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1 Introduction

Like in other developing countries, rural households in Nicaragua live in institutionally, market and naturally risky environments (Berg and Burger, 2006). High percentages of the rural population are (partly) excluded from basic health, water and electricity services. They live in areas that are often badly or only temporarily accessible and have low levels of education. Low availability of financial services and high costs of credit limits economic development (WB, 2003b). Moreover Nicaragua's environment is characterized as vulnerable to natural disasters. Within twenty years (1980-2000) the country underwent three droughts, five floods and seven hurricanes. A huge impact was left by Hurricane Mitch, which hit the country in October 1998. 4000 Nicaraguans died and two million people were affected, of which small farmers the heaviest. 63.000 of the 80.000 hectares that were ravaged were cultivated by small producers (ECLAC, 1999). Mitch caused migration streams, diseases and infrastructural damage. The total damage amounted to 54 % of national GDP (Berg and Burger, 2006). Although the reconstruction programs are expected to have boosted the rural economy in general, there are areas that still suffer from the effects of the hurricane with regard to their economic activities.

Shaped by these risky environments, the livelihoods of households in rural Nicaragua include a wide range of on- and off-farm activities. These activities can be agricultural as well as non-agricultural, the last including self-employment and wage-labour. In 1998 farm income formed the only income source for 49% of the rural households, 6% of the households earned only rural non-farm income (RNFI), and 41% earned both. RNFI, which composes of non-farm wages and non-farm self-employment income, remittances and pensions, forms an important part of a household's total income. In 1998 RNFI constituted 41% of rural households' incomes in Nicaragua, without remittances and pensions (Corral and Reardon, 2001).

The Rural non-farm economy (RNFE) embraces a broad spectrum of activities, of which some have low entry barriers while others demand a certain amount of capital. Based on their ability and motivation households engage in different RNF activities. Household members can work as labourer and earn non-farm wages, they can set up a business and earn income from self-employment, or they can engage in one or more activities. Activities can be part-time as well as full-time, continuous as well as seasonal (Barret, Reardon and Webb, 2001). Many RNF activities in rural Nicaragua are related to agricultural produce and the agricultural season. Examples are the selling of cheese and engagement in temporarily wage labour during the agricultural low-season. Households or individuals that take up RNF activities are motivated either by demand-pull factors, for example higher incomes or evolving markets, or by distress-push factors like stagnating agriculture, land constraints, missing insurance and credit markets (Barrett, Reardon and Webb, 2001). The wide range of possible RNF activities in terms of labour productivity suggests that for some households the activities provide a safety-net function while for others an opportunity to reach a higher level of welfare (Lanjouw P, 2001). Especially in the isolated areas many of the RNF jobs are low-skill and low-paying jobs that do not always form a way out of poverty.

1.1 Relevance and research questions

Agriculture cannot be seen as the sole engine of (rural) economic growth and poverty reduction (ODI,2003). In order to sustain growth it is necessary to recognize the pluriactive nature of the rural economy and acquire better insight in to the multiple activities that take place within rural areas (Janvry& Sadoulet, 2000; Lanjouw and Feder, 2001; Haggblade *et al.*, 2002).The RNFE is regarded as important because it can significantly contribute to rural as well as national economic growth, rural employment, poverty reduction and a more spatially balanced population distribution (Lanjouw, Lanjouw, 2001; Haggblade, 2005). This study aims to get more insight in the RNFE by investigating the determinants of participation. It limits itself to one sector within the RNFE: the rural non-farm self-employment sector (RNFSE). To meet the objective of this research the following research question has been formulated: What factors determine participation in RNFSE-activities in the Pacific region of Nicaragua?

This question was guided by four questions:

- 1) What RNFSE-activities were undertaken by different wealth groups?
- 2) Which trends can be witnessed in the participation and capital assigned to RNFSE-activities between 1998 and 2001 and what is the influence of a natural disaster?
- 3) What explains participation in different types of RNFSE-activities?
- 4) Which location factors influence participation in RNFSE-activities?

