let grow new trees in order to improve the growing conditions of their coffee. This may partly have to do with the reduced use of fertiliser in the 1990s. On the other hand, 5 producers explained that they had more shade than before because they were giving higher priority to fruit trees, namely citrus, avocado, banana and plantains, to compensate for low incomes from coffee production. The producers’ considerations show how they were constantly challenged with the questions of, on the one hand, how to utilise the resources available to them, not least their farming plots, in the most efficient way and, on the other hand, how to safeguard themselves and respond to the variable external conditions of climate and market.

7.1.4 Comparison of shade of parceleros and historically private producers

As described in Chapter 3, the majority of coffee farms that were in the hands of parceleros had been replanted by the CONARCA coffee modernisation programme in the 1980s and the shade trees had been removed. The coffee farms taken over by cooperatives in the course of the agrarian reform were, thus, mostly large-scale, capital intensive production systems in which the use of shade trees was far less than in the traditional systems. One of the working hypotheses in this part of the study was that the almost complete elimination of shade trees that was part of the modernisation strategy would be reflected in the contemporary shade structure of the coffee plantations. Thus, it was expected to encounter lower shade percentages and fewer trees and tree species in the farms of former cooperative members than in the historically family owned coffee farms that had not been modernised by CONARCA.

In the course of the analysis several aspects of the production strategies of these two groups of producers were investigated. The use and composition of trees in the shade strata were given special attention in the analysis, because it was an important distinguishing characteristic between the so-called traditional and modern production systems. Moreover, compared with other cultivation practices (input use, pruning techniques etc.), changes in the tree strata have a much longer time horizon. The reasoning implied in the latter argument is, that if the aim is to find out whether there are significant differences in the management practices of
the two groups, they would most likely be revealed in the shade trees in the agroforestry system as the least flexible element of the production systems.53

The fact that the cooperative producers had been accustomed to and had received training in the use of modern agricultural technologies, furthermore, added to the reasoning behind the hypothesis that there would be differences between the two groups’ production methods. By putting forward this working hypothesis the aim was to investigate the relevance of the unilinear understanding of technological change proposed by the modernisation approach, assuming a progressive move from more traditional forms of production to more capital-intensive modern technologies. The question of whether cooperative producers could have ‘unlearnt’ traditional farming methods, as has been suggested in the literature on Nicaraguan parceleros (Marín 1996, p.11), could be seen as forming part of this debate. To be able to discuss these questions on empirical grounds a comparison of the shade characteristics, shade cover, number of trees and number of species, was carried out with the two groups of coffee producers.

Table 7.4 Shade characteristics, historically private and parcelero farms

<table>
<thead>
<tr>
<th>(N=61)</th>
<th>Family farms: mean (n=35)</th>
<th>Agrarian reform: mean (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees (ind./1000m²):</td>
<td>52.31</td>
<td>92.33</td>
</tr>
<tr>
<td>Tree species (ind.):</td>
<td>7.97</td>
<td>9.00</td>
</tr>
<tr>
<td>Shade density (%):</td>
<td>47.96</td>
<td>45.58</td>
</tr>
<tr>
<td>Coffee area (m²):</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Contrary to the hypothesis that more and more diverse shade would be found among the farms of historically private producers, the table shows that the group of farms owned by parceleros had higher average values for abundance of trees as well as for species. A t-test applied to the results indicated that the difference was statistically significant in the case of number of trees54, but not significant in the case of numbers of species. The difference between the shade percentages, which

53 The reasoning behind the special emphasis laid on shade characteristics in the comparison of historically private and parcelero producers’ coffee agroforestry systems resembles the argumentation of the ‘critical case’ in the sense described by Flyvbjerg (Flyvbjerg, B. (1993)).

54 Based on a t-test, the difference was found significant at (p = 0.001).
were a bit higher in the group of historically private farms, did not prove statistically significant and did, thus, not give support to the hypothesis either. The fact that the higher number of trees in the group of parcelero farms was not reflected in a correspondingly higher shade percentage could be explained by the size of the trees. The canopy of an old guanacaste tree, for instance, can be equivalent to the shade of several madero negro trees planted some 10-15 years ago. Thus, the number of trees with canopy diameters less than 5 m in the group of parceleros was found to be 76 compared to 45 in the other group.

The above results show that the producer households who had received their land through the agrarian reform after the radical modernisation and introduction of unshaded coffee technology by CONARCA had converted their coffee production system to so-called traditional shade grown coffee by the end of the 1990s.

**Case study examples**

The examples of two case study producers, Pedro and Alejandro, illustrate how and why parceleros had gone about growing shade trees in their coffee plots after individualisation of the cooperatives. Pedro told me how in the cooperative La Compañía in Fátima, all the valuable timber such as guanacaste, cedro and pochote had been extracted for exportation during the modernisation of CONARCA. The only big trees that had been left in his plot were 9 big ojoche and a few chilamate trees that had no value as timber. As Pedro considered the ojoche bad for shade he had eliminated 7 of them. He left the four chilamates, but one of them had broken and fallen over during the last strong winds as it was old, and the trunk had got porous. At the same time as removing some of the undesired species, Pedro began to plant and select naturally grown trees. He first started with fast growing species such as banana and plantain and madero negro some 12 years before the time of the study. The oldest of his timber trees, cedro and laurel, were approximately the same age, he said. Shortly after, he also began to plant fruit trees, mainly avocado and citrus, but the first attempt at growing oranges had failed due to pest infection. Pedro was planting the fruit trees he grew little by little, and, thus, trees of varying ages were found in his agroforestry system. Moreover, some fruit trees such as mamon and mango, as many of the other shade trees, were mostly self-sown (CaseStudy1 2000). In general, however, compared to other producers the number of citrus and other marketable fruit trees was rather modest.

Alejandro also had started out with very few trees in his new plot in the cooperative, one avocado tree and some acacia trees, which had been planted by the CONARCA programme around the borders of the field as wind breaks. When he started to manage his coffee individually, Alejandro immediately started to leave growing the timber trees laurel, cedro and other species from natural re-
growth. During the cooperative time, he had already planted some citrus trees on the border of the coffee plot, as the extensionist had not allowed him to grow them in the coffee field itself. When the extensionist stopped coming, Alejandro said, he started to plant both citrus and avocado trees in the coffee plot. At the time of the study, he had a diverse agroforestry system including plantains, bananas, fruit, timber and other trees. With 15 kinds of trees counted in the measurement plot, it was among the coffee agroforestry systems of the sample with the greatest diversity of tree species (CaseStudy2 2000).

The current shade structure in the coffee plantations of the parceleros shows that they started to plant trees already at a very early point in the process of individualisation of the cooperatives. In several conversations with former cooperative producers it was obvious that the growing of trees in coffee plantations had been a point of disagreement between the extensionists and many of the cooperative producers. Considering this it does not seem surprising that they decided to change the structure of the production system by adding trees as soon as they were free to take their own management decisions.

From another angle, the very determined efforts to plant trees that the cooperative producers undertook when they obtained their individual plots is interesting in the sense that they did so when, for the majority of them, there was little security of tenure. The question of investment behaviour and tenure security in Carazo is i.a. treated by a study by Broegaard (Broegaard 2000), which concludes that tenure insecurity does not, as commonly assumed, necessarily imply reluctance to invest in the land. The historical practice of compensation for improvements (mejoras) is suggested as an important reason. Historically, the concept of mejoras valued the productive investment realised when land was sold, or even when rented or borrowed land was returned to the owner (Dore 1995, p.308; D'Exelle and Bastiaensen 2000, p.102). The idea of mejoras seems deeply rooted in local perceptions, as here expressed by the case study producer Alejandro: “For us it is the crop that gives value to the farming plot, not the land as such” (CaseStudy2 2000). Although the concept is not recognised in current law, it still has some practical relevance in land transactions.

7.1.5 Shade trees and diversity in a regional perspective

In Carazo and Masaya natural, social, and economic conditions had promoted the use of diverse shade canopies in coffee cultivation in several ways. Firstly, shade trees mitigated the possibly negative impacts of climatic variations that at times
created too hot and dry conditions with regard to the requirements for coffee growing. Secondly, population density and the patterns of land distribution had led to reduced land sizes in the small-scale farming sector. As several of the producers commented the small land sizes involved the need to grow different crops in one plot, hence making intercropping a way of optimising the use of the horizontal and vertical space available. Thirdly, the closeness of urban markets and their infrastructural accessibility and the existence of local markets for many products were a positive incentive for diversification with tree products, such as fruit, firewood, timber and plantain and banana. In contrast to less densely populated regions, where access to natural resources in uncultivated areas is mostly easier, the need for products for household use such as firewood, poles, etc. was another consideration taken into account by the producers.

Differences in the species richness between that of the study area and those documented in other Central American coffee growing regions point towards the importance of the local or regional context. Compared to the mean quantity of 9 tree species per 1000 m² in the tree inventory carried out in the present study, a similar inventory in the rural area of Turrialba, Costa Rica, showed an average of only 2 species per 1000 m² (Llanderal 1998, Anexo 5). A study of coffee farms in Datanlí, Northern Nicaragua, found an average number of tree species per farm of 6 (Pérez Valdivia 1998). This is also somewhat lower than that of the present study, especially when considering that the number of tree species in the latter study is given for the whole farm, i.e. including areas of forest and other land uses, and not just for a 1000 m² measurement plot as in the other two studies.

Regarding the lower species numbers found in the other studies, in the case of northern Nicaragua it could be suggested as an explanation that limited infrastructure and lack of markets due to low population densities in the region were a constraint on the sale of fruit and other agroforestry products. It could contribute to the explanation that the climate was more humid and cooler entailing less shade requirement. Moreover, due to the better growing conditions revenues from coffee production in northern Nicaragua were generally higher and more stable than in the Meseta region, which probably reduced the incentive to diversify. And finally, the generally somewhat larger farm sizes in the northern coffee growing region may have implied less need to intercrop different plants for production.

In the case of Turrialba, Costa Rica, more humid climatic conditions than in southwestern Nicaragua and the generally higher socio-economic levels of the Costa Rican farm households could be offered as explanations for the less diverse and less dense shade covers. Thus, the better availability of cash among the Costa-Rican
producers implied higher input levels. Moreover, subsistence type markets for minor construction wood, firewood, etc., as those common in Nicaragua did not exist to the same extent because many of these products had been substituted with other materials (e.g. concrete for construction or gas for cooking).

Different climatic conditions played an explanatory role in both cases, but the examples also show that differences in the producer households’ socio-economic situations, markets, infrastructure and the regional and national economic structures influenced the ways in which the production systems were composed and managed.

7.2 Cash and resource flows between household and production system

In order to reach an understanding of the links between livelihood and production strategies, this section deals with the outputs and benefits of the coffee agroforestry systems and the inputs and labour that the producer households invested in them. First, the production of coffee and tree products is investigated including such features as marketing, subsistence needs and cash flows. Thereafter, labour, production costs and input use are discussed, followed by a comparison of the two groups of parceleros and historically private producers regarding the issues investigated.

7.2.1 Outputs and income from the coffee agroforestry system

The output of the agroforestry systems included in the study was composed of a number of different products that contributed to the households’ livelihoods with cash income and subsistence products. The principal cash crop was coffee but a range of different kinds of fruit and wood products were also marketed to varying degrees.

Coffee production
The average yield of the sample group for the four year period from 1996-2000 was 6.3 qq/mz\(^{\text{55}}\) (Std.dev.: 3.3). This figure is somewhat below the national averages, which were 8.2 qq/mz in 1996/97 and 10.6 qq/mz in 1997/98 (Robleto Lang 2000, p.28). This has to do with the growing conditions and productive structures in the study area, but also with some extreme climatic conditions within the four year period included in the field data that had affected yields in the study region.

\(^{55}\) 1 qq oro = 45.45 kg coffee beans
Figure 7.2 Coffee yields, group averages 1996-2000 (qq/mz)

In the season 1999/00, average income from coffee production was calculated at 15,174 C$\textsuperscript{56} (\text{std.dev.:} 17,223) among the sample group (N=39). The standard deviation value shows that this aggregate number conceals great variation between the coffee producers of the sample. Moreover, it should be noted that the figure only gives a snapshot of the income that the producer households could expect from their coffee production. In the study area the climatic conditions, and therefore also yields, were very variable. On top of that, coffee prices fluctuated, which meant that even if the harvest was good, incomes could still fail if the prices were low. With regard to the income figure for the cycle 1999/2000 it should be noted that it was a relatively good year both in terms of yields and prices. This is also important to keep in mind when considering the relative importance of other crops from the agroforestry system compared to coffee.

The producers sold their coffee to export companies or to intermediaries. In the study region, coffee was generally sold unprocessed \textit{i.e.} as green berries at undifferentiated prices without quality bonus. Examples of alternative marketing were not encountered among the sample producers. One coffee cooperative in Fátima that had continued collective production up through the 1990s produced and marketed organic coffee, but was in economic crisis and apparently in the process of individualisation at the time of the field study.

\textsuperscript{56} To calculate the income levels an average sales price of 1000 C$ was used and production costs were subtracted. In reality, however, prices could vary considerably within one harvest period and moreover depended on the individual agreements made between the producer and the buyer.
Sale of tree crops
Besides coffee a range of other products for sale and household consumption was harvested from the agroforestry systems. The table below shows the average income generated by tree crops and gives an overview of the proportions of income that different kinds of products generated.

### Table 7.5 Income from agroforestry tree products 1999/00

<table>
<thead>
<tr>
<th>PRODUCT:</th>
<th>INCOME:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=39)</td>
</tr>
<tr>
<td><strong>Total sale of tree products</strong></td>
<td>3,485 C$</td>
</tr>
<tr>
<td>- sample average:</td>
<td></td>
</tr>
<tr>
<td>(- std. deviation)</td>
<td>(10,780)</td>
</tr>
<tr>
<td>- relative</td>
<td>100 %</td>
</tr>
<tr>
<td>Fruit:</td>
<td>56 %</td>
</tr>
<tr>
<td>Plantain and banana:</td>
<td>17 %</td>
</tr>
<tr>
<td>Timber (incl. poles, etc.):</td>
<td>15 %</td>
</tr>
<tr>
<td>Other products:</td>
<td>10 %</td>
</tr>
<tr>
<td>Fire wood:</td>
<td>2 %</td>
</tr>
</tbody>
</table>

As with income from coffee production, the figures on tree products conceal considerable variation among the sample farms, which can be seen from the value for the standard deviation given in the table. Besides variation in the amount of tree products generated, there were also differences in the composition, comprising regular sale of citrus and avocado, occasional sale of a whole timber tree, and/or minor income from other fruit, plantains, poles or firewood in addition to production for household consumption.

Fruit was mainly sold to nearby markets in Masaya or Managua. The inhabitants of San Juan de La Concepción especially were linked to the markets of Managua with their economic activities, while the other two villages were more oriented towards Masaya. Average income from fruit in the sample (N=39) was 1,997 C$ in 1999 (Std.dev.: 8,197). Citrus and avocado were the fruits generating most income for the farm households, and a few producers were increasingly specialising in the
production of these crops. However, a wide range of other fruits such as mango, *anona*, *jocote*, and many others were sold and consumed at different times of the year.

There were principally two ways of selling fruit produced on the farms. One, and probably the most frequently used, at least in San José, was to sell the fruit to an intermediary who would collect it and take it to the market. A widespread practice was to sell the fruit on the tree before the harvest. Although their gains would be less, many producers preferred this arrangement because the responsibility of guarding the trees against theft would no longer be theirs but that of the buyer. As one of the producers participating in the focus group discussion expressed the matter, you could, of course, choose to market the fruit yourself: “Well if you like, but you have to ‘sleep more in the tree’ because you have to watch it. But if you are able to do it, that way you can sell the harvest at a better price.” (FocusGroup 2000). Direct selling was not uncommon, though. It was often women who took the fruit produced on the farm to the market, and many also engaged in re-selling. Women have historically had an important role in these economic activities in the study area (for an analysis see (Dore 1997)). Buying and selling of fruit was also an income option for people without or with only little land.

The sale of wood was another source of income, be it as poles or firewood or if a whole tree was felled, also as timber of larger dimensions for construction, boards or furniture. In contrast to coffee and fruit, large timber was not produced on an annual basis but when sold supplied the family with a lump sum. While in many other regions the market was limited to timber of large dimensions, in the study area timber of both major and minor dimensions could be sold as there was a flourishing production of crafts and furniture around Masatepe and Masaya and, for instance, fence posts and firewood were marketable products.
Figure 7.3 Harvest of agroforestry system products (case study example):

<table>
<thead>
<tr>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
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<td></td>
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<tr>
<td>Citrus fruit (Mandarin, Orange) -------</td>
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<tr>
<td>avocado ----</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>mango ----</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>plantain -----------------------------------------------</td>
<td></td>
<td></td>
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<tr>
<td>banana -----------------------------------------------</td>
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<tr>
<td>firewood -----------------------------------------------</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>other fruit (zapote, papaya, etc.) -----------------------------------------------</td>
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</tr>
<tr>
<td>Other farm crops:</td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>maize -------</td>
<td></td>
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<td></td>
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<tr>
<td>beans ------</td>
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</tr>
</tbody>
</table>
To fell a tree a permit was required from the Ministry of Environment and Natural Resources (MARENA). The procedure was that MARENA would send an inspector to measure the tree in question and to assess whether there were sufficient trees in the micro-zone to issue a permit. After that, the document filled in by the inspector would be forwarded to the MARENA office where the price of the fee for the permit would be assessed based on the size and value of the tree. (For instance the permit for a tree with a diameter of 60 cm would be a fee of approximately 180 C$). However, because of the great demand for wood there was a considerable black market, which meant that much of the timber was traded without permission. The timber sold on the black market, however, was sold at approximately half the price of legally traded timber (Barahona 1999; Int.Faurby 2000; Int.Reyes/Aguirre 2001).

Figure 7.3 is an illustration of the harvest of products from the coffee agroforestry system based on the in-depth case studies carried out. It can be seen that coffee income was concentrated in the months of December and January. In households with limited resources, a single annual bulk income often implied difficulties in making ends meet towards the end of the agricultural season, especially in a year following a bad harvest. The diversification with tree products meant that subsistence products such as plantains and firewood were available, and it was possible to spread income throughout the year. Although limited in absolute terms, the income gained from the sale of minor amounts of fruit, plantains or firewood could have great importance at times when cash was scarce.

*Products for household consumption*

Besides generating cash income the agroforestry systems supplied several important products for household consumption. Thus, in 36 out of 38 cases the annual household demand for plantains, a considerable element in the local diet, was covered. Moreover, unquantified amounts of fruit of different types contributed to family nutrition.

With respect to wood products, 35 out of 38 respondents stated that wood from the coffee agroforestry system was sufficient to satisfy the household’s annual demand for firewood, which was the principal fuel used for cooking. A more irregular demand for timber for construction or repair of houses was also partly met by the trees in the coffee agroforestry system. Thus 6 respondents had extracted timber for domestic use during the year 1999/2000. In practically all cases unquantified amounts of wood had been used for poles, fence posts, home repair, support poles, *etc.*
Several respondents volunteered the explanation that they only sold such commodities as plantains and firewood when they had excess quantities or experienced acute situations of cash shortage. Calculating the costs of the families’ annual consumption of plantain and firewood had these products been purchased in the local market, the share destined to subsistence had a considerably higher economic value than the share that was sold. Local prices for the two products were about 1.50 C$ for a plantain and 70 C$ for a cord of firewood that would last a family for about a month or two. On a conservative estimate, the average sample household’s annual costs would be in the order of 1,200 C$ for plantains and 400 C$ for firewood.

7.2.2 Labour, production costs and input use

Labour use in coffee production

In the majority of cases, coffee production basically depended on household labour. According to the survey data, most activities were carried out by the respondent or by their husband or other male household members, frequently adult sons, in cases where women were interviewed. In the coffee harvest it was common to see the whole family participate, and in a few cases female household members carried out the removal of new shoots and pruning of the coffee plants or application of fertilisers.\textsuperscript{57} There were also examples of women having the main responsibility for coffee production, but only in a few female-headed households.

The labour tasks most frequently involving hired labour were coffee picking in 42 cases (70 %), weeding in 30 cases (50 %), and tree pruning for shade management in 29 (50 %) cases. Average use of hired labour was 31 MD/mz/year, but 15 (25 %) of the farms did not employ any hired labour.

Coffee production costs

Based on 1998/99 data, average annual production costs were calculated at 1,587 C$/mz, including spending on hired labour and chemical inputs. Production costs break up into 51 % for hired labour and 49 % for inputs.

Table 7.6 Coffee production costs cycle 1998/99

\textsuperscript{57} Being the household members most commonly in charge of coffee production, the majority of interviews of the farm survey were carried out with men. This fact may imply a certain bias, as people tend to be able to give a more detailed account of their own work activities than of those of other household members.
Labour costs were dominated by the task of coffee picking, followed by weeding. Although household labour was a basic factor of production on most of the farms of the sample group, unpaid household labour is not included in the calculus. A different approach has been taken to the discussion of household labour in the study, because other types of considerations play a role in its allocation and prioritisation.