1.2 Outline

In the next chapter I introduce the theory and conceptual framework underlying this study. In chapter three I go into the methodology and provide details on the data used. An introduction to the study area and its RNF economy is given in chapter four. In chapter five I describe the research population. I present the results on the activities, capital assigned to and participation in the RNFSE in chapter six and seven. In chapter eight I analyze the influence of location factors on the RNFSE sector and chapter nine finishes with the conclusions and discussion of this study.

2 Theory and Conceptual Framework

The idea that the RNFE has a pivotal role in the development process is rooted in the theories of structural and economic transformation. These theories presume that diversification of an economy is critical for development (for example: Kuznets, 1966, 1971; Chenery *et al.*, 1986; Timmer, 1988; Syrquin and Chenery, 1989; Start 2001). During structural transformation the share of agriculture in total national output declines and labour and capital are transferred to the secondary and tertiary sector. Based on this declining share it is assumed that agriculture cannot be the sole engine of sustained economic growth. With regard to rural development and poverty reduction demand and supply linkages with non-agricultural activities, as well as urban-rural and migration linkages are significant (ODI, 2003). The RNFE is seen as important because it can offer rural employment and absorb the labour surplus of agriculture, prevent out migration and contribute therefore to a spatially balanced population distribution and reduction of rural poverty (Lanjouw and Lanjouw., 2001). This does not mean that the presence of RNF-activities necessarily leads to economic growth and development and benefits all participants (Siegel 2005). Empirical studies in Africa showed a positive relation between households' asset endowments and RNFI. This indicates that RNF activities can provide a way out of poverty only if the poor are able to engage in the opportunities. Development of the RNFE can increase income inequality when the poor face too high entry barriers and only the richer households can engage (Barret, Reardon and Webb, 2001).

2.1 Components of an asset-based approach

Studying the determinants of participation in the RNFE means studying livelihoods and livelihood strategies. 'A livelihood comprises the assets, the livelihood strategies and the access gained to these. Together the livelihood determines the living gained by an individual or household' (Ellis, 2000). Assets according to Ellis (2000) include natural, physical, human, financial and social capital which each household possesses in different amounts. With its assets and strategies a household gains its living. The household needs to invest time or money to obtain, keep or improve its asset endowment. Assets include tangible as well as intangible resources on different levels: individual and household as well as local, national and international. For instance human assets on the household level can be education and skills, whereas on national level one can think of labour markets (Figure 2.1). Poor people in this sense can be seen as asset-poor (Siegel, 2005; USAID, 2001) It is assumed that more assets owned stimulate productivity and possibility of asset accumulation. The distribution of assets among households and locations is highly dependent on the context. The context consists of the infrastructure, policies and institutions that affect the use of assets and of the risks that affect the welfare-generating potential of assets (WB, 2003a). Households' assets and livelihoods strategies are characterized by heterogeneity (Siegel, 2005).

A suitable approach to analyze livelihood strategies determined by the assets endowed and the interface with the households' context is the use of an **asset-based approach**. Asset-based approaches assume that the quantity, quality and productivity of households' assets, influenced by its context, determine the risk management and livelihood strategies chosen. Asset-based approaches are useful to understand the type and combination of assets required for a specific livelihood strategy (Siegel, 2005). A livelihood strategy is the way in which a livelihood uses its non-leisure time to support itself (Ellis, 2000). Livelihood strategies range from investments in education to land and labour decisions, and therefore also include the choice to participate in the RNFE. The livelihood strategies applied determine the well-being outcomes. Like asset endowment households' strategies are interrelated with the context. A household adapts its strategies to the environment it lives in, but their strategies also influence their environment. Rural households in developing countries often live in institutionally, market, and natural risky environments (Berg and Burger, 2006). The asset-based approach assumes an important relation between livelihood strategies and risk. Risk is related to shocks, for example price or climatic shocks, which households are not able to control and can positively or negatively influence their livelihood. Shocks that affect an individual household are referred to as idiosyncratic shocks; shocks that affect a larger area are called co-variant shocks (Dercon, 2002). Natural disasters are therefore co-variant shocks. The literature on dealing with risk often uses the conceptualization of Alderman and Paxon (1992), which distinguishes between risk-management and risk-coping strategies. Risk-management strategies include income diversification achieved by combining activities with low covariance (with regard to RNF activities this means activities which have low covariance with agricultural returns), and income skewing achieved by taking up low risk activities, even if they're low in return. Risk-management strategies can be applied ex-ante