Use of external inputs

Fertilisers consumed most of the input costs, representing more than four fifths of total input spending. According to the data from the 1998/99 cycle, the most common fertilisers were nitrogen (urea) and NPK products, used by 39 (64 %) of the 62 respondents. In the same year, 17 (28 %) had applied chicken manure. Chicken manure mixed with rice husks was a locally available organic fertiliser, produced by the commercial poultry farms that were springing up around Masatepe to supply the growing urban fast food industry in Managua. In the beginning the poultry farms had given the chicken manure to the producers for free, but as demand for the by-product grew, suppliers started to charge for the manure. The price as such was still relatively low, however, and transport costs for the bulk material represented the main cost for its procurement. Another 14 (23 %) used neither chemical fertiliser nor chicken manure. However, in these cases, as in the majority of coffee plantations visited, tree leaves and cuttings were an important contribution of biomass and nutrients produced within the system.
On many of the coffee farms where chemical fertiliser was used, quantities were relatively low. The second survey showed that only 15 (39 %) producers of the sample of 39 had used chemical fertiliser in the season 1999/2000. Among these 15 producers, average application was 148 kg/mz of fertiliser, which, for instance, was only about a third of the 450 kg/mz recommended by CONARCA for semi-technified coffee production.

The distribution of input costs in table 7.6 shows that fungicides dominated spending on pesticides. However, it should be noted that a few producers applied considerably more than average quantities of pesticides while the majority used none or only very small amounts. Among the sample producers 32 (53 %) had applied fungicides during the cycle of 1998/99, the most common being copper based products. Twentyfive (41 %) had applied insecticides, the most frequently used product being malathion, and 14 (23 %) had applied herbicides, almost exclusively gramoxone (paraquat), which was one of the cheapest products marketed (- and ranking third on the national black list of most toxic pesticides!). A third, 20 respondents, had not applied any sort of commercial pesticides. Three producers had used solutions of papaya, higuera, madero negro or neem leaves, two of them having used both botanical and chemical pesticides and one only the botanical solutions.

Producers’ considerations regarding input use

In the farm survey, a tendency towards use of less agro-chemicals could be detected over the five-year period preceding the study. Half of the sample group (31) stated that they used less chemical fertilisers than five years ago and more than half (33 cases) said that they applied less pesticides than they used to. In the cases of reduced chemical inputs, the most frequently mentioned reasons were economic constraints (lack of financial resources or access to credit, high input prices, or the relation between input and coffee sales prices). Reasons of this type were given in the majority of cases for both fertilisers and pesticides. With respect to pesticides 8 answers referred to considerations about health and environmental effects and long-term production sustainability also had a certain influence.\(^\text{58}\)

In general there appeared to be some variation in the amounts of chemicals used from year to year, depending on the cash situation of the producer household. Hence application tended to be higher in seasons following a good coffee harvest. With regard to the data presented above, these figures may be on the low side as yields had been bad in both previous years. Rather than plant demand, the factor

\(^{58}\) The numbers refer to reasons given not to cases. If a respondent gave more than one reason all were included.
determining the use of chemicals in small-scale coffee production was whether producers could spare the cash to buy them, and in that case they would often purchase cheap, and with regard to pesticides wide-spectered, products. Other determining factors could for instance be that they happened to have products left over from the last growing season or from food grain production.

It has been suggested by a pest management expert working in the area that with the very limited cash available for the purchase of inputs the small-scale coffee producers would probably achieve relatively higher output per Córdoba if investing in fertiliser rather than in fungicides, considering that yields did not go much beyond 5 qq/mz (Staver 2001). The question of the viability of fungicide use for coffee leaf rust becomes even more dubious considering that even at the level of researchers there is some discussion on the impact of leaf disease on coffee production and the appropriateness of treating them with fungicides. However, at the field level, conventional wisdom among producers and extensionists continues to prescribe treatment of leaf rust, and it appeared that producers felt obliged to use chemicals in order to be perceived as ‘good’, responsible producers. This is reflected in the following quotation from a focus group discussion, in which César lamented the constraints that small-scale producers experienced regarding the use of pesticides:
"Yes, in fact there is a problem, there is inefficiency on the farms of people like us, the poor ones. We do not have the resources to prevent, because it is possible to prevent coffee leaf rust! There are many chemical products, at least we have the 'Alto 5', and there is another one that can substitute the 'Alto 5', if there is none. Now then, what happens is that the 'Alto 5' costs 600 córdobas the liter! [Everybody laughs]. This you will not be able to use, will you? There lies the problem as we see it. I am the neighbour of a large hacienda owner, Enrique Montenegro. Now he has some yields, this Enrique Montenegro, the production he has…!

César (FocusGroup 2000)

Pest management practices, however, are not only a matter of norms and beliefs. In many situations very concrete and practical reasons influenced the producers’ decision to use or not use them. In the case of the management of coffee berry borer, another widespread pest-related problem in the study area, the problem was somewhat different. An efficient method of preventing the spreading of coffee berry borer is the so-called graniteo, a manual practice of removing affected berries in order to reduce transmittance of the pest. This could be carried out with the households’ own labour resources. However, the manual removal of affected berries was not nearly as common as it could be. One important explanation was the local marketing system, where coffee was bought from the producers in berries, all at the same (low) price. The fact that there was no quality control or bonus implied a lack of incentive for the producers to reduce the incidence of the coffee berry borer in their product.

Producers’ motivation for using low levels of input is open to discussion, but there is some evidence that the ‘traditional’ low-input cultivation methods are economically the most viable in adverse external conditions such as fluctuating and low world market prices for coffee. This has been documented in a study carried out by Clemens et al. (Clemens and Simán 1993, p.18) of input-output relations for different types of coffee producers stratified by technology at the beginning of the 1990s. The same may be true in the case of climatic shock effects as several producers in the study area had experienced with the El Niño phenomenon and hurricane Mitch. For instance, a parcelero producer from Fátima recounted how he had tried to obtain credit for inputs in the year 1998, but had been denied this by the bank. In the end, however, it turned out that he had been extremely lucky because the hurricane destroyed his entire food grain harvest. Had he obtained credit, he said, he would have been left not only with the loss of his harvest but also indebted (Int.Mejía 2001). Assessing the appropriateness of investing in input, of course, is only simple when done ex post facto. Otherwise, it is
a difficult balancing of productivity and risk influenced by unpredictable variables such as climate and world market prices that the producer has to decide upon.

7.2.3 Comparison of production and input use of parceleros and historically private producers

To follow up on the hypothesis that there would be differences between coffee production of historically private producers and parceleros a comparison was made of the production they achieved and the inputs they used in coffee cultivation. Two possible hypotheses could be formulated to this end. In the modernisation perspective the use of modern production methods would be seen as the key to increased productivity. Following this line of thinking the parceleros could be deemed more likely to achieve good yields, as they had received modernised production systems and had been trained in the new methods in the cooperatives. From the perspective of sustainable agriculture, on the other hand, it might be proposed that the producers’ abilities to adapt their farming systems to local conditions without depending on high input levels are what matters. In this case, the parceleros could be assumed to achieve lower yields, because they were not used to produce with low-input, agro-ecological practices. They had been used to state subsidised inputs, credit and technical advice and had received a coffee production system that was geared to the high-input technology of CONARCA, which was now no longer available to them.

Comparisons carried out between the production of the coffee agroforestry systems of the two groups, however, showed no significant differences, neither in coffee productivity nor in income from tree products. The same was true of input use, where no significant differences between the two groups as to costs of fertilisers or pesticides were identified. This can be interpreted as giving further substance to the conclusion that the differences in the production practices of the two groups that existed during the cooperative period had been dissolved by the time of the study.

7.3 General change tendencies in production strategies

Local adaptation was a central aspect in the assimilation of the production systems and practices of the parceleros to those of the private small-scale coffee producers after privatisation and the dismantling of the agrarian reform. The coffee agroforestry systems that, as a result of this process of assimilation, had become the mainstream production systems among the small-scale coffee producers in the
study area were not static systems, however. They were in a constant process of being created, adapted and changed little by little in response to changes within the wider society that the producer households formed part of. This was among others indicated by some general change tendencies regarding input use, intensification of land use, and diversification of cash crops in the coffee agroforestry systems.

7.3.1 Change tendencies in input use

From an historical perspective both the interviews and the literature indicate that input use was not very common among the coffee producers of the study area before the decade of the agrarian reform, apart from a few modernised large-scale coffee plantations. With the heavy promotion of modern coffee cultivation methods, cheap subsidised inputs and credit the amounts of fertiliser and pesticides increased dramatically in the 1980s, especially in the reformed sector but also to some extent among private small-scale producers. By the 1990s, this tendency was again reversed due to the new government’s policies of deregulation and the privatisation of the state banks, which put an end to the availability of cheap credits for small-scale producers. The result was that many small-scale producers had to reduce their input use, although probably still applying more than before coffee modernisation. Reduced use of inputs in most cases should be seen as necessity rather than choice, as producers appeared to have come to consider input use as a precondition for good coffee production. Apart from the impact of modernisation on producers’ perceptions, however, it is also possible that a greater need for pest management and fertilising had arisen due to gradual intensification of agricultural production in the area in the course of the 20th century, which might have affected pest infection levels and soil fertility (Rice 1990, p.130; Avelino, Muller et al. 1999, p.197; Dufour, Barrera et al. 1999, p.297).

7.3.2 Intensified land use in coffee production

During the farm survey, respondents were asked whether they had the same, more or less coffee than five years earlier. Almost half of the respondents (29) stated that they had more coffee at the time of the study, i.e. larger areas or higher plant densities, which points towards an intensification of coffee growing in terms of land use as the main tendency. Another 17 respondents had the same number of coffee plants as five years ago, and 14 had reduced either the area planted with coffee or plant density.
Table 7.7 Changes in area cultivated with coffee or plant density

<table>
<thead>
<tr>
<th>Change:</th>
<th>Cases (%) (N=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change:</td>
<td>17 (28 %)</td>
</tr>
<tr>
<td>More area than five years ago:</td>
<td>9 (15 %)</td>
</tr>
<tr>
<td>More plants in the same area:</td>
<td>20 (33 %)</td>
</tr>
<tr>
<td>Less area than five years ago:</td>
<td>12 (20 %)</td>
</tr>
<tr>
<td>Less plants in the same area:</td>
<td>2 (3 %)</td>
</tr>
</tbody>
</table>

The respondents were asked about the considerations they had taken into account when deciding to augment or reduce the quantity of coffee cultivated. Coffee return and prices were mentioned by 13 as the most important consideration to augment or maintain areas with coffee. Among those who had reduced coffee areas on their farms three gave low coffee prices as the reason for their decision. The security of coffee compared to other more risk prone crops was mentioned 8 times as an important aspect. ‘El café siempre da, aunque sea un poco’ was an often heard comment among the producers. Whether the producers’ attitudes towards coffee as a relatively secure crop were altered by the drastic price falls in the year 2000 and 2001 could only be hypothesised about at this point. However, the fact that coffee is a perennial crop means that producers do not easily take the decision to substitute it with another crop from one year to the next.

In the cases where producers had augmented plant density in existing coffee fields, better utilisation of their limited production areas was the most frequent reason, mentioned by 9. The move towards intensified land use identified in the present study fits well with the general tendency of intensification in the region as a consequence of the growing pressure on agricultural land.

7.3.3 Diversification as risk spreading strategy

An important feature of coffee yields in the study area was the variability between years, which to a large extent was determined by the erratic precipitation patterns. In view of the bad coffee yields between 1996-1999, lowest in the season 1998/99, the respondents were asked about possible explanations. Most frequent reasons for the low yields were related to climatic conditions (45); secondly, the effects of the sulphuric emissions from the volcano Masaya causing acid rain (16), and thirdly, explanations regarding management aspects (17). It is interesting that the impact of

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59 The coffee always gives [you an output] even if it is just a little
pests and diseases, mentioned by only 2 respondents, was generally not considered an important factor in explaining the low yields in the seasons in question.

**Table 7.8 Explanations for low coffee yields in the period 1996/97-1998/99**

<table>
<thead>
<tr>
<th>Type of explanation:</th>
<th>Frequency of answers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climatic conditions:</td>
<td></td>
</tr>
<tr>
<td>- natural phenomena (&quot;El Niño&quot;, high</td>
<td>45</td>
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<tr>
<td>temperatures, winds, <em>etc.</em>)</td>
<td></td>
</tr>
<tr>
<td>- draught, scarcity and irregularity of</td>
<td>24</td>
</tr>
<tr>
<td>rains</td>
<td></td>
</tr>
<tr>
<td>- hurricane (&quot;Mitch&quot; 1998)</td>
<td>12</td>
</tr>
<tr>
<td>Smoke/acid rain from volcano:</td>
<td>9</td>
</tr>
<tr>
<td>Management aspects:</td>
<td>16</td>
</tr>
<tr>
<td>- age of coffee plants (lack of replanting)</td>
<td>6</td>
</tr>
<tr>
<td>- lack of fertiliser/nutrients/exhaustion</td>
<td>5</td>
</tr>
<tr>
<td>of soil</td>
<td></td>
</tr>
<tr>
<td>- lack of maintenance</td>
<td>4</td>
</tr>
<tr>
<td>- pests and diseases</td>
<td>2</td>
</tr>
<tr>
<td>Other reasons:</td>
<td>7</td>
</tr>
</tbody>
</table>

*Note: The sum is larger than the sample size, because some respondents mentioned more than one reason.*

The above data show that climatic variability and shock effects were important factors to be taken into account in the production strategies of the households in the study area. On top of climatic variability, fluctuating coffee prices presented an important additional risk factor. Considerations regarding risk due to both climatic and price variations were expressed in the production strategies in several ways: Coffee was considered more secure than food crops, and diversification of the coffee agroforestry systems with fruit trees, such as citrus and avocado, was considered more secure than systems with coffee as the only cash crop. Considerations of this type were reflected in the changes that were taking place in the production strategies of the producers, among others in the prioritisation of different crops.

In view of the fluctuating coffee prices and a few bad coffee harvests due to climatic shock effects during the 1990s many producers expressed an interest in planting more fruit trees in their coffee agroforestry systems. For precisely the same reasons, variability of crop yields and prices, it appeared that the prioritisation was not accorded to one product over another, but rather of crop diversification over the maximisation of one of the crops in the system. It was found that among the thirteen producers who had prepared fruit tree seedlings the
majority (11) had also produced coffee seedlings, which rather points towards a
double strategy of investing in more fruit production while maintaining or
improving coffee productivity. This was also supported by the strong concern of
the producers of the study to identify the citrus species and varieties that were
most appropriate for association with coffee. The interest in this issue was
expressed frequently in interviews and discussions and in producers’ experiments,
in which properties with importance for the association with coffee plants such as
root extension, tree height and foliage cycles, were of special concern in addition to
the more general criteria of yields and the time it took for the fruit trees to reach a
productive state. Crop diversification within the agroforestry system could thus be
interpreted as a way of spreading risk, and producers’ interest in identifying citrus
trees that were appropriate for the combination with coffee reflect an aim to
optimise total system productivity.

7.4 Concluding remarks

The analysis of the coffee agroforestry systems in the study area showed how
shade trees were used in order to adapt the production systems to the local
growing conditions, which in terms of temperature and precipitation patterns
tended to be marginal for coffee cultivation. The re-introduction of shade trees by
the parcelero producers after the parcelling out of the cooperatives and the rapid
assimilation of their production systems to those of the historically private
producers emphasised the importance of the principle of local adaptation in the
production strategies of the coffee growers in the study area. In the unshaded
coffee plantations introduced in the 1980s fertiliser use had been an important
element. The reduced levels of fertiliser application, which were a consequence of
the re-structuring of the agricultural and financial sectors after 1990, were an
additional factor stimulating the reintroduction of shade trees into the modernised
coffee plantations of the former cooperative members.

Apart from being a result of agro-ecological adaptation, the producers’ practices
and considerations related to the use of shade trees in the coffee production
systems highlighted the importance of the linkages between production system
and household economy. In the study region, which was densely populated and
where small-scale producers’ farming plots were small, there was a need to
integrate subsistence crops such as plantains into the farming system, as well as
products such as firewood, fence posts, building material, etc., as such resources
were no longer freely available. Moreover, the concept of income smoothing had
great importance for small-scale producer households with modest cash flows. In
households with limited cash reserves it was not only a question how much the
farming system produced in overall terms but also when income could be generated. This meant that it was an advantage to have products in the agroforestry system that were harvested at different points in time or were independent of seasonality (e.g. plantains or firewood). Climatic and market-related risk was another reason for maintaining a diversity of crops. The need and possibility to take into account considerations of income security in their farm management implied a shift especially for those producers who had been members of collectively managed cooperatives and had been used to receive regular wages for their work.

If it has been concluded that local adaptation played an important role in the production strategies of the small-scale coffee producers of the study area, this should not be seen as an expression of some kind of agro-ecological equilibrium, however. Rather, changes should be understood as the outcome of a constant process of creation, maintenance and adaptation in response to multiple influences from the natural and social worlds that the producer households formed part of. This was inter alia illustrated by the influence of supra-local economic and demographic trends, and agricultural policy shifts on the general change tendencies identified within the production strategies of the small-scale coffee producers in the study area concerning reduced input use, intensification of land use and cash crop diversification.

Seen in a theoretical perspective, the findings of the present study regarding technological change thus require a modification of Netting’s concept suggesting adaptation to local natural conditions and household needs and resources defined by internal demographic dynamics as the decisive factors for the understanding of smallholder farming. Both aspects played a central role in the composition and management of the coffee agroforestry systems studied, but other factors importantly influenced the ways in which they were adapted. Among these were economic and demographic development trends at the local, regional and national levels; the political changes leading to the re-structuring of the Nicaraguan agricultural sector after 1990; world market trends and the breakdown of the international price regulation mechanism for coffee.

In contrast to the unilinear model of technology development of the modernisation approach, on the other hand, the findings of the present chapter suggest that modernisation is not an irreversible process. This is inter alia indicated by the assimilation of the production strategies of the parceleros to those of the historically private producers in the post-reform decade. Moreover, the study shows how technological change in small-scale coffee production was not a question of replacing one production system (the traditional) with another (the modernised)
but rather a continuous and hybrid process. Of the modern production methods for coffee which had been promoted, among others, by the CONARCA programme, it could be said that the small-scale coffee producers had adopted the idea of modernisation as far as the use of inputs and to some extent the new varieties introduced. That inputs were not used more than they were at the time of the study was mainly presented as a question of resource constraints rather than conviction. The idea of crop specialisation and coffee cultivation without shade trees, on the other hand, had never really been accepted by the small-scale producers, which was clearly demonstrated by the example of the parcelero producers’ re-establishment of diverse coffee agroforestry systems. The reintroduction of shade trees into the coffee production systems of the parceleros’ could, thus, in part be understood as a response to the withdrawal of state support, in terms of supply of credit and cheap inputs, but also as a response to the withdrawal of state control in terms of the extensionists’ supervision of coffee management on the cooperative farms.

Another interesting point is the observation that market integration of the small-scale producers had contributed to the high degrees of diversity within the coffee production systems. This could be explained by two different aspects related to risk and opportunities. Firstly, the unpredictability of coffee prices motivated producers to diversify their crop portfolios in order to spread risk. Secondly, the demographic and economic characteristics of the region offered access to different types of product markets, from coffee export markets, to urban markets for fruit and other perishables, and local markets for petty products such as firewood or fence posts. The example of coffee cultivation in Carazo and Masaya did, thus, not support the widespread notion of market integration being equated with modernised mono-cultural production systems. In the study area, in fact, quite the opposite was true. Producers of the export crop coffee generally maintained considerably higher levels of agro-biodiversity in their production systems than for instance producers of food grains. In this context, the properties of coffee as a crop suitable for cultivation in agroforestry systems played a not unimportant role.
Chapter 8 Differences in coffee production strategies

The empirical analysis of Chapter 8 is directed towards the question of how differences in the studied coffee production systems, in terms of income, structure and management, can be understood, and how they are linked to the socio-economic characteristics and dynamics of the producer household. To this end, the theoretical positions presented in Chapter 2 regarding the understanding of social difference and agricultural technology in small-scale agriculture serve as a starting point. The question of the dynamics creating social difference among producer households was a crucial factor in distinguishing between these theoretical approaches. Individual mobility was proposed as the determining dynamic by the modernisation approach and also by Netting’s smallholder approach, which also saw the family cycle as an important factor of explanation in this respect. Opposed to this view, both the conventional strand and the more recent theoretical contributions within the political economy field outlined in Chapter 2 focus on the social differentiation processes associated with technological change and social relations of production in market economic systems.

A second, but related, point of divergence is the question of the importance of capital and household labour as factors of production in small-scale agriculture. While the small-farm approach emphasises the decisive role of household labour in smallholder production, political economy and modernisation theories focus on capital as the key factor for agricultural production and development. This can be understood in connection with the diverging technology concepts promoted by the two approaches, the principle of local adaptation in Netting’s approach, opposed to that of small-scale producers adopting modern farming technologies with crop specialisation, capital-intensive methods and market integration. In the previous chapter we saw that both household labour and capital were important factors employed by the producer households to establish, maintain and improve their coffee agroforestry systems. The issue in this part of the analysis is how these two factors can contribute to explain differences in the production systems of the sample in terms of output, composition and management.