or when hardship occurs: ex-post. Risk-coping strategies comprise self-insurance and informal grouped-based risk-sharing. Most poor households don't have the possibility to practice risk-coping strategies and are assigned to use risk-management strategies. Diversification for example can be seen as a risk-management strategy to cope with risk (Barret, Reardon and Webb, 2001).

The literature on diversification distinguishes two extremes of factors that determine the motivation for diversification: on one extreme the demand-pull factors by which diversification is driven by choice and related to accumulation objectives. Households for instance are pulled into diversification by the attraction of higher pay-offs and less risk. Pull factors are associated with an upward spiral of income and assets. On the other extreme are the distress push factors that make households diversify in order to manage risk, cope with shocks or escape from agriculture in stagnation. Households in this sense diversify because of necessity, as a 'surviving-strategy' (Barret, Reardon and Webb, 2001). Distress-push diversification dominates in geographical isolated areas with a low-quality of physical infrastructure, low human capital, underdeveloped markets, vulnerability to shocks and scarcity of resources. Whereas demand-pull diversification takes place in the presence of expanding technological innovations, market development or intensified links with external markets (Davis and Pearce, 2001).

2.2 The RNFE

With regard to diversification, whether or not in order to cope with risk, an example of a livelihood strategy is engagement in the RNFE. The definition of the RNFE as 'all income generating activities (including income in kind) that are not agricultural but located in rural areas' include activities in wage-employment and self-employment. Another important RNF income source is income for which no activities are undertaken: pensions, dividends and remittances. The RNFE encompasses a huge array of possible activities. It includes activities that require certain assets (e.g. education, financial capital) as well as activities that have low barriers to entry. Supposedly there exists a strong positive correlation between income from an activity and its capital requirement, with capital intensive activities being most remunerative (Barrett, Reardon, Webb 2001). The scale of RNF activities varies a lot. One can think of women selling food at their houses, but also a textile factory situated in a rural area belongs to the RNFE. Some RNF-activities are seasonal and correlate with agricultural output, whereas others are uninterrupted and independent of agriculture. Because each household applies its own livelihood strategies and as each context differs, the composition of the RNFE is very heterogeneous and differs across and even within regions.

Barrett, Reardon and Webb (2001) state that the push and pull factors on the micro-level or household level are also reflected on the more aggregated levels (the local, national and international level). With regard to push factors on national level one could think of limited financial systems and inflation. When talking about pull factors on an aggregate level one could think of evolving markets and new technological opportunities. It is important to recognize the interface between the three levels, household, local and national/international, and the linkages that extend beyond the rural economy. Start (2001) refers to production- and consumption-linkages between the farm and the non-farm economy (rural as well as urban). Rising agricultural production stimulates the demand for non-agricultural products (consumption linkage) but also for inputs (backward production linkages) and processing of output (forward production linkages). Growth can lead to beneficial rural-urban linkages in which the RNFE complements, by specializing in activities in which it has comparative advantage, and benefits from advantages of the urban economy. However it should be noted that these linkages also can lead to deterioration of RNFE activities because of too high competition.

Components of Asset-Based approach

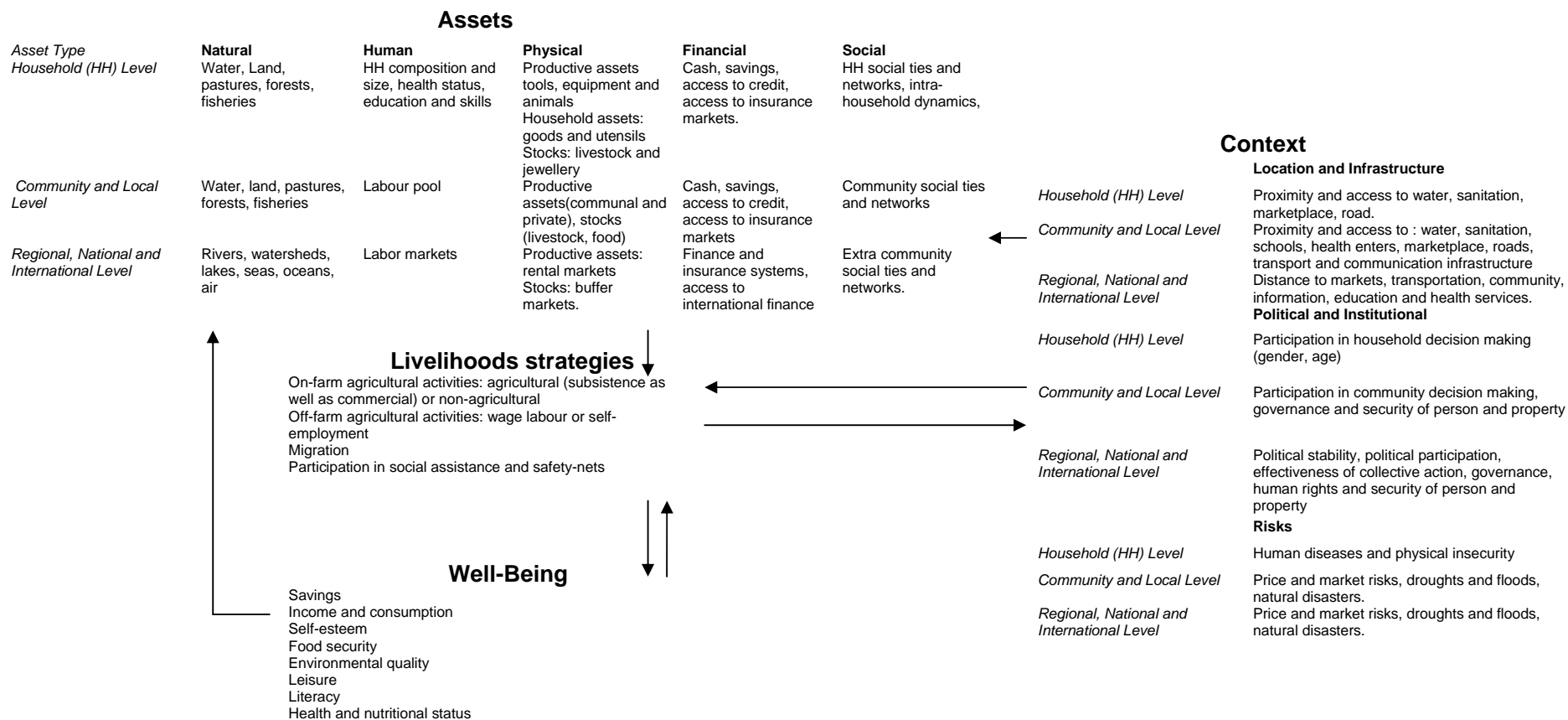


Figure 2.1: Asset- Based approach framework (Siegel, 2005)