The findings suggest that there were no simple cause-effect relations at the level of the production system, but that more complex models of understanding had to be employed to grasp the processes leading to differences between the coffee agroforestry systems studied. The linking of dynamics pertaining to the level of the coffee production system to those going on at the household level facilitated interesting insights in this regard. Both family-cycle related dynamics and processes of social differentiation played a role in the explanation of the differences between different households’ coffee agroforestry production. The importance of
household labour in this context was found not necessarily to be directly related to farm production, but to be mediated via the different types of off- and non-farm work forming part of household livelihood strategies.

The findings of Chapter 6 indicated that there was a difference in the incomes from the coffee agroforestry systems of the groups of producer households pertaining to the three livelihood strategy types identified. The first group in the typology was defined as households living off their farm production without additional income sources. The second group was defined as households, in which the principal manager of the coffee production system engaged in farm-wage labour. The third type comprised all other forms of livelihood diversification at the household level. In order to contribute to an understanding of the dynamics leading to the indicated differences between these groups of producer households, the links between livelihood strategies and production of the coffee agroforestry systems are investigated more closely, *inter alia* in the analysis of four in-depth case studies. Among the issues analysed are the producers’ coffee management practices, the way they reasoned in associating trees and coffee and the importance of capital access and labour for coffee agroforestry production.

### 8.1 Introduction to case study examples

At first glance, the majority of producers included in the sample group appeared to follow quite similar general principles in the cultivation of coffee combined with trees. Taking a closer look, however, some difference could be identified in the size and composition of the incomes they achieved from their coffee agroforestry systems. Some producers specialised more in coffee cultivation and primarily used shade trees in relation to the requirements of the coffee plants while others harvested a more diverse range of products from their coffee agroforestry systems. An important question in this context is how differences in composition, management and output of the coffee agroforestry systems could be understood. The dynamics and considerations explaining these differences are here analysed by means of the following case studies.

The case studies were introduced at this point of the analysis for two purposes. Firstly, the intention with the case study analysis in the following has been to illustrate dynamics between livelihood and production strategies that lead to different socio-economic and agro-ecological outcomes. The four cases discussed in this section are the same as those used in Chapter 6, with the only difference that case number 5 (Andrés) was left out because he had only very recently started to plant coffee and trees in his newly acquired plot. The cases, thus, include examples
from all three livelihood-strategy types identified in the typology presented in section 6.2. They should, however, not be understood as representative of the different groups of the typology in quantitative terms.

Secondly, the cases were selected in order to illustrate differences in production strategies, including the outcome in terms of products and income, the composition and maintenance of the coffee agroforestry systems, and the association of enabling and constraining conditions that influence these factors. The case study producers had some basic characteristics in common with the majority of coffee producers of the sample regarding the areas they cultivated with coffee. They had coffee agroforestry systems that were to some extent diversified, and they all in some way or other invested time and resources in an effort to maintain and improve their production systems. Within these general features, however, there were also differences in the composition, management and outputs of their production systems. The case study households and their coffee agroforestry systems had the following characteristics expressed in relative terms within the sample:

- Case no. 1 (Pedro): Pedro was a parcelero and his livelihood strategy was characterised as specialised in farming (group 1) in the typology presented in Chapter 6. He achieved high productivity levels in his coffee and had a relatively high overall income from his farm, which was the only income source of his one-man household. Pedro’s coffee agroforestry system reflected a relatively specialised production strategy, where only a very small proportion of the total annual income from the production system was earned from tree products.

- Case no. 2 (César): The history of César was that of a private producer, and his household livelihood strategy was also characterised as farm specialisation (group 1). The farm was a bit larger than the other three and was managed by César and several adult sons living in the household. He had the highest income of the case study producers, achieved by a combination of relatively high coffee productivity and high tree product income due to diversification with a few selected marketable fruit types.

- Case no. 3 (Jorge): Jorge’s household was categorised by a livelihood strategy with farm-wage labour (group 2), as both Jorge and his adult son worked more or less permanently as farm wage-labourers on a large coffee farm in the vicinity. Jorge’s case was an example of low income from the coffee agroforestry system, with both low coffee productivity and low tree product income.
• Case no. 4 (Alejandro): Alejandro was a parcelero, and the livelihood strategy of his household was categorised as diversified (group 3) due to his wife Magdalena’s engagement in non-farm work. He achieved relatively high incomes from his coffee agroforestry system, which was based on medium coffee productivity and relatively high tree product income due to diverse tree composition and niche production.

The table below summarises the data of the four producers’ coffee agroforestry systems in terms of areas planted with coffee, net incomes from coffee production and cash income from other agroforestry system components in the season 1999/2000:

Table 8.1 Coffee agroforestry system income (selected cases)

<table>
<thead>
<tr>
<th>Cycle 1999/2000</th>
<th>Livelihood strategy</th>
<th>Coffee area (m²)</th>
<th>Coffee net income, total (C$) (% of total AFS income)</th>
<th>Tree product cash income (C$) (% of total AFS income)</th>
<th>Total AFS cash income (C$) (% of total AFS income)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Pedro</td>
<td>Specialised in farming</td>
<td>2</td>
<td>21,359 (94 %)</td>
<td>1,318 (6 %)</td>
<td>22,677 (100 %)</td>
</tr>
<tr>
<td>2) César</td>
<td>Specialised in farming</td>
<td>3.3</td>
<td>36,425 (86 %)</td>
<td>5,950 (14 %)</td>
<td>42,375 (100 %)</td>
</tr>
<tr>
<td>3) Jorge</td>
<td>Farm-wage labour</td>
<td>1.5</td>
<td>2,598 (79 %)</td>
<td>690 (21 %)</td>
<td>3,288 (100 %)</td>
</tr>
<tr>
<td>4) Alejandro</td>
<td>Diversified</td>
<td>3</td>
<td>21,000 (80 %)</td>
<td>5,120 (20 %)</td>
<td>26,120 (100 %)</td>
</tr>
</tbody>
</table>

*) AFS= Agroforestry system

The table shows that there were considerable differences not only in the size of the income derived from the coffee agroforestry system but also in its composition, incomes from tree products ranging from 6 % to 21 % of the total income. It should be noted that the relative importance of coffee and tree product incomes could vary from year to year so that tree product incomes could weigh relatively more in years with low coffee yields or prices.

César achieved by far the highest income from his production system. The fact that he cultivated the largest area of land was part of the explanation. High coffee yields and a good additional income from tree products added to the overall picture. César and his wife had started building up the production system several decades ago. They had been able to save up some capital from wage- and non-farm work during the years of the agro-export boom and buy their first farmland. Farm
production combined with César’s work as farm manager in the agro-export sector had allowed them to accumulate further capital over a period of 20-30 years. The capital was used for productive investments and later to expand the farm with further purchase of land. The management of the expanding farmland, that apart from coffee included cultivation of food grains and a few other crops, was carried out by César and Mirna’s many children, who provided abundant household labour as they grew up.

Pedro and Alejandro generated comparable incomes from their coffee production, although Pedro achieved a somewhat higher productivity in his 2 mz of coffee than Alejandro in his 3 mz. Because of a considerable additional income from tree products, however, Alejandro ended up with a larger total income. Although he was diversifying his system and would have liked to plant a lot more fruit trees, Pedro’s fruit production was limited, because he was living alone and had nobody to guard his fruit crops from theft. His coffee, however, was well maintained and gave him a good output. Pedro had no income sources apart from the farm, but a good portion of the income he gained with his coffee could be re-invested, as household consumption in his one-man household was modest.

Alejandro had also had some opportunity to invest in his farm, although on a more moderate scale than César. Furthermore, he had done so only since the late 1980s when he received his farming plot at the splitting up of the cooperative. He had access to credit through a credit cooperative he was a member of and his wife earned money in a sewing workshop and by selling fruit in the market. Although he saw his wife’s work as a constraint on his own labour time, because he had to help taking care of his young son and guarding the house and door yard against theft, he could dedicate most of his labour to working on his own farm. There were no other household members working regularly on the farm, and the couple’s adult children had moved and were making a living independently. Alejandro, like César, had considerable income from tree products. However, as will be elaborated upon below, the two producers’ criteria and strategies for tree composition in the agroforestry system were somewhat different.

Jorge had the lowest coffee agroforestry income of the four producers, both in terms of coffee production and income from tree products. What he was actually doing, however, was in principle not that different from, for example, Alejandro. Jorge was also working on renewing his production system with a coffee nursery, planting citrus trees, and experimenting with different varieties to improve his production. In terms of resources, however, it appeared that there were some important differences in terms of availability of both capital and labour. In contrast to the other three producers, Jorge had not been able to quit farm-wage work apart
from the decade of the Sandinista agrarian reform. Both Jorge and the adult son living in the household had to work as farm labourers most of the year to make ends meet. There seemed little or no surplus to be invested in the farm, and the work as farm-wage labourers of the two adult men in the household meant labour constraints on their own farm. Therefore, even if Jorge was working on improvements of his production system, advance was much slower and piecemeal than in the other cases.

In the following, the differences in income size and composition of the coffee agroforestry systems of the four case study producers and the total sample of the study are investigated in more detail. Firstly, we shall look at the coffee component and management factors that can contribute to the explanation of variation in the yields achieved by different producers. Secondly, the composition and management of the tree component is studied. The analysis both looks at the importance of direct factors of production and links these to the socio-economic dynamics expressed in the wider livelihood strategies of the case study households.

### 8.2 Coffee production and management

In general terms, it could be said that coffee productivity was quite low in the study area. The average yield of the sample group achieved over the three-year period 1996-1999 was only 4.1 qq/mz, but somewhat higher in the season 1999/2000 with 8.1 qq/mz. As can be seen in figure 8.1, however, there were major differences between producers. The graph illustrates the variation among the producers in the average yields achieved.
Figure 8.1 Coffee yields, mean cycles 1996/97-1999/2000 (qq/mz), count

![Histogram of coffee yields](image)

**Coffee yields, mean 1996-2000 (qq/mz)**

Although the majority of cases produced less than 8 qq/mz the range of yields, from below 1 to 15 qq/mz, demonstrates that there were some producers who achieved considerably higher yields than the rest. Moreover, differences that appear to be minor variations in the above figures - for instance 3 qq or 7 qq - can be of great importance for the producer households. The following section investigates how such differences could be explained by, *inter alia*, the case study examples and the analysis of the survey data.

### 8.2.1 Case studies: coffee

The following table gives an overview of data related to coffee productivity and management of the case study producers. Compared to the sample group, in two cases yields were above, in one around, and in one clearly below the 1999/2000 average yields of 8.1 qq/mz.
Table 8.2 Coffee yields, plant maintenance and input use in selected cases

<table>
<thead>
<tr>
<th>Productive coffee plants (Productivity category 1 &amp; 2)</th>
<th>Total number of plants/mz</th>
<th>Input costs (C$/mz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee yields (qq/mz)</td>
<td>Individuals/mz</td>
<td>As % of total number of plants/mz</td>
</tr>
<tr>
<td>1. Pedro</td>
<td>12.7</td>
<td>2737</td>
</tr>
<tr>
<td>2. César</td>
<td>13.6</td>
<td>921</td>
</tr>
<tr>
<td>3. Jorge</td>
<td>1.8</td>
<td>204</td>
</tr>
<tr>
<td>4. Alejandro</td>
<td>9.1</td>
<td>669</td>
</tr>
</tbody>
</table>

Pedro’s coffee plantation was productive and well maintained. As can be seen from table 8.2 with 75% of the coffee plants in a good productive state, the maintenance of his coffee plants was by far the best of the four producers. In the visits to Pedro’s farm it was obvious that he spent a lot of time working in the coffee plot, and that he was very outspoken about the need to maintain the coffee trees well, by pruning, stumping and replanting.

An explanation of César’s good coffee yields could be average plant maintenance, not quite as careful as Pedro’s, but combined with relatively high fertiliser levels in terms of the sample average. It is interesting to note that Pedro and César achieved comparable coffee yields but that they had different ways of achieving them. Pedro appeared to invest relatively more labour in plant maintenance, while César used more inputs.

Although they did not quite measure up to the yields of César and Pedro, Alejandro also achieved relatively good yields in the season 1999/2000. The state of plant productivity in his coffee plantation observed was somewhat poorer, however.

Jorge had the lowest coffee yields of the four producers. When taking a closer look at the structure of his coffee plantation, it is obvious that the much lower plant density and relatively few coffee plants in a productive state had something to do with low productivity in Jorge’s case.

### Input use and plant maintenance

The analysis of management factors and their importance for coffee yields suggested that the effect of fertiliser application was no simple input-output equation, and that differences in productivity rather had to be understood as the outcome of a combination of different management factors, including activities...
contributing to maintenance and improvement of the production system in the longer term. Hence, no general correlation could be detected between input use and coffee yields. There were, of course, some cases where producers invested relatively heavily in chemical inputs and achieved good yields. There were, however, also cases with high input costs and yields below average and the reverse. As can be seen in figure 8.2, four of the producers who had spent most on fertilisers had yields somewhat less than average, whereas fertiliser costs for the two cases with by far the highest yields were closer to the sample average of 628 C$/mz of fertiliser.

**Figure 8.2 Sample producers’ coffee yields and fertiliser costs (1989/99)**

Several plausible explanations for the apparent lack of correlation between input use and coffee yields could be found in the characteristics of the management practices and the resource situation of the producers in the sample. Firstly, as described in the previous chapter, producers’ purchase of inputs tended to depend on the previous year’s income and the availability of cash rather than plant demand. Secondly, other factors of production (e.g. manual practices of plant maintenance or shade characteristics) could outweigh the importance of inputs in the specific situation. Thirdly, an explanation partly related to this could be that the effect of input use tends to be marginal in situations with yields as low as those found in the sample. Thus, experimental results have shown how use of mineral
fertilisers can increase coffee production substantially\textsuperscript{60}, but that to be profitable a certain minimum yield level before use of fertiliser would be required. The referred minimum yields correspond to 8-11 qq/mz (Cambrony 1992, p.61), which is somewhat higher than the average yields found on the sample farms even if the good harvest of 1999/2000 is included.

To obtain a reasonable effect of fertilising low productive coffee as that indicated by the average of the sample, it must thus be taken into account that the plant needs to have a certain capacity of growth if it is to respond to the supply of fertiliser. In this context it is worth considering the results from the evaluation of plant productivity carried out on the 62 coffee farms of the sample. The data indicated that the state of productivity of the majority of the coffee plants was sub-optimal, half of the plants evaluated requiring stumping or total replanting (See table 7.1).

If the producers did not seem to put more effort into plant maintenance this was not necessarily only due to lack of time, knowledge or the resources to carry out the actual stumping or replanting, although all these factors may have contributed to the explanation. The reason most frequently given by the producers themselves was rather that they felt that they could not carry out stumping or replanting of their coffee to a larger extent, because the household could not afford to sacrifice the income from the old plants, even if it was very little, while waiting a few seasons for the new coffee plants to become productive. Several producers’ experiments with reintroducing the older practice of capping the coffee trees in order to maintain an annual production instead of stumping them every few years could be understood in this light.

It has been observed that the possibility to improve the production system little by little is an important advantage of coffee agroforestry systems for farm households with limited financial resources (Staver 2001). This is obvious from the way that, in the study area, small-scale producers with limited capital renewed and changed coffee plants and trees in their production systems. Many of them did so by their own means and in small areas or by individual plant because of capital constraints, in order not to have to cope without the annual income from their plot, or both. Thus, compared to many other production systems, the coffee agroforestry systems allowed for low-cost management and renewal by available means. Changes and

\textsuperscript{60} In the experiments referred to production increases of 30-70 \% were achieved with use of mineral fertiliser, and up to 100\% when combined with mulching. It should be noted, however, that the experiments were not carried out in a Central American context and that the results may not be directly transferable. Differences in soil quality, for instance, may be of importance.
improvements, however, could be undertaken to different extents and at different paces depending on the resources available to the farm household. The renewal of coffee plants to maintain productivity of the system may serve as an example. Producers wanting to replant or expand their coffee plantations could buy the planting material or to produce their own seedlings in a nursery on the farm. In approximately 21 out of 39 cases (56 %) producers had prepared seedlings for their own use in 1998 or 1999 with an average of 3,000 coffee plants. During the same period 16 producers had bought seedlings, with an average quantity of 1,275 plants. Three producers had both produced and bought seedlings.

Slightly varying prices were given locally for the cost of coffee seedlings. At the coffee growers association of Masatepe (ASOCAM) seedlings were sold at 1 C$ in the year 2000 (Int.Sánchez 2000). Another source stated prices of 1,50 C$ per seedling and estimated the cost of producing seedlings on farm at 0,80-0,90 C$ (Int.Reyes/Aguirre 2001). However, some basic investments would have to be made to be able to prepare a nursery, which probably only made it worthwhile investing in if a certain production of plants was expected. Larger producers, thus, could enjoy a certain advantage of scale in terms of preparation of plant nurseries. Moreover, the preparation of a nursery required water, planning and permanent care-taking also during the dry season when many small-scale producers engaged in other economic activities.

8.2.3 Specialisation vs. diversification

For many years it has been a conventional wisdom within the field of coffee production that dense shade of mixed multi-purpose trees is detrimental to the achievement of high coffee yields. Specialisation in coffee as the only crop and no, or only very limited shade cover, as promoted under the CONARCA modernisation programme, was seen as the right way to cultivate coffee. Such modern coffee production systems, however, require the use of high yielding varieties and high input levels. As the findings of the present study suggest, in an empirical situation the appropriateness and success of such systems depends, at least to some extent, on local natural conditions, markets, the socio-economic and institutional context and on the risks involved.

The impact of shade on coffee productivity is a complex issue, involving dynamics related to plant productivity, conditions for different pests and diseases, weed development, and stress due to extreme climatic conditions. In recent years, the interrelationships have been investigated in different studies. Research from Central America has illustrated the relation as a curve topping at a locally specific
Differences in coffee production strategies

optimum density, depending on the given natural conditions (Fernández and Muschler 1999, p.83; Guharay, Monterroso et al. 1999, p.83) (see Appendix 6 for an illustration). Thus, the shade demand of coffee plants grown in higher altitude areas with more rainfall is quite different from the lower altitude and drier conditions found in Carazo and Masaya. Other factors, however, also played a role as for example soil quality, fertilisation levels and other management practices.

An illustration of the shade percentages and coffee yields in the coffee farms of the sample shows a tendency towards a \( \cap \)-formed pattern. Assuming a relation between the two variables, this could indicate an optimum density between 40-50% in these local conditions, which corresponds fairly well with the range of 35-60% suggested for low, dry zones by Muschler (Muschler 1997).

**Figure 8.3 Shade percentages and coffee yields, mean 1996-99 (qq/mz)**

![Figure 8.3 Shade percentages and coffee yields, mean 1996-99 (qq/mz)](image)

Although most of the small-scale producers in the sample maintained relatively dense and diverse shade covers in their coffee plots, the notion of the superiority of modern production methods and crop specialisation, nevertheless, also influenced their views. Thus, during a focus group discussion held towards the end of the fieldwork, the participating coffee producers were asked about the reasons for the differences in coffee productivity among the sample producers. One of the participants, César, unhesitating mentioned two reasons for the low yields that many producers achieved. Firstly, people had too many fruit trees, plantains and
bananas in their coffee plantations because of their need for the tree products, and secondly, plant productivity was low due to deficient management of the coffee plants. On the first reason, he mentioned a second thought, however. He added that although coffee productivity might not reach its maximum when associated with fruit trees, plantains and bananas it was possible to achieve better overall production at the level of the production system (FocusGroup 2000).

César’s interpretation could to some extent be supported by quantitative analyses of the survey data. Thus the variable number of fruit trees was found to be modestly correlated with average coffee yields\(^{61}\), which could indicate a tendency to trade-off coffee yields with a stronger prioritisation of fruit production. The correlation was not very clear, however, as can be seen in figure 8.4\(^{62}\). Moreover, a trade-off was not reflected in the analysis of the relation between coffee and tree production in economic terms as seen in the figure 8.5.

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\(^{61}\) The number of fruit trees counted in the 1000 m\(^2\) sample plot showed a modest negative correlation with the variable ‘coffee yields 1996-1999’ in the big sample (N=60) at (p= 0.001) and with ‘coffee yields 1996-2000’ in the small sample (N=39) at (p=0.005).

\(^{62}\) The case of a producer principally concentrating on citrus with coffee as a secondary crop was omitted in the illustration as an extreme outlier.
Figure 8.4 Abundance of fruit trees and coffee yields, average 1996-99

Figure 8.5 Tree and coffee incomes from the agroforestry systems, 1999/2000 (C$)
It can be seen from the scatterplot above that there was considerable difference between the producers in income levels and composition in terms of coffee and tree product income. From the sample data it could not be concluded, however, that specialisation in coffee production or diversification with tree products per se generated more income. Successful producers and less successful producers were found within both approaches. To be successful, strategies of specialisation or diversification with tree products per se generated more income. Successful producers and less successful producers were found within both approaches. To be successful, strategies of specialisation or diversification with tree products worked in combination with other factors, such as availability of capital and labour, access to external resources through for instance off- and non-farm work or credit and management skills and knowledge.

Taking a closer look at the scatterplot in figure 8.4, it can be seen that the producers with the highest coffee incomes had moderate incomes from tree products. On the other hand, the producers with the highest incomes from tree products also had coffee incomes higher than average. A possible indication of the pattern of relation between the two output variables is that although there might be a negative correlation between the production of commercial tree crops and coffee, ceteris paribus, in reality there were many other variables that affected system productivity.