2.3 Conceptual framework

The asset-based approach framework developed by Siegel (2005) (Figure 2.1), which can be seen as an elaborated version of the livelihood frameworks developed by Ellis (2000), formed the starting point for analyzing the determinants of participation in the RNFSE. The basic assumption of this framework is that the asset status of an individual or household within its context is fundamental to understanding the livelihood strategies a household selects and that are of influence for its well-being outcomes. In this thesis I take on the assumption that asset endowment determines engagement in RNFSE activities and the type of RNFSE activity a household chooses. Studying all factors that are of influence on participation in RNFSE activities would require at least a PHD study, this study limits itself to three factors: the agricultural productive assets (e.g. land, animals and equipment) the human assets (e.g. wealth, age, education and gender) and the contextual factors (eg. natural disasters and location). Figure 2.2 shows the framework used which is an adaptation of the original framework by Ellis (2000) and Siegel (2005).

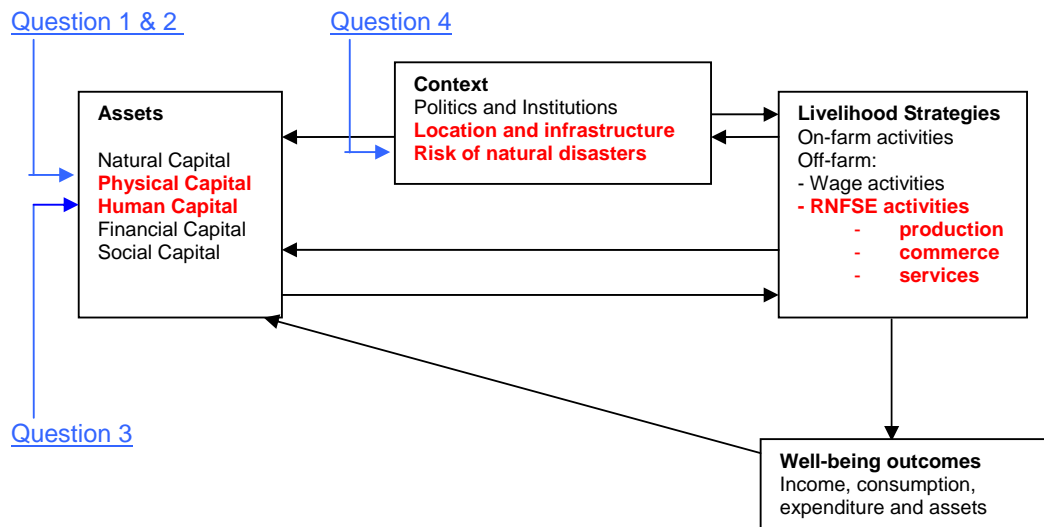


Figure 2.2: Conceptual Framework

The framework illustrates the relations between households assets and livelihood strategies that determine well-being outcome within the context it lives in. The system is recursive, meaning that feedback loops continue endlessly. The assets a household endows are influenced by the context a household lives in and by the outcomes of the livelihood strategies a household selects. Context and strategy outcomes can increase, diminish or sustain assets. The asset endowment determines the livelihood strategies a household selects. Livelihood strategies include decisions on education, spending of leisure time, engagement in activities etc. The strategies chosen determine the well-being outcome. Well-being outcome is reflected in income, consumption, expenditure and therefore in asset-endowment. A household can choose to invest its income in human assets, for instance education, or in one of the other assets, for example improvement of land. There exists an inter relationship between a households strategies and its context: the context influences the strategies a household selects, for instance areas with fertile soils stimulate households to engage in agricultural activities. The strategies influence the context on their turn: households that engage in illegal woodcutting can contribute to erosion and deteriorating soils, which on its turn makes it difficult to practice agricultural activities. As this study focuses on RNFSE activities the livelihood strategies are limited to engagement in production, commercial and service activities. It is assumed that the decision to participate in these different categories is determined by agricultural productive asset endowment and personal, household and contextual characteristics.