An interesting question regarding those producers who achieved both relatively good coffee yields and high output from the tree component was whether their agroforestry systems had obvious characteristics that made them succeed in achieving both. Taking a look at the composition of their tree income, however, it was difficult to generalise. Looking closer at three of the producers with tree incomes of more than 2,000 C$/mz and above average coffee yields it turned out that the content of their tree income was quite different. One had sold a big guanacaste tree for timber in 1999 that accounted for most of his tree income. Another had sold plantains and banana and the third producer’s tree income was predominantly from citrus fruit.

A preliminary conclusion on the issue of productivity might be that there is no single general factor that explains why some producers have a better output from their coffee agroforestry systems than others. Instead, it is suggested that different combinations of factors within farm management and in the wider livelihood strategies of the producer households lead to differential outcomes.
8.3 Shade trees: composition, production and renewal

The discussion in the previous chapter showed how many of the coffee producers were seeking to diversify the marketable products from their coffee agroforestry systems. A certain diversity of the production system, thus, was a means of safeguarding the household against climatic and market-related risk in addition to providing smaller amounts of cash and subsistence products throughout the year. In the conditions encountered in the study area, a certain diversity thus obviously had a positive effect on the farm households’ livelihood security and income possibilities, which explains why the majority of producers maintained a certain level of product diversity. On closer investigation, however, there were also many differences in the composition, production and maintenance of the tree component of the agroforestry systems in the sample. Some of these differences are discussed in the following section, drawing on case study examples and the producers’ perceptions and criteria regarding shade trees.

8.3.1 “No citrus, no banana, no nothing…”

In Nicaragua it is a widely held notion that large-scale coffee producers tend to have less and less diverse shade in their coffee plantations. This could be confirmed by the data of the present study regarding the number of trees and the abundance of fruit trees, plantains and bananas in the coffee plot. The result for shade percentages, however, was not significant. There are several conditions of a socio-economic nature that add to the explanation of the fact that large coffee producers tended to have fewer species and trees. Wealthy producers do not have to meet direct subsistence needs from the trees in their farming plot e.g. for firewood or food crops. Income smoothing is not required in the same way as in small, resource poor farm households because more cash is available. Larger cash reserves also make it less crucial to safeguard against variability in coffee income due to a bad rainy season or temporary price drops. Even if large-scale producers should chose to diversify their crop portfolio, the availability of larger areas of farmland permits cultivating different crops separately. Moreover, large-scale producers are likely to use more chemical fertiliser, which can modify shade demand of the coffee plants.

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63 Correlations were identified between farm size and the tree variables total quantity of trees/1000 m² (p<0.05), fruit trees (p<0.05) and plantains and bananas (p<0.01). Correlation coefficients in all three cases, however, were quite low.
In a focus group discussion Andrés, one of the case study producers, very clearly expressed how resource availability and the different needs of wealthy and poorer producers required different designs of coffee production systems:

“I have noticed that Mario Gutierrez [one of the large-scale coffee producers in San José] produces 60 fanegas per manzana, equivalent to 30 quintales. But now we are talking about technified [production], right? He has all the resources. There he has no citrus, no banana, no nothing, right? But I prefer a farm that has (...) citrus, plantain, etc. Then you will have three harvests a year, or rather, two harvests and you maintain your plantain throughout the year. And yes, it is possible [to have coffee and production of fruit, banana and plantain in the same plot], although the coffee may not give the same production. But what we are talking about is that one needs the firewood, one needs the money, and of course you need the citrus.”

Andrés, (FocusGroup 2000)

The above quotation highlights two important aspects of the discussion about association of coffee and trees in the studied agroforestry strategies. One concerns the question of productivity of diverse coffee agroforestry systems, and the different components of which they consist. The other aspect is the way that the design and management of the agroforestry system is linked up with the socio-economic situation of the farm households. Thus, Andrés mentions two different functions of the diversified tree strata in the agroforestry system: the need for subsistence products and the advantage of income smoothing by harvesting different products at different times of the year.

The differences between the composition of the production systems of larger and small-scale coffee producers show that the assumption of scale neutrality of the modernisation approach towards agricultural technology does not apply in the investigated case. Not if it is assumed that the use of modern production technology is equally accessible and advantageous for large as well as small producers. The abundance of trees and the combination of coffee with other products in the same area are, thus, influenced by the small-scale producers different resource conditions and socio-economic needs. Some of the more general differences in the ways that shade trees are used in the coffee agroforestry systems of larger and small-scale producers can, thus, be accounted for by quite obvious reasons. Considering that large-scale producers represent only a relatively small proportion of the total number of coffee producers, however, the question remains what explains the differences regarding the association of coffee and trees, coffee yields and system productivity within the large group of small-scale producers.
8.3.2 Case studies: differences among small-scale producers?

Although, at first glance, the agroforestry systems investigated seemed quite similar in terms of shade density and composition, it will be argued that the tree diversity encountered on different farms, at least partly reflected different dynamics and considerations. Tree composition in some cases was the result of carefully planned design and investment in consideration of household needs and market demands, while in others, the association of trees appeared to be more the consequence of a laissez faire approach with corresponding differences in system output. A comparison of the case studies revealed that apparently similar coffee agroforestry systems, in terms of output levels, could be the result of different design and investment patterns. Thus, system diversification could be expressed as a focus on coffee and a few selected fruit trees or as wider diversification into a broad range of niche products. Tree diversity, however, did not always lead to the production of marketable products, as demonstrated in one of the case examples.

The table below shows the tree composition and income of the coffee agroforestry systems in the four case studies:
### Table 8.3 Tree composition and income in four cases

<table>
<thead>
<tr>
<th>Case</th>
<th>Tree species (1000 m² sample plot):</th>
<th>Cash income from tree products:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Pedro</td>
<td>(7 species, 86 individuals)</td>
<td>Total: 1,318 C$ (659 C$/mz)</td>
</tr>
<tr>
<td><strong>Fruit:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 orange</td>
<td>76 plantain</td>
<td>1 cedro</td>
</tr>
<tr>
<td>2 mamón /banana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 lemon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 zapote</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shade/other:</strong></td>
<td>Shade/other:</td>
<td>3 madero negro</td>
</tr>
<tr>
<td><strong>Timber:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cedro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) César</td>
<td>(6 species, 68 individuals)</td>
<td>Total: 5,950 C$ (1,803 C$/mz)</td>
</tr>
<tr>
<td><strong>Fruit:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 avocado</td>
<td>45 plantain</td>
<td>3 laurel</td>
</tr>
<tr>
<td>1 nancite /banana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 lemon</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shade/other:</strong></td>
<td>Shade/other:</td>
<td>5 madero</td>
</tr>
<tr>
<td><strong>Timber:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 laurel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Jorge</td>
<td>(15 species, 45 individuals)</td>
<td>Total: 690 C$ (690 C$/mz)</td>
</tr>
<tr>
<td><strong>Fruit:</strong></td>
<td><strong>Timber:</strong></td>
<td></td>
</tr>
<tr>
<td>3 avocado</td>
<td>1 cedro</td>
<td></td>
</tr>
<tr>
<td>1 mango</td>
<td>1 guanacaste</td>
<td>1 guaba</td>
</tr>
<tr>
<td>1 anona</td>
<td>1 acetuno</td>
<td>1 guácimo</td>
</tr>
<tr>
<td>1 zapote</td>
<td></td>
<td>1 huevo de burro</td>
</tr>
<tr>
<td>26 plantain /banana</td>
<td>Shade/other:</td>
<td>1 cachito</td>
</tr>
<tr>
<td><strong>Timber:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cedro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 laurel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 roble</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 sonsonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Alejandro</td>
<td>(15 species, 86 individuals)</td>
<td>Total: 5,120 C$ (1,706 C$/mz)</td>
</tr>
<tr>
<td><strong>Fruit:</strong></td>
<td><strong>Timber:</strong></td>
<td>Shade/other:</td>
</tr>
<tr>
<td>9 orange</td>
<td>15 cedro</td>
<td>2 madero</td>
</tr>
<tr>
<td>4 mango</td>
<td>11 laurel</td>
<td>1 guabillo</td>
</tr>
<tr>
<td>1 avocado</td>
<td>1 roble</td>
<td>4 acetuno</td>
</tr>
<tr>
<td>1 huevo de burro</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shade/other:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 guacimo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 zapote</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 bamboo</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Timber:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cedro</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shade/other:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 sonsonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Timber:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 laurel</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shade/other:</strong></td>
<td></td>
<td></td>
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<tr>
<td>1 sonsonate</td>
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<td></td>
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<tr>
<td><strong>Shade/other:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 sonsonate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the sample plot on Pedro’s farm quite a few tree species were counted. Shade mainly consisted of banana and plantain and a few fruit and madero negro trees. The fruit, bananas and plantains were mostly used for consumption, or stolen. As can be seen, only quite modest amounts were sold. Pedro was planting a few new orange and avocado trees at the time of the study. However, he was restricted in his efforts to diversify because he was living on his farm alone and had nobody to
help him guard the fruit against theft. The problem of theft had visibly influenced the arrangement of trees in the agroforestry system, where most fruit trees were concentrated in the middle of the plot near the house. Pedro lamented that he was not able to grow more fruit trees: “You ought to have a tree of every kind, because you can sell the products” (CaseStudy1 2000). He liked fruit trees, he said, because you could use them for sale and for the children who liked to eat the fruit. He especially preferred orange trees as shade because they both created favourable conditions for the coffee plants and generated an income. He also assigned a certain value to timber trees but said that the benefit could be realised only in the very long run.

It can be seen from table 8.3 that César had the fewest tree species, and those he had all had a very well-defined purpose or benefit, concentrating on fruit for sale, plantain for home consumption and the shade tree madero negro. His priorities had lead to a substantial income from tree products, mainly concentrated on the sale of avocado and some citrus fruit that he cultivated more of in another plot.

Alejandro had many trees and a lot more species than César and Pedro, covering a range of different fruit, timber and other trees. His income from tree products was comparable to César’s but with a much more complex composition, among others plantains, oranges, avocados, other fruit, honey and bamboo. Moreover, he was producing timber for the family’s future use and was experimenting with niche cash crops such as cinnamon and pepper.

The number of species counted in Jorge’s plot was the same as in Alejandro’s. However, there were far more trees that neither had especially good shade properties, nor much of a productive use apart from maybe firewood. This was reflected in the data on tree product income, which was by far the lowest of the four. The products that were sold consisted principally of plantains and bananas and some avocados. Although his overall approach of coffee production combined with fruit trees did not seem that different, the way Jorge explained his ideas regarding the shade trees he had seemed somewhat less visionary than that of for instance César or Alejandro. Jorge appeared far less rigid in the selection of tree species and seemed to have more to say about different tree species (e.g. ojoche or mora) that were not generally mentioned as good shade trees by the producers of the sample.

The difference in tree composition and income between Alejandro’s and Jorge’s agroforestry systems pointed towards the question of knowledge and its importance for successful farming, which is a central issue in much of the current literature on sustainable agriculture and agroforestry (see e.g. (den Biggelaar 1996; Nielsen 1998)). Although Jorge had a good knowledge of the local tree species, he
apparently was not able to turn this knowledge into opportunities for cash income. By contrast, the share of income that Alejandro and his family earned from agroforestry products was substantial and showed that he had been able to find several viable product niches and was on the way to explore new ones as with the introduction of spice trees, albeit at a small scale. Where the market is an important aspect of household livelihood strategies, the example indicates, knowledge of ecological and technological nature is not necessarily enough but has to be complemented by knowledge of the functioning and opportunities of markets. In the case of Alejandro, it appears likely that his wife, who regularly went to the market in Masaya to sell fruit, was a source of information in this respect.

With the example of Jorge in mind, another aspect of the explanation as to why producers do not employ what to experts and other outsiders would seem more structured strategies for tree growing may be a certain reluctance to eliminate possible future opportunities. Thus, when producers sometimes were not very rigorous about tree selection, as in the example of a respondent who said that he did not select but let trees from natural re-growth fight it out themselves, this may have to do with the general outlook of the small-scale producers of the region. With the variable climatic and market conditions and frequent political and social changes within Nicaraguan society the world may look random to a small-scale producer. Although most people probably attempted to at least retain a minimum of strategy for maintenance of their livelihoods, a blueprint approach did definitely not appear compatible with the very variable contextual conditions. For the farm households this meant, on the one hand, a need to manage and reduce risk and on the other hand, a constant search for new opportunities, always on the lookout for all sorts of niches for marketing products or jobs of different types.

Regarding the trees in their coffee agroforestry systems, this perspective might help to understand why many producers seemed not to like cutting anything out in case it might turn out to be an advantage to have them later on were an unforeseen opportunity to turn up. This is not to say that a detailed assessment was necessarily made of what possible benefits every tree or species might have in different circumstances. Rather, in times of crisis or cash shortage, a certain diversity of trees and products in the agroforestry system allowed you to look around your agroforestry system and think what you could make use of. Product properties in terms of seasonality here play an important role. Thus the question is not only what kind of potential products you have, but also when you can use them. Although oranges give a higher annual income, lower value products as for instance firewood or plantains can be crucial during the dry season when cash shortages often arise.
Time perspectives in tree growing

When working with trees, the time horizon is a crucial factor in decision-making. In contrast to most agricultural crops, trees are a medium or long-term investment. Regarding the question of his criteria for species selection, Pedro gave an illuminating answer when asked what he would chose to do if he found a self-sown *madero negro* and a *laurel* in the same place in the coffee agroforestry system. Contrary to what could have been expected - that he would probably choose the higher value timber tree *laurel*, he said that he would leave the fast-growing *madero negro* because it would give him a quicker benefit in the form of poles. Moreover, he would not have to sacrifice the shade, which he would if a whole tree was cut for timber. With timber trees, he said, the time horizon was too long (CaseStudy1 2000). The example of producers’ preference for fast growing, low value trees for poles to valuable timber is also interesting in the way that it highlights the importance of petty commerce and local markets in the area. That timber does not appear a too attractive product compared to other options may also in part be attributed to the fact that felling trees for timber is subject to somewhat bureaucratic procedures and taxation and the low producer prices on the black market that were a consequence of this.

The question of short term vs. long term benefits from agroforestry trees was further discussed among the producers participating in the focus group discussion. Some of them supported the view held by Pedro, that timber trees had too long a time horizon, as for example César during a field walk through Alejandro’s coffee plot:

“You have to grow things that are more rapid, that get there quicker! Well the citrus, the citrus is the most rapid. Sure, let us talk about your ‘patio’ (...).[The timber trees] will give you a little cash, but when? It will take 20 more years, and then our friend here won’t be around anymore! [Everybody laughs] Well, okay, okay, he might still be around, that could be. But 20 years until you can make some money, whereas the orange yields in 3 years! You have to grow things that earn you more money, earn you money more rapidly. At least we who are poor, we who live of the farm.”

César, (FocusGroup 2000)

The remark “at least we who are poor, we who live off the farm” that César added to his statement on the importance of growing tree crops with quick returns points, interestingly enough, towards an ongoing discussion within the field of agroforestry projects and research. Based on a review of forestry and agroforestry initiatives in the region, Utting, for instance, has criticised a tendency not to take
the conditions and preferences of small farmers sufficiently into account when
promoting tree species and designs in agroforestry projects (Utting 1993, p.132). The
tendency in agroforestry projects and research to focus on trees with longer term
benefits such as timber or nitrogen fixing species could, thus, imply a bias towards
larger producers. Larger producers are generally in a better position to set aside
land for tree growing and wait for the returns of long-term investment than small-

scale farm households with limited availability of land and cash. The preference of
fruit trees for shade found among the producers of the sample group could be
understood in this context.

Alejandro, however, expressed a diverging view. During a walk through his coffee
grove, I asked him about the cedro trees he had. Pondering a little on the issue, he
told me that it made him think how he had been struggling 15-20 years with his
plot and that soon his children would be needing to build a house of their own, for
which they would need timber. “Therefore the cedro”, he said. “Well, that is my
opinion, maintain it as much as you can” (FocusGroup 2000). At another point during
the field study, however, Alejandro had expressed a different vision. His
agroforestry system had comparatively many tree species, composed of both
different kinds of fruit, timber and a range of other trees, as well as banana and
plantain. In one conversation he told me how he was thinking of changing the
composition of the shade to only avocado, plantain, citrus and madero negro in
orderly, alternating rows of coffee and fruit trees and eliminate the remaining tree
species. “In 10 years, you will see a transformed coffee plantation!”, he said (CaseStudy2
2000). The apparent contradiction between the two quotations of Alejandro’s view
of the trees in his coffee agroforestry system shows that things were not always
that clear cut. It might be that he was caught at two different moments in a process
of deciding what to do with his agroforestry trees, or that he felt torn between his
own inclination towards diversity and conserving trees growing in his plot and the
conventional truth that a modern, orderly systematic design of the agroforestry
system was necessary to improve its production. Another possible explanation,
however, could be that his strategy was to structure his production system more
rigidly as César had done, but that he had not yet had the means to pursue this
strategy.

8.3.3 Establishment of the tree component

The design of the shade component is another example of how the possibilities of
improving the coffee agroforestry system were not equal for all producers. To this
end a comparison is presented of the ways in which two of the case study
producers planted trees in their coffee plantation when they received their farming
plot.
In correspondence with his opinion that it was necessary to ‘technify’ the coffee agroforestry system, César had designed his agroforestry systems in a very structured way. There were relatively few tree species (6), citrus, avocado, *madero negro* trees, and plantain and banana, and those he had were purposefully planted and all produced some marketable output. He also had some timber trees, but they were concentrated on the borders of the coffee field. César and his family had established the farm from scratch after they had bought the plot in the late 1960s. The couple had been able to accumulate some capital from the savings of years of work on haciendas during the agro-export boom, and César’s work as foreman and later as farm manager, which he carried on after having acquired their farm in San José until 1984. When the coffee production system was established, the family had sufficient means to invest in the planting of coffee and fruit trees all at the same time. Some years later, the surplus from their production allowed them to purchase an additional piece of land, which they planted with coffee and fruit trees in the same manner as the original one.

In contrast to César’s limited range of trees, the inventory made on Alejandro’s farm counted 15 species, of which some were purposefully planted while others originated from natural re-growth. Unlike César, Alejandro had not had the means to undertake a larger investment in the farming plot he received in the late 1980s when his cooperative was split up in to individual holdings. Asked about the way he had gone about starting to grow trees in his coffee field, he told me how some of the first ones he had planted were a number of *madero negro* trees. At the time of the interview, more than ten years later, he still remembered with gratitude what a stroke of luck it had been that his father in law had given him a hundred cuttings of *madero negro* for free. Otherwise it would have been more difficult for him to establish proper shade for his coffee at the time. So the fact that there was a market for almost everything in Carazo and Masaya, was not an advantage for the producers in all situations. The positive aspect was that they could sell many different products, but almost all they did not produce themselves had to be bought. Everything had a price, even cuttings of *madero negro*.

The examples show that although generally speaking the production strategies might not have been that different. César had the means to plant what he wanted when he wanted, while producers with more limited amounts of capital to invest planted what they had, or what they could get hold of cheaply or for free, and they tended to carry out improvements only little by little.
8.4 Importance of capital and household labour

To follow up to the theoretical discussion in Chapter 2 on the dynamics leading to differences between small-scale producer households in production and socio-economic terms, the importance of variables related to capital access and labour availability for coffee production were investigated.

The above discussion of differences in incomes, composition and management of the coffee agroforestry systems and their components showed that the general socio-economic situation of the household and the availability of capital was important for the ways in which producers could maintain, adapt and improve their production systems and consequently for the incomes they could achieve. Although the coffee agroforestry systems investigated were not capital-intensive production units, the quantity of available capital influenced the possibilities of different producers to undertake investments with longer-term benefits and the flexibility with which they could adapt to new conditions. As already referred to in Chapter 5, the importance of capital access for coffee production could be supported by statistically significant results in the analysis of coffee production and capital related variables, namely the existence of sources of household income other than the farm and access to credit.

Regarding the importance of household labour, the study showed that a certain amount of household labour, one or two persons on average, was a basic factor of production in the majority of producer households. As concluded in Chapter 6, however, the analysis also indicated that household members tended to seek other economic activities in cases where more labour was available. By contrast, no statistically significant correlations could be identified between coffee production variables and labour variables. The identified pattern diverges from the concept of production on family farms being a direct function of available household labour, which is found in the small-farm literature as represented by Netting, and that is suggested as a key explanation for social differences between smallholder households.

Not surprisingly, the in-depth studies showed that the question of household labour was important for farm production in all four cases, but they also showed that it played different roles in different producer households. In two extreme cases, one with only one member and one with almost double the average household size, the direct influence of household labour on farm production was decisive. In Pedro’s one-man household, limited labour availability had direct implications for farm production. The consequence, however, did not so much present a constraint on coffee production as on diversification with fruit and
chicken due to the risk of theft. In César’s case household labour had a direct positive influence on farm production, as the abundant labour of his adult and teenage sons allowed for the cultivation of the household’s relatively large area of farmland without having to employ hired labour. In the remaining two cases the implications were more indirect. In the case of Jorge, that two male household members’ engaged in farm-wage labour meant that constraints were felt in the management of their own coffee agroforestry system. By contrast, in Alejandro’s case livelihood diversification had a beneficial effect on farm production. In this case, the different non-farm activities of the wife Elena generated additional household income, which permitted for re-investment of farm income and, on the other hand, did not seriously limit the labour time allocated to farm production.

As was discussed in Chapter 6, the economic dynamics between off-and non-farm work and the household’s agricultural production were influenced by the amount of income generated and the compatibility of the activities with farm work in terms of labour. Compatibility of off- and non-farm activities, of course, to some extent depended on the amount of labour available in the household, which again was linked to the family cycle. Moreover, the ways in which labour was organised within the household was found to play a role. Another crucial aspect with regard to compatibility in terms of labour as well as the volume of income generated, however, was the type of work engaged in. This was demonstrated clearly in cases where the principal coffee agroforestry system manager engaged in farm-wage labour, which did not generate sufficient capital for productive investment and tended to have a negative impact on farm production in terms of labour constraints. The motive for producers’ engagement in farm-wage labour was typically found to be economic compulsion rather than economic opportunity.

A positive dynamic, on the other hand, was achieved where off- and non-farm activities generated enough capital to allow for surplus to be invested in the farm production system and where these activities did not entail labour constraints on farm production. As found in Chapter 6, the producer households’ possibilities for engaging in off- or non-farm activities with a potentially positive effect on farm production, were in many cases restricted. There were constraints such as entry barriers in terms of education and start-up capital, which tended to give more wealthy households an advantage over poorer households, implying a tendency towards progressing social difference.

8.5 Concluding remarks
The main questions in the present chapter were how differences in the sample group's coffee agroforestry production - system composition, management and output - could be understood and how they were interrelated with the differences identified in the producer households' livelihood strategies. In household-level studies using qualitative methodologies, as those forming part of the present study, personal characteristics, capabilities and interests of the subjects studied will mostly be obvious factors contributing to the explanation of the observed differences and dynamics. The present analysis, however, aimed to investigate whether more general patterns or relations could be identified that structured producers' possibilities of strategy and adaptation. In this respect, the theoretical approaches discussed in Chapter 2 pointed towards different concepts to explain relations between agricultural technology and social difference in small-scale farming.

Regarding the issue of agricultural technology the modernisation approach has typically promoted specialisation and capital-intensive methods to increase agricultural productivity. In Nicaragua the coffee modernisation programme CONARCA was an expression of this concept. The concept, moreover, was reflected in the widespread conventional wisdom that the shade in the coffee fields was a decisive factor of difference between high and low productivity. Netting in his work on smallholder sustainable agriculture, on the other hand, emphasised the importance of adaptation to local natural conditions and the family cycle, perceiving of household labour as a decisive explanatory factor for difference in agricultural production on this type of farms.

Among the proponents of modernisation of small-scale agriculture as the key to rural poverty alleviation it is assumed that the advantages of modern production methods are neutral to scale. The emphasis on dynamics of social differentiation of the political economy inspired theories stands in contrast to this conception. Netting's model offers a third way to understand the question of social difference among small-scale producers. According to his approach, reliance on household labour and agro-ecologically based farming practices protect smallholders against the differentiating dynamics prevailing in the wider society. Moreover, the concept does not, as does the political economy perspective, perceive of social difference among smallholder households as being the expression of a progressing tendency towards differentiation, but rather as an outcome of family cycle dynamics and individual mobility driven by personal skills and characteristics.

To begin with the use of shade as a central issue in the debate on coffee production technology, it was found that the relatively small group of larger producers included in the sample tended to specialise more in coffee production, have less
shade trees and less diverse compositions of tree crops. A range of explanations related to the socio-economic characteristics of small farms based on family labour vs. those of larger producers accounted for the differences. Larger producers, thus, were more likely to have the resources to apply inputs, and wider financial margins in their farm economies allowed for long-term investments and calculating with risk over longer periods. Moreover, larger producers’ household needs were mostly not linked that directly to farm production in terms of subsistence products or smoothing of cash flows. Crop specialisation, thus, was not equally feasible for large and small-scale producers. The possibilities to use and benefit from chemical inputs proved not to be entirely neutral to scale either. Small-scale producers also used chemical inputs, but sub-optimal timing, quality and quantities of the inputs used due to limited financial resources in many cases prevented resource poor producers from reaching the same effect as larger, wealthier producers.

Overall, the coffee production systems found among the large group of smaller producers resembled each other in the way they produced coffee under a relatively dense shade canopy composed of a diverse mixture of shade trees, including many multi-purpose trees. A closer look at the composition, management and output of the coffee agroforestry systems, however, revealed that there were also considerable differences among the small-scale producers of the sample. A wide range of factors contributed to explain the observed differences in the density and composition of shade trees in the small-scale coffee production systems, among others the producer’s personal preferences, vision and knowledge, household composition, market access, and response to risk. There was also some difference to be observed with regard to incomes from their coffee agroforestry systems. The data of the study did not suggest that the degrees of diversification with tree crops or specialisation in coffee production per se made some producers’ strategies more successful than others. The analysis showed that it was not one single factor of production that explained the observed differences between production systems, but that combinations of different factors working together accounted for the observed differences in production. Maintenance and improvement of the productive capacity of the entire coffee agroforestry system was important, however, and in this regard capital played an important role, although maybe in relatively subtle ways.

This finding was confirmed by the study of the ways in which small-scale producers invested available capital. Capital availability typically would result in an increased use of inputs but did not generally appear to lead to the conversion of diverse coffee agroforestry systems to more specialised production systems without shade trees. Longer-term capital investments were rather used to improve
and adapt the coffee agroforestry system in different ways through maintenance and replanting of coffee and shade trees and product diversification with fruit trees. The influence of capital availability on the producers’ capacity to adapt to changes and variability occurring in their natural and economic environment suggests that Llambi’s notion of social heterogeneity acting as a filter for their possibilities to adapt production strategies is a useful concept. Most producers, thus, could to some extent do something to adapt and improve their production systems, but some could do it the way they wanted and when they wanted, while others had more limited options.

Although household labour was essential for the management of the studied small-scale coffee farms, different quantities of available household labour understood as a direct factor of production did not seem to constitute a general explanation of differences in the productivity of the coffee agroforestry systems. Capital access proved to be more of an explanation of why some producers appeared to be more successful than others in the realisation of their production strategies. The analysis of livelihood strategies in chapters 5 and 6 demonstrated, however, that the allocation of household labour to off- or non-farm economic activities could contribute importantly to the generation of capital for the household and thereby indirectly have an importance for the possibilities to invest and enhance farm productivity.

Based on the findings of the present study Netting’s concept of smallholder households’ being protected against dynamics of social differentiation due to their labour intensive, agro-ecologically based farming practices could be both supported and modified. In support of Netting’s argument is the possibility to maintain and improve the coffee agroforestry systems with available means and low levels of external inputs. Family cycle dynamics in this respect played a certain role, in the sense that it would take producer households many years to establish a productive coffee agroforestry system if they started from scratch and worked with small investments. Moreover, the advantages of the diversified production systems in terms of risk reduction, income smoothing and inclusion of subsistence products provided the producer households’ livelihood strategies with a certain degree of robustness. Compared to more capital intensive or specialised production systems these qualities might be said to protect the small-scale producer household against some of the adverse effects of variability, competition and tendencies of differentiation in the market economy. On the other hand, social heterogeneity set different limits to the ways in which the small-scale coffee producers of the sample group could adapt and improve their production systems, both in terms of flexibility and quality. Moreover, as already indicated in Chapter 6, the study of links between dynamics at the household level and the production system revealed
tendencies of progressive difference associated with households’ possibilities to accumulate capital.
Chapter 9  Conclusions and perspectives


9.1 Conclusions

The research objectives of the analysis have been concerned with small-scale coffee producer households in Nicaragua and the social and technological change processes they formed part of. The investigation hereof was undertaken from two different perspectives, a broader agrarian change perspective and a household perspective, and centred around the three thematic issues of social differentiation, technological change and livelihood diversification. In order to investigate these issues, central positions on the dynamics of agrarian change were introduced, their divergences were discussed and used to formulate questions to guide the analysis.

In the debate on the ‘agrarian question’, the theoretical positions of the modernisation approach, political economy theory and what is here called the small-farm literature are often presented as conflicting models for understanding the dynamics driving agrarian change processes. It would have been tempting to try to point out one of the theoretical approaches as being the most important for understanding the processes observed in this study. The empirical evidence in this case, however, did not bear out such a conclusion. Even over a longer historical period no single one of the dynamics which the different approaches pointed towards seemed able to explain the complex change processes taking place in a satisfactory manner.

An important conclusion of the present study is that different types of explanations were required to grasp the multiple dynamics which played out simultaneously and were mutually constitutive at various points in time. Each perspective crucially influenced the type of dynamics that came to the fore in the analysis. For instance, the influence of family cycle dynamics at the household level and of broader structural transformation processes at the regional or national level were not mutually exclusive but operated simultaneously. Hence, in the case studied in the research work, elements from more than one of the theoretical approaches discussed could contribute to understanding some aspects or layers of the analysis.
Small-scale producers and the broader social transformation and technological change processes in the coffee sector of the Meseta region

In spite of a turbulent history, the coffee sector in the study area continued to feature a large proportion of small-scale producers at the time of the study. The majority of the coffee producer households cultivated other crops for sale and subsistence, and many also engaged in other types of economic activities in addition to coffee production. Most of the coffee cultivated in the small plots of land was managed with so-called traditional practices with low input levels and different kinds of shade trees and, compared to other regions and countries, gave relatively low yields.

At first sight, the existence of a relatively large group of small-scale coffee producers in the study region after 150 years of coffee export production would seem to suggest a history of continuity, as indicated in Netting’s concept. A closer investigation, however, deemed the notion of smallholders escaping the effects of social differentiation due to their reliance on family labour and local adaptation an insufficient explanation. The processes at play among the producer households studied suggested far more uncertain livelihood trajectories, which, among others, were influenced by the opportunities of diversifying household incomes under changing political-economic conditions. Hence the existence and characteristics of the social category of small-scale coffee producers in the study area should rather be understood as the outcome of dynamic social change processes, formed through the articulation of i.a. larger political-economic tendencies and local and regional socio-economic, cultural and demographic patterns. Social struggle and politics played an important role for the way in which and the extent to which different tendencies dominated in different historical periods.

If the analysis concluded that the explanatory concept of the small-farm approach did not sufficiently explain the processes studied, it was also found, however, that nor did the other approaches. The dualistic historical development model of the modernisation or orthodox political economy approaches did not fit the social transformation processes that had taken place in the coffee sector of the study region since the introduction of the export crop up to the time of the study. The small coffee farms with so-called ‘traditional’ production methods had not disappeared in competition with more efficient, fully commercialised production units and the introduction of modern technology as the modernisation approach assumed. Nor did the orthodox political economy assumption of mass proletarianisation as a consequence of agricultural development and the expansion of export production match the empirical processes studied. In fact, at one point in history, the group of small-scale producers actually grew, due to the Sandinista
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reforms and the political opportunities for their existence, which these reforms gave rise to.

However, although outright mass proletarianisation was not a consequence of the development of coffee export production, the political-economic concept of social differentiation made an important contribution to understanding the social processes associated with it. The impact of the identified tendencies of social differentiation, however, did not appear to be equally strong in different historical periods. The impact was influenced by the changing political and economic conditions, social struggle and the ability and determination of the small-scale coffee producer households of the study area to seize economic opportunities and niches allowing them to maintain or re-establish their livelihoods as producers. Nonetheless, processes of differentiation were, and are, important.

The concepts of peasantisation, de-peasantisation and re-peasantisation as used by Bryceson provided a useful way of framing the social transformation processes that small-scale coffee producers formed part of in the study region. Hence, instead of marginalisation and total proletarianisation of an existing peasantry, the immediate consequence of the expansion of coffee export production and the associated privatisation of land in the study region has been interpreted as having been the creation of a peasantry. True enough this process was followed by an increasing tendency towards social differentiation and marginalisation of segments of the peasantry, especially during the period of politically reinforced capital concentration under the Somoza dictatorship. If this tendency did not lead to the loss of more small-scale coffee producers’ access to land at the time this was at least partly due to the possibilities of diversifying their income portfolios during the agro-export boom of the 1950-60s, with, among others, production directed towards the emerging urban markets.

During the Sandinista government, the tendency towards land concentration was temporarily turned around with the re-distributive land reform carried out as part of the revolution. Regaining access to land by a considerable number of rural people during the agrarian reform and the subsequent parcelisation of many of the cooperatives could, thus, be interpreted as leading towards re-peasantisation of the beneficiaries involved. Moreover, this tendency in the coffee sector was reinforced by supportive agricultural policies during the agrarian reform combined with relatively stable international coffee prices during the 1980s. The case studies showed that these conditions had the effect on the livelihood strategies of small-scale coffee producer households that they were able to concentrate on farm production instead of depending on additional income sources.
The historical course, thus, draws attention to the influence of politics and social struggle on the ways that rural households formed their livelihood strategies and the extent to which they could base them on agricultural production. Social struggle in this context was most clearly expressed in the processes leading to the revolution and, later, in the social pressure leading to a certain reorientation of the agrarian reform strategies from a strong focus on large-scale collective production units to a certain reorientation towards the demands of the campesino sector.

The trajectory of the group of parceleros included in the study lead to another conclusion as it showed that neither social differentiation nor technological modernisation were necessarily irreversible processes. The parceleros had been directly affected by the drastic structural changes that the Nicaraguan agricultural sector had undergone before, during and after the Sandinista revolution. Having lost their access to land during the polarised economic development under the Somoza regime, they became members of state-promoted cooperatives with modernised coffee production during the Sandinista agrarian reform, and finally found themselves as private landholders in a liberalised economy at the beginning of the 1990s, when the reformed sector was de-collectivised. After these drastic influences on their livelihood conditions it was remarkable to find that their production and livelihood strategies had changed again in the course of the 1990s in a way that made them hardly distinguishable from those of the historically private small-scale producers of the sample group at the end of the decade. The observed changes in the parcelero group’s livelihood and production strategies, however, should not be understood as the return to an earlier state of traditional life styles and production systems. Rather, the observed process should be seen as the homogenisation of two groups with temporarily different trajectories into a mainstream that was itself dynamic.

Change tendencies in the coffee producer households’ livelihood and production strategies

The broader social and technological change tendencies outlined in the above were in several ways reflected in the livelihood trajectories of the case study households in the decades before, during and after the agrarian reform. The general picture was that favourable agricultural policies and stable coffee prices in the period of the agrarian reform had enabled the small-scale coffee producer households to concentrate more on farm production than they had done earlier, when many had engaged in seasonal farm-wage labour. Production methods had changed in the direction of more intensive use of chemical inputs and new varieties. This was especially so in the case of the then cooperative members, who worked totally
modernised coffee production systems. When subsidies and credits from the state banks stopped as a consequence of the de-regulation of the agricultural sector, management of the small-scale coffee production systems became less capital intensive. Moreover, the political and economic changes of the 1990s contributed to an increased tendency towards livelihood diversification.

_Diversification in household livelihood strategies_

The analysis of the broader rural change processes taking place in Nicaragua in the 1990s showed that increasing numbers of rural people worked outside the agricultural sector and that a growing share of rural household incomes was derived from non-agricultural occupations. Diversified livelihood strategies including different kinds of off-and non-farm activities were a characteristic feature of the producer households of Carazo and Masaya. Against this background, the question was posed whether these tendencies were to be perceived as an indication of processes of (semi-)proletarianisation and de-agrarianisation taking place in the study area. An analysis of the dynamics associated with livelihood diversification in the studied coffee producer households, however, did not bear out a general conclusion of this kind. On the contrary, a closer study of the changes that had taken place in the households’ livelihood strategies revealed that livelihood diversification had contributed to making a farm-based livelihood possible for many of them.

The explanatory concept based on the family life cycle was an important inspiration to reach an understanding of changes and differences in the livelihood strategies of different households. The dynamics of the family life cycle, however, turned out to be of importance in a different way than that proposed by the small-farm approach. According to Netting the family life cycle is a key factor of explanation for the changes that take place in smallholders’ farm production over time. This has to do with changing availability of family labour to work on the farm and its relation to the number of consumers in the producer household. Family labour obviously was also important for the management of the Nicaraguan coffee production systems studied, but it was concluded that the import of family labour was not limited to its direct use in farm production. Thus, a crucial function was found to be the allocation of family labour to off- and non-farm work that could generate capital and thereby facilitate investment in land and production systems.

In continuation of this conclusion, the analysis identified a cyclical pattern that, among other explanations, was important for understanding income diversification in the producer households’ livelihood strategies. So the cyclical pattern could, to a considerable extent, account for observed differences and
changes regarding producer households’ access to land as well as the relative importance of farming and off- and non-farm work. The cyclical pattern identified among the sample households consisted of three phases. During the first phase of adulthood many of the respondents had experienced dependence on off- or non-farm work, because they did not have access to land. In other cases inherited plots were not sufficient to maintain the household due to the practice of splitting up family holdings at inheritance. This meant that they had to try to acquire more land or find other additional income sources. This was followed by a phase during which the households acquired land and established their production systems. The respondents had gained access to land in different ways, through the agrarian reform, purchase or inheritance. During this phase, off- and non-farm income was mostly still needed to cover household needs at the same time as investing in the farm. The third phase in the cycle was specialisation in farming once the farm had become sufficiently productive. This typically coincided with the respondent having reached an age when it became more difficult to sell his or her own labour and adult children had left the household.

In cases characterised by the cyclical pattern outlined above the young generation’s access to land and their establishment as producers did not happen as an automatic consequence of the family life cycle but had to be regained. To this end, access to local, urban and international commodity and labour markets that allowed the producer households to diversify incomes, both at the level of the production system and of the household, was crucial. The diversified strategies, when successful, in turn contributed to their possibilities of maintaining, regaining or expanding their access to land.

The cyclical pattern identified among the studied households’ livelihood strategies is also relevant to the question of whether livelihood diversification should be understood as a step towards de-agrarianisation. Based on the studied coffee producer households’ investment behaviour and labour allocation this could generally not be said to be the case. The sample group’s evidently strong social identification as producers pointed in the same direction. It was found that respondents perceived themselves as producers even in cases where farm income was far from sufficient to maintain the household. The low income levels and the contingent and volatile nature of most of the income generating activities accessible to poorer producers probably added to their perception that the farm was the most important element in their livelihood strategies and that a farm-based livelihood was the most desirable option.

A point that is important to highlight in this context, however, is that the possibilities of earning off- and non-farm incomes and regaining access to land and
establish a farm-based livelihood in this way were not constant, but were influenced by the broader political, economic, social and demographic changes taking place. Taking a broader view of the development perspectives in the study region there appeared to be tendencies that made access to land increasingly difficult once it had been lost. Holdings were continuously being fragmented by inheritance. Land prices were rapidly increasing whereas employment opportunities for rural people in Nicaragua were very limited. This implied that young people migrated further to find work and it seemed to take them a longer time to accumulate the capital necessary to establish themselves as producers, and, if the tendency continued, a smaller proportion of them would eventually be successful in doing so. The somewhat ambivalent visions regarding the young generation’s future that were revealed in the interviews with both producers of the parent generation and young people themselves should probably also be seen against this background.

It should also be mentioned that besides dynamics based on the family life cycle other kinds of explanations contributed to the understanding of diversification in producer households’ livelihood strategies. In some cases, for instance, households never reached the point where they could depend on farm income alone but, out of economic compulsion, had to rely on additional income sources. Different households’ possibilities to complete the cycle described above were, thus, not equal, an aspect I shall return to below. In other cases, livelihood diversification was the outcome of individual decisions of household members to engage in off-farm or non-farm work, or in other terms, an expression of individual opportunity seeking more than a step towards a household livelihood strategy specialised in farming. A further factor of relevance in the discussion of diversification is that of risk management. Diversification of incomes with activities not related to coffee production, thus, could serve as a buffer to climatic and market-related risks. While many of the respondents explicitly mentioned risk spreading as an objective of crop diversification, however, they did not describe livelihood diversification in this sense.
Coffee production strategies and technological change

The analysis of production strategies showed that neither the unilinear development model of the modernisation approach nor an exclusive focus on local natural conditions and household dynamics could sufficiently explain the technological changes that had taken place in small-scale coffee production. Rather, the conceptualisation of the investigated technological change processes had to be based on a more integral analysis of local level and broader social and political-economic dynamics influencing the coffee producers’ strategies.

Moving through the area where the study was carried out it was obvious that modern plantation design had not become common practice among the small-scale producers of the region. On the contrary, the analysis found that the parceleros, who had received plots replanted by the CONARCA coffee modernisation programme at the beginning of the 1980s, by the time of the study had turned their production systems back into coffee agroforestry systems with dense shade cover composed of a diverse range of trees. The reestablishment of dense shade canopies in the coffee plots of the parceleros is to be regarded as a radical change in the production systems, considering that it takes a lot more time to grow trees than to fell them as was done under the modernisation programme CONARCA. Based on the data presented in the study it could be concluded that a comprehensive homogenisation had taken place between the coffee production strategies of the parceleros and those of the historically private producers, with regard to agro-ecological structures and management practices.