3 Methodology and Data

One of the aims of my study was to analyze the research questions by using different, quantitative as well as qualitative methodological tools. For this reason data analyses as well as fieldwork was carried out. Literature study and interviews with experts provided useful information on the context of the research topic and area. Quantitative data analysis was completed and triangulated with information of NGO's, micro-finance institutions and other experts in the field. The qualitative methodological tools used were SWOT-analyses with experts and semi-structured interviews with individuals engaging in RNFSE activities.

3.1 Data collection

The descriptive data used to introduce Nicaragua and describe the research context were extracted from the most recent Censo, carried out by INEC in 2005. The introduction was completed with data of the 'World banks' poverty assessment for Nicaragua' (2003) and other literature. Data used for the quantitative analysis, providing information on the research population, the RNFSE activities, the capital trends and the determinants of participation rests on three LSMS-surveys carried out by INEC with technical assistance of the World Bank. The survey rounds were held in 1998 and 2001. Households that lived in the areas affected by hurricane Mitch in October 1998 were revisited in 1999. The surveys provide household information as well as information on the individual household members. For the qualitative part of the analysis I conducted fieldwork between April and June 2007. UNAG, the national farmers union, was the organisation assisting this part of my research. For the reason that most of the literature and data are provided on municipality level, I chose to order the department per municipality. I visited seven of the thirteen municipalities. These municipalities differed in socio-economic and geographic characteristics and therefore formed a sound base to analyse the influence of location factors. To capture local factors influencing development of RNFSE activities I carried out SWOT-analyses. I performed them with UNAG municipality representatives, as they are regarded as experts in their local and rural situation. The gathered information has been compared and extended with the 'limitations and potentials' presented in the 'Development plan of Department Chinandega, 2005-2016'. The descriptive data on the fieldwork area were extracted from Censo2005, CENAGROIII, the rural atlas of MAGFOR, a socio-geographic study of Nitlapan-UCA (2002) and a study carried out by the different municipalities of the research area. In addition I visited different RNFSE activities and carried out semi-structured interviews with individuals engaging in RNFSE activities. An outline of the semi-structured interview is included in Appendix I. I conducted semi-structured interviews with NGO's, micro-finance institutions, governmental institutions and experts which I selected by snow-ball sampling. Each institution or expert could be interviewed as long as it had a focus on the rural population engaging in RNFSE-activities. As the research base was situated in the city of Chinandega most of the institutions interviewed were located near to Chinandega, nevertheless many of them were working all over the pacific and therefore representative. The information I gathered with these interviews was used to complete the findings of the quantitative data analysis. The interviews are collected in 'Interview report, Chinandega 2007'

3.2 Analyzing wealth and activities

I used two statistical packages to carry out the quantitative analysis, SPSS and Stata9. Stata9 provides the possibility to apply survey weights which made the analysis more accurate. I corrected all data for the price differences between the different locations. I corrected for inflation by dividing the data of 2001 by factor 1.28 (INEC, 2007). Mean differences are tested using T-tests for continuous variables and Chi-square-tests for categorical variables to indicate their variance. The significance of the values are indicated with ** at the 1% level and * at the 10% level.

Nicaragua has three distinct geographical areas: the Pacific, the Central and the Atlantic Region. The research area chosen for this study is the most populated and economic active region: the Pacific. Only the rural areas of the Pacific were studied. These are situated in the departments of Chinandega, Leon, Masaya, Granada, Rivas en Carazo. The LSMS defines the department of Managua as urban and therefore I left it out. The backbone of the Pacific economy is agriculture and together with human productive assets (education and experience) land, animals and agricultural equipment form the principal production assets to which a rural household has access (Davis and Stampini, 2002). As figure 2.2 shows the asset endowment determines the livelihood strategy, in this case participation in the RNFSE sector. The livelihood strategy on its turn changes the asset endowment. To analyze the