To turn to the model of interpretation encountered in the small-farm literature, it can be concluded that adaptation of the coffee production systems to the local agro-ecological conditions was an important explanation for the widespread use of shade trees in the study region. This was shown both by the historical development of the production systems with shade trees after the introduction of coffee to Central America and the producers’ further adaptation of their coffee systems to the local climate of the study area which was warmer and dryer and where rainfall was more variable than in the more optimal coffee growing areas of Central America. The characteristics of coffee as a crop that responds positively to cultivation under shaded conditions are important in this context.

Aspects related to demographic dynamics within the producer households, as Netting suggests, can have importance for farm production both with regard to labour availability and consumption needs. In the present study it was found that the availability of household labour was important for the management of the coffee agroforestry systems, especially on larger family farms. On the host of smaller farms, however, the findings indicated that family labour exceeding that of
one or two permanent workers on the coffee agroforestry system was mostly
directed towards other occupations than farm work, except for times of peak
demand on the farm. Although household labour was an essential factor of
production, the available quantities of household labour in different households
were not generally the explanation of differences between production systems and
outputs. As concluded above, however, family labour could be important for the
generation of cash to allow for farm investment. The reduced access to credit for
small-scale producers following the privatisation of the state bank in the beginning
of the 1990s should be considered as a factor that emphasises the importance of off-
and non-farm incomes for farm production compared to the previous decade.

Another link between production system and family size was the household’s need
for subsistence products, *viz.* plantain and firewood, which had a certain influence
on tree composition in the coffee agroforestry systems. The link between
household size and the demand for subsistence products met by the coffee
agroforestry system, however, did not bear the characteristics of a linear function.
Depending on a household’s socio-economic situation, substitution of the products
in question with purchased goods could be preferred to including them in the
coffee agroforestry system. Examples were observed among a few more wealthy
producers forming part of the sample and in the comparison with producers in
regions with generally higher incomes and living standards, as for instance in
Costa Rica with its more specialised and capital-intensive coffee production
systems.

Having pointed out the ways in which adaptation to local growing conditions,
household labour and the dynamics pertaining to the family life cycle influenced
coffee production among small-scale producers in the study area, it shall also be
argued, however, that these were not the only factors of importance. Production
strategies were also changed and adapted in response to agricultural policies and
strategies, markets and the wider social and demographic processes characterising
the region.

The technological change processes that had taken place within the coffee sector in
the study region during the Sandinista agrarian reform were an example of the
impact of state-led modernisation. The CONARCA programme formed part of a
strategy to induce the desired radical modernisation of the coffee sector. It entailed
wide-ranging elimination of existing coffee plantations and the abundant trees
within them; their substitution with new varieties in un-shaded plantations;
facilitation of good credit possibilities; low input prices and heavy promotion of
‘technified’ production methods through the agricultural extension system.
The analysis of coffee production systems and management practices a decade after the agrarian reform had ended indicated that the efforts to modernise coffee production in the area had had a somewhat mixed impact on the sample group. Some elements had been adopted or adapted, while others had been outright rejected by the producers. One of the principles that apparently had been rejected by small-scale producers was crop specialisation and the elimination of shade trees as the example of the parcelero coffee producers’ reinstatement of multi-purpose shade trees in their coffee plots showed.

In other aspects, however, modernisation efforts seemed to have had a more lasting effect on producers’ practices and attitudes. This applies for the use of newer coffee varieties, which were introduced by CONARCA. They were found in many producers’ coffee plots, although often in a mix of different older and newer varieties, and for the cultural practices by which they were managed. Moreover, the use of inputs had been widely adopted among the producers of the sample, at least in principle if maybe not always that visibly in practice. In this regard, the favourable policies during the Sandinista government had lead to considerable increases of input use, especially in the production units of the reformed sector but also among private small-scale producers. With the strongly increased access to credit and rise in input prices as a consequence of deregulation of the agricultural sector and foreign exchange rates in the 1990s, however, most small-scale producers had to reduce their use of inputs. Financial constraints rather than rejection of the practice were given as the main reason for not using more inputs.

The breakdown of the international coffee price agreement at the beginning of the 1990s was a factor spurring another change tendency identified in the respondents’ production strategies. Adding to the risk of variable climatic conditions, fluctuating coffee prices motivated many producers to pursue a strategy of risk diversification, by intercropping more citrus and other fruit for the national markets in their coffee agroforestry systems. Moreover, the local and regional economic and demographic development trends and infrastructural conditions played a role for the production strategies in several ways. Trends towards urbanisation in the Managua area and the nearby larger towns offered the producers of the region increased market opportunities in terms of vegetables, fruit, plants, etc. and thereby presented an incentive to diversify crop portfolios. The conclusion that the diversity of the farming systems increased due to integration into different types of markets and the characteristics of the cash crop coffee diverges somewhat from the conventional wisdom of market integration and export crop production being associated with specialisation and mono-cultural production patterns.
Another change tendency, which at least partly could be explained as an implication of the demographic and economic trends in the study area, was a gradual intensification of land use in the coffee production systems. The reduced land sizes in the study area, thus, meant that producers could not just carry on producing in the same way as their parents and grandparents had done but had to seek new ways to increase the outputs of the agricultural land available to them. Higher densities of coffee plants and intercropping with tree products, plantains and bananas were ways of intensifying the use of the horizontal and vertical space available in the mostly very small farming plots.

**Aspects of difference in livelihood and production strategies**

A further question that the analysis investigated was whether the possibilities of adapting and improving production systems and livelihood strategies were the same for different producer households in the sample. This part of the analysis responded to the theoretical discussion of social difference among small-scale producer households and the diverging positions offered on this issue, by *inter alia* the small-farm approach and the different strands departing from the political economy perspective. Netting, representing the former, perceives smallholders as being relatively unaffected by the dynamics of social differentiation prevailing in the wider society. Opposed to this view Jansen and Llambí, belonging to the strand of newer political-economy-inspired theory, identified social difference and polarised social relations as important aspects in their analyses of rural change processes in different Latin American contexts. Jansen concluded that producers held qualitatively different positions in polarised social relations, which made them act differently. Likewise, Llambí characterised the social heterogeneity existing among producers as a filter, setting limits to the ways in which they could respond to influences from their economic, political and natural environment.

Seen from the outside, the livelihood and production strategies of the small-scale coffee producers of the sample showed a lot of common characteristics. This was further emphasised by the homogenisation that had happened between *parceleros* and historically private producers. Neither matching the image of the traditional peasant nor that of a modern agricultural entrepreneur, the coffee producer households had adapted with diversification and flexibility to variable external conditions and complex, but limited, product and labour markets at the local, national and international levels, at the same time as securing certain subsistence needs with their farm production.
When functioning in a positive way, diversification of incomes supported the small-scale producer households in establishing, maintaining and improving their farms. The diversified coffee agroforestry systems in turn provided the producer households’ livelihood strategies with a certain robustness due to their advantages in terms of the combination of different cash and subsistence products, the possibility of income smoothing, and relatively low maintenance costs and risk levels. In a context as volatile as the Nicaraguan, such strategies in many ways appear better adapted than specialised, capital-intensive production systems involving high risks to the investments made and to the livelihoods that they maintain. The drastic drop of international coffee prices that happened at the time of writing is just one example. In this sense, the coffee producers seen as a group, compared to for instance food grain producers or landless wage labourers, may be said to have some resemblance to Netting’s image of smallholders resisting the effect of polarised social relations in the wider society. Taking a closer look at the dynamics at play at the levels of the production system, the households’ income and activity portfolios, and the interactions between farm production and other types of work, however, the analysis identified aspects of social differentiation influencing the room for manoeuvre of different producer households.

Hence, the widely held notion within the small-farm literature that low-input, agro-ecologically based production systems opposed to ‘green revolution’ style farming technology, are neutral to the dynamics of social differentiation could to some extent be supported, but was also modified by the findings of the analysis. The coffee agroforestry systems found in the study area permitted producer households with limited financial resources to create, maintain and improve their production systems with low levels of external inputs using available resources, not least household labour. However, as already concluded above, household labour availability in most cases was not a direct determinant of difference with regard to farm production. In spite of the relative good possibilities of managing the coffee agroforestry systems with low capital intensity, the scale and pace at which changes and improvements could be undertaken and the flexibility with which producers could adapt to changing market and climatic conditions to some extent depended on the capital available to the households. This implied that opportunities were not equal and that different resource endowments at the outset lead to differential outcomes, implying different possibilities of re-investing and accumulating capital, also in the case of low-input production methods based on agroforestry practices.

At the level of the household, the analysis found that the possibilities of completing the cyclical pattern described above, involving off- and non-farm work, (re-)gaining access to land and establishing the agricultural production system, were
not equal for all. This applied to the possibility of gaining access to land as well as the next step, the establishment of a production system able to maintain the producer household. The role of social heterogeneity was manifested in the differences identified in the relations between livelihood diversification and farm production, which could be expressed as either a positive dynamic or a trade-off situation.

The types of off- and non-farm jobs and economic activities that producers engaged in turned out to be of great importance for the possibilities for improving the coffee production system. Farm-wage labour on the larger coffee farms, the most common wage labour opportunity in the area, had an obvious constraining effect as it was difficult to generate an investable surplus from the low wages paid. Peak labour demands coincided with those of the producer’s own farm and there was high covariate risk in terms of climatic adversities and coffee price fluctuations. Other types of economic activities, on the other hand, could have a positive effect on farm production in terms of the additional capital that could be used for productive investments. The types of employment that were identified as having a positive, or at least neutral, effect on farming either consisted of jobs that were better paid than agricultural wage labour or of economic activities, as for example petty commerce or business, that were more flexible in their timing and therefore did not interfere with farm production.

Poorer households’ access to better paid jobs and income possibilities, however, in many instances was constrained by entry barriers in terms of education or a minimum of capital for investment. Capital and education, thus, were identified as important factors influencing the ways in which different producer households could adapt their livelihood strategies and whether or not they could accumulate surplus to invest in farm production. In this sense, the findings of the analysis support Llambi’s notion of social heterogeneity acting as a filter to the ways in which producer households or individuals can respond and adapt their livelihood strategies.

Hence, although dynamics related to the family cycle and personal characteristics obviously played a role in the livelihood trajectories of different households, they were not the sole explanation for social differences between producer households. The existence of positive and negative dynamics between production of the coffee agroforestry system and access to off- and non-farm income opportunities in dependence of availability of capital and education levels pointed towards aspects of social differentiation influencing the social and technological change processes that the small-scale coffee producer households formed part of.
Summing up

To briefly sum up the major conclusions, the analysis indicated that neither social differentiation, as a consequence of which small producers were pushed of the land, nor technological modernisation were irreversible processes. With regard to the former, this is not to say that tendencies to social differentiation and marginalisation of poor agricultural producer households did not exist. Rather, the point is to draw attention to the role of social struggle and politics by which they were decisively modified or reinforced in different historical periods. The Sandinista revolution and agrarian reform were an illustrative example of this. An example of the reversibility of technological modernisation is the parceleros’ re-shaping of their modernised coffee production systems to diverse, shaded agroforestry systems in response to the local natural environment and changing political and market conditions.

Moreover, it was demonstrated how micro and macro dynamics interacted in shaping the historical processes studied. Local natural conditions and social\textsuperscript{64} dynamics as well as broader structural tendencies contributed to shaping social and technological change processes in the study area. The analysis pointed towards one of the crucial questions being that of how stages in the life cycle of the producer households coincided with the changing opportunities offered by their broader political and economic context, which at different points in time could be of a more constraining or more enabling nature.

\textsuperscript{64} ‘Social’ is here used in the broad sense, i.e. as an attribute of aspects pertaining to society in contrast to ‘nature’.
9.2 Perspectives and reflections on the research approach

The main tension in the studied processes was between the multiple drastic changes in the broader political and economic context of the coffee producer households of the study region on the one hand, and on the other, the seeming constancy of the social category of small-scale producers within the sector. The combination of a broader structural perspective with a household perspective in the analysis facilitated an understanding of this paradox. Hence, the household perspective revealed that the apparent relative stability of the social group of small-scale coffee producers, in terms of numbers as well as in their social and technological characteristics, was, in fact, the result of constant movement. Individuals and households moved between different kinds of economic activities of which farming was one. People lost access to land, lived off wage labour and other employment types. Some succeeded in regaining access to land at some point in their lives, others did not. Even among those who had land it was a constant challenge to seize changing opportunities arising from dynamic product and labour markets and to adapt their livelihood and production strategies to changing political, economic and demographic circumstances. Thus, the study of coffee producer households’ livelihood trajectories showed that what on the surface could appear to be stable was the outcome of constant struggle and adaptation in a volatile context. Or, in other words: the only constant was change, hence the title of the dissertation.

In those parts of the analysis that dealt with social and technological change processes from the perspective of the coffee producer household, Netting’s approach provided some useful ideas. Explanations recognising the importance of local dynamics, viz. that of the family life cycle and adaptation of farming systems to local natural conditions, greatly helped to make sense of the observed changes in livelihood and production strategies and differences between households. However, neither the livelihood strategies of the households - including their access to land - nor the manner in which the coffee production systems were designed and managed were entirely determined by internal household dynamics and local natural conditions.

The findings of the study support the argument made in the theoretical section as to why research with a limited focus on the farm household is not able to grasp many of the important dynamics that link individual agricultural production strategies, producer households’ socio-economic situation in terms of resources and labour, and the broader contextual changes that influence them. With an analytical approach confined to the farm level it would, thus, not have been possible to reach an understanding of the dynamics that condition the opportunity
structures of the producer households, which are not constant over time and not equal for different households. As a critical comment on the delimitation undertaken by Netting, the findings of the present study therefore suggest that acknowledging the relations between smallholders and larger society ontologically without taking the step further to the epistemological level has implications with regard to the models of explanation and conclusions that are reached. Hence, although Netting acknowledges that smallholder households are not isolated entities, he analyses them as if they were and does not study the relations and dynamics by which smallholders are linked to the wider society. This means that his models of explanation and his conclusions regarding the nature of the social relations and dynamics that constitute the smallholder category tend to presume that smallholders are not politically and economically linked to the wider society.

The conclusions of the present study, thus, not only emphasise the relevance of the chosen methodological approach of combining different analytical perspectives, that of the producer household with that of the broader structural change processes they formed part of and were influenced by, but also the combination of different types of theoretical concepts to explain the observed processes. As a reflection on the research process, the different types of dynamics that were at play simultaneously in the investigated processes also explained why, at times, it seemed difficult to reach satisfactory conclusions on the relations and dynamics analysed. Only by using a combination of different types of theoretical explanations to contribute to an understanding of the dynamics at work in different layers of the studied processes was it possible to make the appropriate analytical linkages.

Limitations
By combining a household perspective and a broader structural perspective the analysis highlighted and linked two important dimensions of the processes of change studied. A scientific study, however, is always a simplification of reality, where some aspects are brought to the fore in order to facilitate a deeper understanding of the structures and dynamics at work. Thus zooming in on selected aspects implies leaving other aspects in the background, which are left out or given far less emphasis in the analysis. In the present study, social relations and institutional issues at the community level belonged to the aspects that, although also of importance for the shaping of the studied change processes, were left in the background for the sake of analytical clarity and feasibility in terms of time requirements for data collection and analysis.

A few comments should also be made on the limitations deriving from the sample criteria. These have partly to do with the principle target group being defined as coffee producer households and partly with the choice of respondents within the
households. Firstly, the fact that the sample households were all landowners limited the extent to which processes of social differentiation could be investigated. The inclusion of households that had lost their access to land, thus, could have facilitated a more thorough study of the dynamics leading households to sell their farmland. Another interesting issue to investigate would have been the social relations between different producer types *e.g.* coffee producers who hired food grain producers or landless workers to work on their farm. Some individual interviews carried out in the study villages and available local studies were drawn upon to gain information on these issues. A more systematic inclusion of other types of producers or farm workers in the survey, however, would have meant a considerable increase in the time requirements for fieldwork and analysis of data of different kinds of production systems.

Finally, a few remarks shall be made regarding the choice of respondents for the survey interviews. The principal coffee agroforestry system manager was chosen as respondent in order to carry out a thorough study of the production strategies. This was in most cases the senior adult male in the household, which implied a trade-off in terms of a wider inclusion of other household members in the surveys. Interviews with women and youth formed part of the key-person interviews and in-depth case studies, however, and contributed to the analysis with valuable insights. A greater emphasis on these groups in the entire fieldwork process would have enabled me to give a more nuanced picture of intra-household relations and inter-generational change at the level of the survey sample. It should be mentioned that I had originally intended to include a wider range of household members, in terms of gender and generation, in the target group for the survey. When designing the questionnaire, however, it turned out not to be feasible at that point in the process, as the range of issues and the time requirements would have been excessive.

An integration of a more limited number of focussed questions would not have been possible until later in the research process when it could have been based on the preliminary analysis of the quantitative material and qualitative interviews. At that time, however, the surveys had already been completed. As an example, it would have been relevant to include a few more focussed questions in the survey on the elder generations’ trajectories regarding access to land and ability to live off the farm. This would have provided a more thorough quantitative basis for the discussion of differences in the livelihood prospects of today’s young generation compared to those of the parents in their time. This, however, would have required knowing beforehand some of the conclusions of the study concerning the cyclical pattern with regard to land access, farming and off- and non-farm work. At this
point of the process, realising this could be suggested as a basis for future research within the field.

Scope of generalisation
The geographical and historical characteristics of the households and production systems studied were, of course, specific to the local context, as were the ways in which broader structural influences and locally specific dynamics were articulated in household livelihood and production strategies in the three study villages. Compared to other rural areas in Nicaragua some tendencies were more pronounced in the study area, viz. population density, pressure on agricultural land and rural-urban linkages. Moreover, considering the condensed political and economic changes that had taken place in Nicaragua in the decades up till the time of the study, conclusions regarding the concrete historical development process in Nicaragua cannot be directly transferred to other empirical contexts. However, the revealed dynamics leading to changes in households’ livelihood and production strategies, the linkages between them, and the processes leading to social difference are suggested to be of more general relevance. The fact that some of the historical changes and tendencies in the studied Nicaraguan setting had taken on a somewhat more marked form could possibly also imply that dynamics and mechanisms of broader relevance were easier to make visible in the Nicaraguan context than in other places, where they might be expressed in more subtle ways or over a longer historical period.

Hence, it shall be held that the findings of the analysis can contribute to more general debates in several ways. Firstly, small-scale coffee producers resembling those of south-western Nicaragua are found in many other places along the Meso-American Pacific region. Similarities include both natural settings (soils, climate, topography, etc.) and several important social, institutional and economic aspects, including demographic and employment patterns, land distribution, crops and landuse, turbulent political histories, the impact of international economic and political trends (economic liberalisation and globalisation), etc. The conclusions on tendencies in small-scale agriculture and coffee production could thus be considered of broader relevance across the isthmus.

Secondly, the Nicaraguan case is interesting in the light of the Latin American debate on agrarian change tendencies in a post-land-reform context. The historical trajectory of the Nicaraguan rural sector condenses a range of tendencies and

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65 Depending on the variables in question, similarities might generally be said to be less pronounced with regard to Costa Rica, in several ways an economic and political exception in the region, and more pronounced with regard to Honduras, El Salvador and Guatemala.
Conclusions and perspectives

conditions characteristic of Latin American development, among others a marked *latifundio-minifundio* structure with polarised distribution of land and other resources, an export sector based on agricultural primary products, agrarian reform and modernisation programmes followed, at the end of the century, by de-regulation of the agricultural sector under the banner of structural adjustment.

Referring to the three adjustment paths of Latin American agrarian reform beneficiaries outlined by de Janvry (de Janvry, Sadoulet et al. 1998, p.14), - selling out, semi-proletarianisation and successful capitalisation - a comment could be made based on the findings regarding Nicaraguan *parcelero* coffee producers. Thus, the present case suggests that, although many *parceleros* in the Nicaraguan cooperative sector had sold out in the decade following the agrarian reform, it cannot be taken for granted that agrarian reforms cannot have any lasting impact. The example of the *parcelero* producers who formed part of the study demonstrated that redistribution of land can contribute to re-peasantisation of segments of the rural population, but also indicated that access to land alone was not necessarily a sufficient basis for the formation of a social category of successful small-scale producers. In the case studied here, the fact that the received cooperative plots had been planted with coffee, and not for instance food grains, had been an advantage for the beneficiaries, combined with access to credit and good, stable coffee prices during the phase of establishment, and later, possibilities to generate additional incomes by diversifying into broad portfolios of products and economic activities.

Thirdly, in continuation of the above, the study of relations between livelihood diversification and farming in small-scale producer households in a Central American setting can contribute new empirical evidence to the ongoing international debate on these issues and the broader question of de-agrarianisation, which among others has been debated in an African context (Bryceson 1997).

Finally, the design of the present study with its aim of an integrated understanding of socio-economic processes at the household level and production practices and strategies in their concrete expression within the context of broader structural change processes is suggested as a contribution to the debate on inter-disciplinary methodologies within the fields of small-scale agriculture, political ecology and related areas of research.

Some policy implications
Based on the above reflections, some policy implications can be sketched out. The realisation that the image of a stable social category of small-scale producers does not endure when looking closer at the social processes it is constituted by, means that planning in rural areas as if dealing with a constant group of producers does
not seem appropriate. Taking into account that producers such as those studied in the present case are not constantly and not exclusively producers calls for an integrated understanding of the livelihood portfolios of producer households and the importance of off- and non-farm work. Livelihood diversification with off- and non farm incomes, however, should not be interpreted as a simple dynamic. Whether off- or non-farm work has a positive or negative impact on farming depends a lot on the quality of the jobs in question in terms of both income levels and compatibility with farm work. The importance of social heterogeneity conditioning different households’ possibilities with regard to livelihood diversification should be emphasised in this context.

Moreover, it could be suggested that one should be careful about having universal assumptions regarding producers’ interests, regarding the social trajectories they aspire for as well as with regard to technological change. For instance, neither the dichotomous concept of a transition from ‘traditional’ to ‘modern’ production systems nor the sustainable agriculture approach were adequate to fully grasp the ways in which producer households changed and adapted their production systems and methods. Producers tried out, chose and rejected elements of different kinds of production technologies, adapting their production systems to the possibilities and constraints associated with the local setting as well as the changing contextual conditions.
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Appendices:
Appendix 1: Comments on methods of data collection and analysis

Timing and length of the fieldwork

The fieldwork in Nicaragua consisted of three periods: a shorter exploratory visit in July and August 1998; a second period of field work from February to July 1999, including the first larger farm survey; and a third period from October 1999 to May 2000, including a follow-up survey and in-depth case studies (for comments on the selection of study villages, samples and case study households see section 2.4). It was planned to cover the whole growing season with the fieldwork, in order to observe the changes in agriculture and other occupations of the producer households during the year. Besides the local level field studies, fieldwork in Nicaragua included a series of key person interviews, literature search, participation in relevant meetings, workshops and conferences, and office work consisting of preparation of field work and the initial data processing. The length of the fieldwork not only allowed for relative thoroughness and flexibility in the carrying out of the field studies, for example, re-visiting the producers participating in the study, but also gave me the chance to get a broader and better knowledge and understanding of the wider context within which the study was carried out. Sharing offices and interchanging with the staff of the research and extension project CATIE-MIP/AF on a daily basis, participating in relevant local and national events, reading newspapers and following the general debate in the country, thus provided a valuable background for the analysis of the more specific information gathered.

At the end of the fieldwork period, preliminary findings were presented and discussed with those participating in the focus group discussion, with the team of the regional research and extension project CATIE-MIP/AF and at a national agroforestry congress with extensive participation of Nicaraguan research institutions and other organisations within the field.

Techniques and materials used in the field

The two surveys were based on a questionnaire consisting of closed and open questions about coffee production and socio-economic information on the household (See Appendix no. 3). The use of a questionnaire ensured the comparability of the data that were to be used in the quantitative parts of the analysis. The questionnaires were administered in personal interviews, which was necessary because it could not be assumed that the respondents were literate. The interview form also allowed for more flexibility and avoiding that questions and answers be misunderstood.

Another element of the survey consisted of measuring shade percentages, an inventory of shade trees by species and size categories, and an evaluation of coffee plant productivity in a sample plot of 1000m$^2$ within each of the 62 coffee farms. Shade percentages were measured by means of a densiometre. Shade data were taken in 4 different points in the sample plot with readings undertaken in 4 directions in each of the 4 points. Based on these results, an average shade
percentage was calculated for the plot. Inventories were made of all trees in the 1000-m² sample plots of the 62 coffee farms, by tree species and size categories (diameter > 5m, diameter < 5 m, and recently sown/planted). Moreover, on three of the case study farms a complete mapping of trees in the coffee agroforestry system was undertaken. The evaluation of coffee plant productivity followed a format with 6 plant categories (1: normal coffee plants, 2: plants requiring pruning, 3: plants requiring stumping, 4: plants requiring replanting, 5: pre-productive plants, 6: lacking plants). Samples of 25 plants each were taken in three points of the sample plot. Finally, coffee plant density was measured.

The inclusion of technical and biophysical data related to the issues at stake has been an important aspect of the study. My own scientific approach towards agriculture and natural resource management is rooted in the social sciences, but an integration of more technical and agro-ecological aspects was essential for the study, not only in order to understand the concrete agricultural management practices as such, but also to be able to ask the right questions and make the right connections in the analysis of the relations between coffee agroforestry and livelihood strategies. Research collaboration with the regional IPM and agroforestry research and extension programme CATIE-MIP/AF and the field research assistants’ knowledge of coffee growing were invaluable, as my own experience and knowledge of coffee before carrying out the study was fairly limited to that of a dedicated consumer.

In the case studies a range of different techniques were used, including semi-structured interviews and open conversations with different household members, PRA-inspired methods, such as ranking-and-scoring exercises and historical matrixes regarding agroforestry system and household incomes, field walks, calendars and maps. In the case studies the aim was to use participatory, visual and simple methods (e.g. with use of local materials such as beans for ranking and scoring exercises) as recommended in many fieldwork manuals. The methods worked well with some respondents, while others seemed to prefer the interview form. Key person and group interviews were carried out as semi-structured interviews.

Most interviews were documented by note taking, which made the interview situation more relaxed and meant that part of the selection and processing of information was done on site. However, the group interviews and the focus groups discussion were recorded on tape, as the facilitation of the discussions required my full attention. An advantage of having these interviews on tape was that direct quotations could be used in the text. Furthermore, sometimes information that did not seem very relevant at the time of the interview, and therefore might have been ‘filtered’ during note taking, at a later stage of the analysis turned out to be extremely valuable.
Use of assistants

The first exploratory study to the area was carried out together with an extensionist who knew the area and many of the producers well and could provide useful background information about coffee growing in the region.

The fieldwork in the three selected study villages was carried out with the help of research assistants. A team of two-three permanent assistants for the entire time of the survey helped carry out the interviews and measurements. The assistants had previously worked as research assistants in agronomic experimental research. The objectives of the field study, the questionnaire and some interview technique and methodological considerations were discussed thoroughly with the assistants. After the assistants had observed the first interviews carried out by myself and had carried out a few under supervision, we worked in teams of two. Additionally, in each of the study villages a local assistant was employed temporarily to help with the identification of coffee producer households and to help establish contact with the respondents selected for the study. The work with the assistants functioned well and team discussions in the course of the fieldwork turned out to be very fruitful, providing interesting insights for all who participated.

Key person interviews, group interviews, focus group discussions and some of the case study interviews were carried out without the help of assistants. The local assistant who had participated in the survey, however, assisted in carrying out the case studies, with the identification of tree species in the mapping of the coffee agroforestry systems and sometimes as ‘cultural interpreter’. Language as such was generally not a problem in the interview situation, but sometimes it was very useful to be filled in with some contextual explanations to be able to avoid misunderstandings between researcher and respondents – and as sparring partner for the discussion of some of the observations made in the course of the fieldwork.

Sources of bias

The respondents for the survey were selected at random from a complete as possible list of coffee producers in the study villages. In two villages lists had to be completed or compiled before the selection could be undertaken. The numbers of coffee producers on the lists were 104 in San José, 54 in Fátima and 78 in San Juan. The producers approached for an interview in most cases were willing to participate. However, in a number of cases it was not possible to make an appointment or carry out an interview due to reasons that were not always known. It could be hypothesised that social bias played a certain role. Thus, it appears that those who had to be dropped from the list of respondents were often the poorer, the less articulate, less accustomed to interact with outsiders, and those spending much time on wage work outside the farm or as seasonal migrants. In other cases, however, producers were just not interested in participating in an interview, which of course had to be fully accepted.
Although most of the farm level interviews were carried out with the principal coffee agroforestry manager, who in most cases was a male household member of the elder generation, the aim was to include the perspectives of both women and men and of household members of different generations. This was done by, as far as possible, including interviews and PRA-exercises with both husband and wife in the case study households, and by carrying out some individual and group interviews targeted especially at youths or women among the coffee producer households of the study area. Interviews with the wives in households where contact had already been established with the male coffee producer were not always easy or possible to carry out, or at least not without the husband interfering in the interview situation. However, when possible the interviews with both partners gave valuable information on gender-related differences in the perceptions of production and economic issues.

A few of the considerations regarding the relation between researcher and respondents in the farm level interviews and how to avoid bias due to distrust and mistaken preconceptions should be presented. Regarding the building up of confidence and mutual understanding, being able to carry out interviews and conversations without the use of an interpreter was a great advantage. Moreover, revisiting respondents several times over a longer period of time turned out to create a much more relaxed atmosphere and willingness to talk on the side of the respondents, even among those who had seemed too busy or maybe a bit reluctant during the first interview.

A problem that probably has more general relevance in research situations than the above, but that appeared very pronounced in the study area, was that of expectation, arising from the situation of an, by local standards, wealthy foreign researcher visiting poor households in a developing region. In spite of an explicit introduction to the objectives and nature of the study, questions as ‘did the survey mean that a new development project was coming?’ - or ‘were there any possibilities of funding or credit?’ – were frequently asked, and at least once rumours to this regard had to be traced and killed.

Use and interpretation of primary data

The outcome of the key-person interviews was mostly used as background information while the qualitative data from the producer, household and focus group interviews were also analysed in an interpretative manner. The quantitative data were entered on a database and analysed using SPSS (Statistical Package for Social Sciences). It was a great advantage to be able to draw on both qualitative and quantitative field data and analytical methods. The two types of methods included in the analysis were used both to inspire each other and to corroborate findings e.g. correlations identified in the qualitative case study material with a quantitative analysis of the corresponding data in the large survey sample.
The quantitative data were first explored by producing descriptive statistics (frequencies, means, standard deviations, medians, range, minimum and maximum values) and graphic outputs (scatterplots and histograms) and later by means of different bi- and multivariate tests. The quantitative methods used in the final analysis mainly consist of descriptive statistics and some tests investigating associations between variables and differences between groups in the sample, including parametric (correlation analysis and Student's t-test) and non-parametric tests (cross tabulation with Pearson's Chi²-test). The quantitative data include nominal, ordinal and interval data. For interval scale data parametric tests were preferred when possible. For testing the associations between two interval level variables correlation analysis was used, and for those between interval and dichotomous variables the t-test was chosen. As some of the variable data were found not to be normally distributed as required for these tests, however, in some cases non-parametric tests (Chi²-test) were applied instead. A brief outline of the tests referred to in the text is given in the following.

**The t-test:** The independent samples t-test is used to compare the differences in the means of the values of the dependent variable of two unrelated samples. The t-test tests the null hypothesis i.e. that there is no difference between the mean values of the samples. To this end, the test works out the likelihood of drawing two samples with a difference in means that is at least as big as that observed. The likelihood of drawing a sample with the observed difference in means from a population in which there is no difference between the two groups with regard to the investigated variable is determined according to a table of t-scores, which in the present study was provided by SPSS.

The t-test assumes a random sample, and is also applicable for small samples. It requires the dependent variable to be interval level and normally distributed, and moreover requires that the variances within the two groups, which are compared, are not too different from each other. The test divides the difference between the two means with the estimated standard error of this difference (Wright 1997, p. 68). The standard error is calculated as the square root of the variance (or the standard deviation) divided by the square root of the number of cases. This is based on the variance from the samples, assuming that, in the population from which the samples were drawn, the variance of each group on the dependent variable is the same. If the assumption is met - that the variances of the two groups are not different - the pooled variance is used to estimate the standard error of the difference (Dometrius 1992, p.226).

**Cross tabulation and Chi²:** The Chi² test departs from a cross tabulation of the frequency distributions of two variables. What the Chi² test basically does is to answer the question how likely it is that the pattern in the frequency table would have occurred by chance if no association existed between the variables, or, in other words, it tests the null hypothesis. The test measures the summed differences between the observed and expected values in the cells. The expected frequencies are
computed on the assumption of independence. The significance of the calculated statistic can be found in a table of distribution of \( \chi^2 \) when the number of observations and the degrees of freedom are known. When using SPSS, as in the present study, the probability will be provided by the programme when running the \( \chi^2 \) procedure.

The \( \chi^2 \) test assumes random selection of the sample from the target population. In contrast to the other statistical tests used in the present study, the \( \chi^2 \) test can be used for nominal and ordinal level variables, and does not require normally distributed interval level data. A limitation of the test is that it should not be used on tables with cells with expected values less than 1 or more than 20% of the cells with expected frequencies less than 5 (Bryman and Cramer 1997, p.124). Moreover, it should be mentioned that the test only tells something about the strength, but not the direction of the association between the investigated variables.

**Correlation:** Correlation analysis measures both the strength and the direction of an association between variables. Correlation analysis assumes normally distributed interval level data and some kind of linear relationship between the variables. The correlation coefficient, Pearson’s \( r \) (Pearson’s Product Moment Coefficient), indicates the direction and strength of an association with values varying between -1 and +1. The closer to zero an \( r \) value is, the weaker and the closer to (+/-) 1 the stronger the relationship, where + and – indicate the direction. The \( p \) value indicates the likelihood of drawing a sample showing a relation as that indicated by the computed \( r \) value. In the present study, before applying a test of correlation to the data, scatterplots were produced to explore the relationship. Some of these are reproduced in the text.

A comment that is often made in texts on the methodology of statistical analysis is that correlation should not be mistaken for cause. Correlation merely gives an estimate of covariance of variables, but cannot explain how and why they are related. The results of correlation analyses, as well as of other statistical tests, should therefore always be interpreted prudently, considering not only the test conditions (e.g. sample size), but also the context from which the variables were taken and the model and research hypotheses that motivated the use of the statistical tests. It shall be held that over-interpreting statistical results has not been a serious risk in the present study, as the general research approach has not essentially been based on statistical analysis. This is also the base of the argument for including results of correlation analyses that in some cases could be claimed to have relatively low correlation coefficients\(^1\). The low correlation coefficients could be due to many different factors and factor combinations influencing the independent variables

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\(^1\) As a rule of thumb it has been suggested that an \( r \) value below 0.19 could be considered very low, 0.20 to 0.39 low, 0.40 to 0.69 modest, 0.70 to 0.89 high and above 0.9 very high (Bryman and Cramer quoting Cohen and Holliday). Bryman, A. and D. Cramer (1997). *Quantitative data analysis with SPSS for Windows*. London, Routledge.
investigated but could in some cases also be due to inaccuracies in the collected data, which may imply that existing relationships could not always be clearly identified. The argument for choosing to include some results from correlation analyses with relatively low correlation coefficients is that the results might not be entirely convincing seen in isolation but can be used as indications supporting a qualitative argument, as was done in the present study.

Probabilities and significance levels: The ‘p’ values given for the tests referred to in the study indicate the probability that samples showing the observed differences (t-test) or correlations (Pearson’s r or Chi²) could be drawn from a population in which such differences or correlations did actually not exist (the null hypothesis). For the statistical tests included in the final analysis, one-tailed or two-tailed significance levels were used in dependence of the alternative hypotheses formulated for the individual test, according to the principle suggested by Bryman and Cramer (Bryman and Cramer 1997, p.111). For situations where the hypothesis was directional a one-tailed significance level was used while two-tailed significance levels were employed for non-directional hypotheses or in cases where an unexpected difference was found. Following the commonly accepted convention, the null hypothesis is rejected if p is found to be lower than 0.05, a result that thus can be used to support – albeit not prove – the alternative hypothesis. It should be added that the alternative hypotheses used in the statistical tests in the present study are considered working hypotheses, and not as hypotheses corresponding to the level of the overall research questions of the study.

Regarding the typology of livelihood strategies described in Chapter 6, the differences between the three groups and correlations in terms of the variables in table 6.2 were investigated by different means (ANalysis Of VAriance, Kruskal-Wallis, Chi²-tests). Exploring the data in such ways contributed to the understanding of the processes studied, but the statistical tests were not included in the final analysis as no results with more than a 90% significance level could be identified in this particular part of the analysis. Among the possible reasons for this could be that the livelihood strategies were the outcome of different types of dynamics that were at play simultaneously, as is shown in the qualitative analysis. It is therefore likely that the influence of a single one of these dynamics may not have been that clearly reflected in the individual variables. For instance, the group of parcelero producers forming part of the sample may have blurred the dynamics of the family life cycle, which were found to play a role in access to land and the state of productivity of the coffee agroforestry systems of historically private producer households.

Literature consulted:


## Appendix 2: Statistically significant test results referred to in the text

<table>
<thead>
<tr>
<th>Alternative hypothesis (Hₐ):</th>
<th>Dependent variable: Variable:</th>
<th>Type:</th>
<th>N</th>
<th>Independent variable: Variable:</th>
<th>Type:</th>
<th>N</th>
<th>Test:</th>
<th>P</th>
<th>Test value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producer households with additional income sources achieved higher coffee yields</td>
<td>additional income sources (y/n)</td>
<td>dichotomous</td>
<td>61</td>
<td>coffee yields 1998-99 (qq/mz)</td>
<td>interval</td>
<td>61</td>
<td>t-test</td>
<td>0.023</td>
<td>t(59) = -2.040</td>
</tr>
<tr>
<td>Coffee producers with access to credit achieved higher coffee yields</td>
<td>credit received for coffee production (y/n)</td>
<td>dichotomous</td>
<td>61</td>
<td>coffee yields 1996-99 (qq/mz)</td>
<td>interval</td>
<td>60</td>
<td>t-test</td>
<td>0.002</td>
<td>t(58) = 2.995</td>
</tr>
<tr>
<td>Older producers were likely to achieve a better output of their coffee production systems</td>
<td>producers’ age</td>
<td>interval</td>
<td>61</td>
<td>coffee yields 1996-99 (qq/mz)</td>
<td>interval</td>
<td>60</td>
<td>correlation</td>
<td>0.021</td>
<td>Pearson’s r: 0.264</td>
</tr>
<tr>
<td>Households tended to allocate labour to off- and non-farm activities when labour available</td>
<td>Household size (1-4; 5-8; &gt; 9)</td>
<td>categories</td>
<td>61</td>
<td>other income sources (y/n)</td>
<td>dichotomous</td>
<td>61</td>
<td>Chi²-test</td>
<td>0.001</td>
<td>Pearson’s Chi²: 12.793</td>
</tr>
<tr>
<td></td>
<td>male household members, aged 16-75 (&lt;2; 2-3; &gt; 3)</td>
<td>categories</td>
<td>61</td>
<td>do.</td>
<td>do.</td>
<td>Pearson’s Chi²: 7.110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The different original farm designs of private and parcelero producers would be reflected in the shade characteristics</td>
<td>producer’s background</td>
<td>dichotomous</td>
<td>61</td>
<td>Shade trees (ind./1000m²)</td>
<td>interval</td>
<td>62</td>
<td>t-test</td>
<td>0.002</td>
<td>t(60) = 3.510</td>
</tr>
<tr>
<td>Diversification with fruit trees implied trading-off coffee yields</td>
<td>fruit trees (ind./1000m²)</td>
<td>do.</td>
<td>62</td>
<td>coffee yields 1996-99</td>
<td>interval</td>
<td>61</td>
<td>correlation</td>
<td>0.001</td>
<td>Pearson’s r: -0.393</td>
</tr>
<tr>
<td>Larger producers would have less shade and less diverse tree and crop compositions in their coffee agroforestry systems</td>
<td>farm size (mz)</td>
<td>do.</td>
<td>60</td>
<td>shade trees (ind./1000m²)</td>
<td>interval</td>
<td>62</td>
<td>correlation</td>
<td>0.011</td>
<td>Pearson’s r: -0.297</td>
</tr>
<tr>
<td></td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>Pearson’s r: -0.201</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>Pearson’s r: -0.264</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>do.</td>
<td>Pearson’s r: -0.349</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3: Questionnaires and formats

- Formats for measurements and inventories, 1999.
CUESTIONARIO PARA ENCUESTA CON CAFICULTORES EN LAS MUNICIPALIDADES DE MASATEPE, SAN MARCOS Y LA CONCEPCIÓN, NICARAGUA.