relation with engagement in RNFSE activities I chose to base asset endowment on agricultural productive assets as I expected these to be least influenced by engagement. To practice agriculture and livestock activities households need land. Land in Nicaragua mostly is inherited and therefore can be regarded as a stable asset (Boucher, Barham and Carter, 2004). The measures education and experience are individual and not suitable for household analysis, and therefore left out. I grouped the total population, consisting of 622 households in 4 wealthgroups. Households belonged to a wealthgroup according to their wealth, which in this study is defined as the sum of land assets (beginning 1998), animal assets (beginning 1998) and agricultural equipment assets, valued in Nicaraguan Cordoba (1€ = 25.30 Cordoba, August 2007) given by the surveyed households themselves. The first wealthgroup consists of households with assets up till 50 Cordoba. I ranked the rest of the population (the population with assets) on their total endowment of productive farm assets and divided them in 3 groups of equal size. Belonging to the second wealthgroup are households with total assets between 50 and 581 Cordoba, the third wealthgroup consists of households with total assets between 581 and 7268 Cordoba and all the households with more than 7268 belong to wealthgroup 4. For 2001 I only selected the households that were also surveyed in 1998, in total 447. These households were grouped in the same wealthgroup as they were in 1998. In 1998 191 of the 622 households engaged in RNFSE activities. In 2001 there were 180 engaging households.

The livelihood strategy I analysed in this study was participation in the RNFSE sector. To distinguish between RNFSE activities, I applied the same typology used in the Living Standard Measures Survey of 1998 (LSMS). The LSMS distinguishes three categories of self-employment activities: services, production and commercial activities. Households that didn't have self-employment activities were grouped in the category 'No RNFSE activities'. Household could participate in more than one self-employment activity, therefore the total number of activities is higher than the number of households. With regard to households that don't have RNFSE activities: I counted them only once in the category 'No-RNFSE activities'. As each of the categories included many activities that differ in the amount of capital used I divided them into 'low capital intensive' and 'high capital intensive'. Capital intensiveness has first been calculated based on the amount of business capital used for an activity divided by the amount of FTE per business. 1 FTE is equal to 40 hours working a week. However after studying households that participated in 1998 as well as 2001, I found misleading results: some households kept the same amount of capital while decreasing their hours of work spent on the activity by 400%. It is possible that a person wanted to quit an activity but faced problems by selling his business capital; the consequence is a rise in capital intensiveness giving us wrong impressions. Therefore I decided to divide the activities in low and high intensiveness based on the total amount of capital used for the business. I accumulated the total amount of business capital from all self-employment activities in the Pacific Lowlands and chose the 90% line to indicate the start of 'high capital intensity'. An activity was regarded as high capital intensive when it owned more than 3900 Cordoba business capital.

To describe the trends in RNFSE-capital I summed capital owned by households for their RNFSE-activities. I accumulated total RNFSE capital of all households and divided the households based on this in two groups. Households above the 90% line, with RNFSE capital more than 5300 Cordoba, belonged to the high capital group and households below the line to the low capital group. Due to uncertainty on the data I had to leave out some household for the section on capital. The analysis of 1998 is still based on 191 households. The households from 2001 reduced from 180 participating households to 173.

To study the influence of risk on being engaged in RNFSE activities I chose to analyze the influence of a natural disaster shock. Because hurricane Mitch had a devastating effect on agriculture, one might expect an influence on wealth and therefore on participation, the amount of RNFSE capital and the composition of the RNFSE sector also. I distinguished between households and individuals that were affected and households that were not. Regardless of the level of damage all households affected by Mitch were defined as 'hit'.