1. DATOS GENERALES:

1.1 No. de entrevista:______

1.2 Departamento: ________________

1.3 Municipalidad: _________________

1.4 Comunidad/comarca: ______________

1.4 Nombre de la finca: __________________________

1.5 Lugar de entrevista: ________________

1.6 Fecha: _________

1.7 Hora de comenzar: _________

1.8 Hora de terminar: ________

1.9 Nombre del/la encuestador/a: ____________________

2. PERSONA ENTREVISTADA:

2.1 Nombre: ______________________________

2.2 Edad: ___________

2.3 Nivel escolar: ____________

3. LA FINCA:

3.1 Qué tamaño tiene la finca? ________ mz

3.2 Cuántas fincas o propiedades tiene? ________

3.3 Quién es el/la propietario/a de la finca? ____________________
3.4 Desde cuándo tiene la finca? __________________________

3.5 Cómo la consiguió? ________________________________

3.6 Qué otras fuentes de ingreso tiene la familia además de la finca?
_______________________________________________________________

3.7 Cuál es la fuente de ingreso más importante para la familia?
_______________________________________________________________

3.8 Croquis de la finca
(Dibujar un mapa del uso de la tierra en la finca junto con la persona entrevistada, vease siguiente página)

3.9 Uso y tenencia de la tierra y productos: (rellenar en base de croquis de la finca)

| Uso de tierra: | Área (mz): | Tenencia: | Producto para venta (v) o consumo (c): | Importancia*:
|---------------|------------|-----------|--------------------------------------|----------------
|               |            |           |                                      |                |
|               |            |           |                                      |                |
|               |            |           |                                      |                |
|               |            |           |                                      |                |
|               |            |           |                                      |                |

(*Asignar el número 1 al rubro más importante, el número 2 al siguiente, etc.)
4. EL CAFÉ - MANEJO Y CONOCIMIENTOS

4.1 Las parcelas de café:

<table>
<thead>
<tr>
<th>No. de parcela</th>
<th>Área (mz):</th>
<th>Edad:</th>
<th>Variedad:</th>
<th>Densidad (plantas/mz):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>en producción:</td>
<td>café joven:</td>
<td>recepado:</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td>3</td>
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<td>5</td>
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<td>6</td>
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<tr>
<td>7</td>
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</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

4.2 Tienen más o menos café que hace 5 años? ___________________

4.3 Qué aspectos considera cuando decide si se va a sembrar, abandonar o eliminar una área de café?

________________________________________________________________________________
________________________________________________________________________________

4.4 Con quién discute o platica antes de tomar la decisión? __________
________________________________________________________________________________
4.5 Labores para el manejo del cafetal durante el ciclo 1998/99 en la parcela No. _____ *
(* Escoger una parcela en producción acuerdo con el cuadro 4.1)

<table>
<thead>
<tr>
<th>Actividad:</th>
<th>Cuando (meses)?</th>
<th>Quiénes lo hicieron?</th>
<th>Insumos usados:</th>
<th>Insumos que piensa aplicar este año:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Producto:</td>
<td>Aplicaciones:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Producto:</td>
<td>Aplicaciones:</td>
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<td>Producto:</td>
<td>Aplicaciones:</td>
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<td>Producto:</td>
<td>Aplicaciones:</td>
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<td></td>
<td>Producto:</td>
<td>Aplicaciones:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Producto:</td>
<td>Aplicaciones:</td>
</tr>
</tbody>
</table>
4.6  (⇒ ahora 7.6)

4.7  Aplican mas o menos fertilizantes que hace 5 años? ____________

4.8  Porqué? __________________________________________________________________________

4.9  Aplican mas o menos pesticidas que hace 5 años? ____________

4.10 Porqué? __________________________________________________________________________

4.11 Qué plagas y enfermedades dañan mas su café? ____________

4.12 Qué tiene que ver la sombra con las plagas y enfermedades?
______________________________________________________________________________
______________________________________________________________________________

4.13 Qué malas hierbas ó montes dañan mas su café? ____________

4.14 Qué tiene que ver la sombra con las malas hierbas y montes?
______________________________________________________________________________
______________________________________________________________________________

5. LA SOMBRA DE CAFÉ: CONOCIMIENTOS Y MANEJO

5.1 Para qué sirven los árboles en los cafetales?________________________
______________________________________________________________________________
______________________________________________________________________________

5.2 En esta zona bajo qué tipo de sombra piensa Usted que se debe cultivar café (densa/regulada y qué tipo: montaña, frutales, guaba, etc.)?
______________________________________________________________________________
5.3 Qué árboles son buenos para la sombra?

<table>
<thead>
<tr>
<th>Árboles buenos para sombra</th>
<th>Porque:</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

5.4 Qué árboles no sirven para la sombra?

<table>
<thead>
<tr>
<th>Árboles malas para sombra</th>
<th>Porque:</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

5.5 Cómo sabe Usted cuales son buenos ó malos? _______________

_________________________________________________________________

5.6 Cuánta sombra debe tener el café en esta zona (%) ? __________

5.7 Cuánta sombra tiene Usted en su cafetal (%)? __________________

5.8 Tienen mas o menos sombra que hace 5 años? __________________

5.9 Porqué? ___________________________________________________

_________________________________________________________________

5.10 Qué hacen para manejar la sombra?

<table>
<thead>
<tr>
<th>Técnica:</th>
<th>Frecuencia:</th>
<th>Quién lo hace?</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>
5.11 **Los árboles en el cafetal:**

<table>
<thead>
<tr>
<th>Nombre común:</th>
<th>Cantidad:</th>
<th>Origen*:</th>
<th>Uso(s):</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

*) P.ej, nacieron naturalmente ó fueron sembrados por el productor o otra persona

5.12 **Cuáles árboles nacen naturalmente en el cafetal?**

________________________________________________________________________

5.13 **Qué hace con ellos?**

________________________________________________________________________

5.14 **Qué aspectos considera cuando selecciona los árboles que va a tener en el cafetal?**

________________________________________________________________________

________________________________________________________________________

5.15 **Con quién discute o platica antes de tomar la decisión?**

________________________________________________________________________

5.16 **Cómo sería la sombra en el cafetal, si Usted tuviera una finca de ....?**

<table>
<thead>
<tr>
<th></th>
<th>Composición:</th>
<th>Densidad:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 1.5 mz:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 15 mz:</td>
<td></td>
<td></td>
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<tr>
<td>- mas que 30 mz:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.17 **Cómo sería la sombra en su cafetal, si los precios del café durante los próximos 5 años fueran....?**

<table>
<thead>
<tr>
<th>Precios:</th>
<th>Composición:</th>
<th>Densidad:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- altos y estables:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- bajos y estables:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. Origen de los conocimientos del caficultor

6.1 Dónde aprendió el manejo del café?

<table>
<thead>
<tr>
<th>- manejo de sombra:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- poda:</td>
</tr>
<tr>
<td>- uso de fertilizantes:</td>
</tr>
<tr>
<td>- uso de pesticidas:</td>
</tr>
<tr>
<td>- otras técnicas:</td>
</tr>
</tbody>
</table>

6.2 Usted ha recibido alguna forma de asistencia técnica durante los últimos 5 años?

<table>
<thead>
<tr>
<th>Participó en capacitación</th>
<th>Organización/institución:</th>
<th>Cuando:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fue visitado por extensionista</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No recibió asistencia técnica</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. LA ECONOMIA DEL CAFÉ

7.1 Cuánto fue la cosecha de café los últimos 3 años (fanegas / mz)?

| Cosecha 1996/97:                |                         |
| Cosecha 1997/98:                |                         |
| Cosecha 1998/99:                |                         |

7.2 Si haya variación, a qué se debe? ________________________________

7.3 Cómo venden el café? ________________________________

7.4 Qué fue el precio que le pagaron por fanega de café este año? _____

7.5 Qué fue el costo de los insumos para la producción del café el último año? _____________
7.6 Si contrató mano de obra de fuera el último ciclo, cuántos jornales y a qué costo (vease cuadro 4.5)?

<table>
<thead>
<tr>
<th>Labor:</th>
<th>Jornales:</th>
<th>Costo/journal:</th>
<th>Costo por labor:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

Costo total:

7.7 Qué gasto pagó primero, segundo, etc... con la ganancia de la última cosecha de café? (p.ej. préstamo, necesidades de casa, inversión en el café, inversión en otro cultivo, ...) 

1. 
2. 
3. 
4. 

7.8 Con quién discute o platica antes de decidir como van a gastar la ganancia del café? __________________________________________________________

____________________________________________________________________

7.9 Para cuáles de sus cultivos ha obtenido crédito en los últimos 3 años?
____________________________________________________________________

8. La familia

8.1 Miembros de la familia que viven en la finca:

<table>
<thead>
<tr>
<th>Relación familiar (y/o nombre):</th>
<th>Sexo:</th>
<th>Edad:</th>
<th>Ocupación:</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>
8.2 Miembros de la familia que viven fuera de la finca:

<table>
<thead>
<tr>
<th>Relación familiar:</th>
<th>Sexo:</th>
<th>Edad:</th>
<th>Ocupación:</th>
<th>Contribuye a la economía del hogar (si/no):</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

8.3 Otras personas que viven en la finca:

<table>
<thead>
<tr>
<th>Relación:</th>
<th>Sexo:</th>
<th>Edad:</th>
<th>Ocupación:</th>
</tr>
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<tbody>
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</tbody>
</table>

9. Otras informaciones:

9.1 Qué piensa son los limitantes ó problemas más importantes para Usted como productor?

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

9.2 Tiene alguna pregunta o inquietud? ____________________________
___________________________________________________________________________
___________________________________________________________________________

9.3 Descripción de la situación de entrevista / otras observaciones:
(A rellenar por el encuestador)
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
Cuestionario No. 2 Fátima & San José de Monteredondo

(Antes de hacer la entrevista hay que chequear información de la primera entrevista, para conocer los árboles/productos que tienen y detectar datos faltantes/contradictorios!)

1) Productos de los árboles de sombra:

<table>
<thead>
<tr>
<th></th>
<th>VENTA:</th>
<th>CONSUMO:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cantidad/año:</td>
<td>Ingreso/año:</td>
</tr>
<tr>
<td><strong>Musaceas:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- fruta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- hojas</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cítricos:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aguacate:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Otros frutales:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Leña:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Madera</strong>:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Madera*:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Otros productos:</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) **Madera**: Probablemente no aprovechan todos los años: hay que preguntar cuando talaron un árbol la última vez, o la frecuencia con que lo hacen.

2) Rendimiento cosecha 1999/2000 (qq oro/mz):
3) Costos de la producción de café ciclo 1999/2000:

<table>
<thead>
<tr>
<th>Insumos:</th>
<th>Cantidad anual: (kg/mz o l/mz)</th>
<th>Precio:</th>
<th>Costo (C$/mz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizante:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fungicida:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecticida:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbicida:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mano de obra contratada: (DH/mz)</td>
<td>Precio:</td>
<td>Costo (C$/mz)</td>
<td></td>
</tr>
<tr>
<td>Deshije:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poda:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deshierba:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aplicación de químicos:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulación de sombra:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosecha:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros*:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) Puede incluir actividades que no se realizan todos los años, p.ej. renovación, recepo, etc. En este caso hay que preguntar la frecuencia con que se realiza la labor.

4) Hizo vivero de café el ciclo 1999/2000? Si: ___ / No: ___
   a) Si no lo hizo este ciclo, lo ha hecho en el pasado? Qué año?_____

   b) Si hizo vivero, **cuántas plantas** produjo para:

<table>
<thead>
<tr>
<th>Propio uso:</th>
<th>Venta:</th>
</tr>
</thead>
</table>

   c) Si *no* hizo vivero, compró plantas para renovación? **Cuántas plantas?**

<table>
<thead>
<tr>
<th>Compró:</th>
</tr>
</thead>
</table>

5. Hizo vivero de árboles frutales el ciclo 1999/2000? Si: ___ / No: ___
   a) Si hizo vivero, **cuantas plantas?**
   b) Si *no* lo hizo, compró árboles frutales?

   | **Cuántas plantas?** |
|----------------------|----------------------|

<table>
<thead>
<tr>
<th>Compró:</th>
</tr>
</thead>
</table>

   **Cuántas plantas?**
Diagnóstico de la productividad del cafetal

Fecha: _____________  Finca (No.): ________________

Proprietario: _________________  Parcela (No.): ______

Variedad: _________________  Edad: _________  Cantidad de plantas: ______

Cantidad de plantas por tipo de café (en tres sitios de muestreo):

<table>
<thead>
<tr>
<th>Tipo de café:</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitio 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sitio 2</td>
<td></td>
<td></td>
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<tr>
<td>Sitio 3</td>
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</tbody>
</table>

Observaciones:

<table>
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<tr>
<th>Observaciones:</th>
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<tbody>
<tr>
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</tbody>
</table>
Mediciones de sombra y distanciamiento de café:

**Finca No. _____  Parcela No. _____**

Se define una parcela de medición de 1000 m$^2$ (20 x 50 m) dentro de la parcela de café en producción, seleccionado en el cuadro 4.5 del cuestionario.

1. Distanciamiento de las plantas de café: ___________________________

2. Diversidad y abundancia de árboles en el cafetal:

*Se hace un inventario por especies de las árboles dentro de la parcela de medición.*

<table>
<thead>
<tr>
<th><strong>Especies:</strong></th>
<th><strong>Cantidad:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nombre común:</td>
<td>Nombre científico:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. **Densidad de la sombra (%)**: Se mide la sombra con densímetro en cuatro puntos de la parcela de medición. En cada punto se hace cuatro mediciones orientado al norte, este, sur y oeste respectivamente.

<p>| Punto: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Total: |
|--------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 1.     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| a)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| b)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| c)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| d)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| 2.     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| a)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| b)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| c)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| d)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| 3.     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| a)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| b)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| c)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| d)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| 4.     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| a)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| b)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| c)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| d)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |</p>
<table>
<thead>
<tr>
<th>a)</th>
<th>b)</th>
<th>c)</th>
<th>d)</th>
<th>suma (a,b,c,d):</th>
<th>promedio (suma a-d/4):</th>
<th>* factor 1.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punto 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Punto 2:</td>
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<tr>
<td>Punto 3:</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Punto 4:</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Suma (Punto 1-4):  
Porcentaje promedio de parcela (suma1-4/4):  
Appendix 4: List of tree species

Tree species from 1000² sample plots on 62 coffee farms in San José de Monteredondo, Fátima and San Juan de la Concepción (alphabetical sequence):

<table>
<thead>
<tr>
<th>No.</th>
<th>Species:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acacia (<em>Acasia auriculiformis</em>)</td>
</tr>
<tr>
<td>2</td>
<td>Acetuno (<em>Simarouba glauca</em>)</td>
</tr>
<tr>
<td>3</td>
<td>Achiote (<em>Bixa orellana</em>)</td>
</tr>
<tr>
<td>4</td>
<td>Avocado (<em>Persea Americana</em>)</td>
</tr>
<tr>
<td>5</td>
<td>Bambú (<em>Bambusa vulgaris</em>)</td>
</tr>
<tr>
<td>6</td>
<td>Búcaro (<em>Erythrina vulgaris</em>)</td>
</tr>
<tr>
<td>7</td>
<td>Cachito (<em>Acacia farnesiana</em>)</td>
</tr>
<tr>
<td>8</td>
<td>Canelo (<em>Cinnamomum verum</em>)</td>
</tr>
<tr>
<td>9</td>
<td>Capulín (<em>Muntingia calabura</em>)</td>
</tr>
<tr>
<td>10</td>
<td>Cedro (<em>Cedrela odorata</em>)</td>
</tr>
<tr>
<td>11</td>
<td>Chaperno (<em>Lonchocarpus parviflorus</em>)</td>
</tr>
<tr>
<td>12</td>
<td>Chichilín (n.i.)</td>
</tr>
<tr>
<td>13</td>
<td>Chilamate (<em>Ficus sp.</em>)</td>
</tr>
<tr>
<td>14</td>
<td>Chilillo (n.i.)</td>
</tr>
<tr>
<td>15</td>
<td>Chocuabo (<em>Caesarpinia violacea</em>)</td>
</tr>
<tr>
<td>16</td>
<td>Coco (<em>Cocos nucifera</em>)</td>
</tr>
<tr>
<td>17</td>
<td>Copel (<em>Ficus sp.</em>)</td>
</tr>
<tr>
<td>18</td>
<td>Cortéz (<em>Tabebuia chrysantha</em>)</td>
</tr>
<tr>
<td>19</td>
<td>Elequeme (<em>Erythrina berteroana</em>)</td>
</tr>
<tr>
<td>20</td>
<td>Escobillo (<em>Jacaranda copaia</em>)</td>
</tr>
<tr>
<td>21</td>
<td>Espadillo (<em>Yucca elephantipes</em>)</td>
</tr>
<tr>
<td>22</td>
<td>Floripón (n.i.)</td>
</tr>
<tr>
<td>23</td>
<td>Gavilán (<em>Albizia lebbek</em>)</td>
</tr>
<tr>
<td>24</td>
<td>Genízaro (<em>Pithecellobium saman</em>)</td>
</tr>
<tr>
<td>25</td>
<td>Guaba (<em>Inga sp.</em>)</td>
</tr>
<tr>
<td>26</td>
<td>Guabillo (<em>Inga vera</em>)</td>
</tr>
<tr>
<td>27</td>
<td>Guachipilín (<em>Diphisa robinoides</em>)</td>
</tr>
<tr>
<td>28</td>
<td>Guácimo (<em>Guazumo ulmifolia</em>)</td>
</tr>
<tr>
<td>29</td>
<td>Guacuco (<em>Eugenia salamensis</em>)</td>
</tr>
<tr>
<td>30</td>
<td>Guanábana, anona (<em>Annona spp.</em>)</td>
</tr>
<tr>
<td>31</td>
<td>Guanacaste (<em>Enterolobium cyclocarpum</em>)</td>
</tr>
<tr>
<td>32</td>
<td>Guapinol (<em>Hymenaea courbaril</em>)</td>
</tr>
<tr>
<td>33</td>
<td>Guarumo (<em>Cecropia peltata</em>)</td>
</tr>
<tr>
<td>34</td>
<td>Guayaba (<em>Psidium guajava</em>)</td>
</tr>
<tr>
<td>35</td>
<td>Higuera (<em>Ricinus communis</em>)</td>
</tr>
<tr>
<td>36</td>
<td>Higuero (<em>Ficus glabrata</em>)</td>
</tr>
<tr>
<td>37</td>
<td>Hoja chigua (<em>Petrea volubilis</em>)</td>
</tr>
<tr>
<td>38</td>
<td>Huevo de burro (<em>Stemmadenia donnell-smithii</em>)</td>
</tr>
<tr>
<td></td>
<td>Scientific Name</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>39</td>
<td>Icaco (Chrysobalanus icaco)</td>
</tr>
<tr>
<td>40</td>
<td>Jícara (Crescentia cujete)</td>
</tr>
<tr>
<td>41</td>
<td>Ḥiñocuabo (Bursera simarouba)</td>
</tr>
<tr>
<td>42</td>
<td>Jocote (Spondia mombin)</td>
</tr>
<tr>
<td>43</td>
<td>Laurel (Cordia alliodora)</td>
</tr>
<tr>
<td>44</td>
<td>Lavaplato (Solanum erianthum)</td>
</tr>
<tr>
<td>45</td>
<td>Lemon (Citrus limon)</td>
</tr>
<tr>
<td>46</td>
<td>Leucaena (Leucaena leucocephala)</td>
</tr>
<tr>
<td>47</td>
<td>Madero Negro (Gliricidia sepium)</td>
</tr>
<tr>
<td>48</td>
<td>Madroño (Calycophyllum candidissimum)</td>
</tr>
<tr>
<td>49</td>
<td>Mañey (Mammea americana)</td>
</tr>
<tr>
<td>50</td>
<td>Mamón (Melicoccus bijugatus)</td>
</tr>
<tr>
<td>51</td>
<td>Mandarin (Citrus reticulata)</td>
</tr>
<tr>
<td>52</td>
<td>Mango (Mangifera indica)</td>
</tr>
<tr>
<td>53</td>
<td>Marañón (Anacardium occidentale)</td>
</tr>
<tr>
<td>54</td>
<td>Mata palo (Ficus cotinifolia)</td>
</tr>
<tr>
<td>55</td>
<td>Melocotón (Averrhoa carambola)</td>
</tr>
<tr>
<td>56</td>
<td>Mora (Chlorophora tinctoria)</td>
</tr>
<tr>
<td>57</td>
<td>Muñeco (Cordia bicolor)</td>
</tr>
<tr>
<td>58</td>
<td>Nancite (Byrsonima crassifolia)</td>
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<tr>
<td>59</td>
<td>Naranjo agrio (Citrus aurantium)</td>
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<tr>
<td>60</td>
<td>Neem (Azadirachta indica)</td>
</tr>
<tr>
<td>61</td>
<td>Ojoche (Brosimum alicastrum)</td>
</tr>
<tr>
<td>62</td>
<td>Orange (Citrus sinensis)</td>
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<tr>
<td>63</td>
<td>Palo de hule (Castilla elastica)</td>
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<tr>
<td>64</td>
<td>Palo de río (n.i.)</td>
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<tr>
<td>65</td>
<td>Papaya (Carica papaya)</td>
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<tr>
<td>66</td>
<td>Patacón (n.i.)</td>
</tr>
<tr>
<td>67</td>
<td>Pimienta (Pimienta dioica)</td>
</tr>
<tr>
<td>68</td>
<td>Plantain/banana (Musa spp.)</td>
</tr>
<tr>
<td>69</td>
<td>Pochote (Bombacopsis quinata)</td>
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<tr>
<td>70</td>
<td>Quelte (Cniobsculus aconitifolius)</td>
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<tr>
<td>71</td>
<td>Roble (Tabebuia rosea)</td>
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<tr>
<td>72</td>
<td>Sacuanjoch (Plumeria rubra)</td>
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<tr>
<td>73</td>
<td>Sonsonate (Colubrina arborescens)</td>
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<td>74</td>
<td>Tabaco de monte (Triplaris melanodendrum)</td>
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<tr>
<td>75</td>
<td>Tamarindo (Tamarindus indica)</td>
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<tr>
<td>76</td>
<td>Tempisque (Mastichodendrum capiri)</td>
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<tr>
<td>77</td>
<td>Zapote (Pouteria sapota) (Calocarpum mammosum)</td>
</tr>
<tr>
<td>78</td>
<td>Unidentified species (#1)</td>
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<tr>
<td>79</td>
<td>Unidentified species (#2)</td>
</tr>
<tr>
<td>80</td>
<td>Unidentified species (#3)</td>
</tr>
</tbody>
</table>

(Silke Mason Westphal, 2000)
Appendix 5: Transect of coffee agroforestry system

Appendix 6: Relation between coffee plant production and pests at different shade levels