3.3 Modelling determinants of participation

To analyse the determinants of participation in different activity categories I chose to use a multinomial logit model (Figure 3.1). Multinomial logit models are an extension of logistic models. A multinomial logit model permits analysis of participation in more than two activity categories that are not treated in any continuous order. Instead of having dichotomous alternatives (0,1) a multinomial logit model assigns probabilities (P) to the different categories (S). The five categories in the multinomial logit I developed are: services, production, commercial, no RNFS-activities and engagement in more than

one activity category, referred to as 'multiple'. The vector of possible determinants is denoted by 'Z'. The independent variables included in this vector are based on literature study and my fieldwork. A multinomial logit model needs a category which functions as reference state. As we're interested in the factors that determine participation the normalized category in this analysis is the 'no RNFS- activities' category. The probability of participation in the different activity categories is compared to the probability of participation in this reference category. The most important assumption of the multinomial logit model is the Independence of Irrelevant Alternatives (IIA), meaning that the odds between any of two outcomes are independent of other outcomes that are simultaneously considered. There are two tests to test for IIA available in Stata9. As the outcomes of the Hausman test resulted to be unstable, I used the small Hsiao test that indicated that there was no significant difference between the full model and a model with an omitted category. As I wanted to include personal characteristics also the research unit was the individual. I selected the productive population, aged between 15 and 65. From the 440 households surveyed in 2001, 173 households with in total 249 individuals participated in RNFS activities.

$$P(Y = s) = \frac{e^{\beta_s Z}}{1 + \sum_{j=2}^s e^{\beta_j Z}} \quad \text{for } s \text{ not equal to } 1$$

Figure 3.1: Specification multinomial logit model
Source: Nkamleu and Kielland, 2006

4 Introduction to Nicaragua and the Pacific

With an area of 120.339 km² and a population of 514.209.8 (Censo, 2005) Nicaragua is the biggest and least populated country in Central America. Nicaragua borders Honduras on the north and Costa Rica on the south. The country possesses a diverse geomorphology and different micro climates, contributing to a diverse production ranging from coffee in the higher zones to sesame, basic grains and fruits in the lower zones. Nicaragua is a democratic unitary republic that is divided into fifteen departments and two self-governing regions. Due to its colonial history a cultural division can be made between the eastern part of the country and the western part. The eastern part traces cultural heritage of Spanish and to a minor extend other European settlers. The western part is characterized by a mixed population of indigenous people and descendants of African slaves.



Figure 4.1: Map of Nicaragua
Source: MAGFOR rural atlas, 2002

Nicaragua has three geographical distinct regions: the Pacific, the Central and the Atlantic region. The research area for this study was the Pacific. The Pacific region is located in the west and consists of a broad fertile plain with a volcanic mountain range. With a population of 151.7 habitants per kilometre compared to 10.5 in the Atlantic and 48.3 in the Central region, the Pacific is the densest populated region of the three. 54% of Nicaragua's total population lives in this region (Censo, 2005). The Pacific consists of the departments of Carazo, Chinandega, Granada, León, Managua, Masaya and Rivas.

Table 4.1: Percentage rural population Chinandega, 2005

Department	Total Pacific	Chinandega	León	Managua	Masaya	Granada	Carazo	Rivas
Rural	27%	40%	41%	10%	45%	36%	38%	53%

Source: Censo, 2005

4.1 Economy

After Haiti Nicaragua is regarded as the poorest country of Latin America. Until today the country fights the consequences of its recent history that is characterized by political instability, civil war, macroeconomic mismanagement and a series of natural disasters (WB, 2007). A 36-year period of military dictatorship led to a society with a highly unequal wealth division and a majority of the population that was suppressed and lived in poverty. Power was taken over by the revolutionists' party, known as the FSLN (Frente Sandinista la Liberación Nacional) in 1979. In addition to continuing war against its opponents, the FSLN intervned heavily in the agriculture sector; starting with

formation of cooperatives, enforcing land reformation policies and launching literacy and nutrition campaigns. Nonetheless the war left people in poverty and a trade embargo of the USA in 1985 caused huge inflation rates. Democratic elections in 1990 saw the unexpected defeat of the FSLN and the new right winged government received a country in ruins. The Liberal Governments that were in power from 1990 to 2002 took on policies to reduce the huge fiscal deficit that was left: they restricted on credit, privatized more than 350 state enterprises, liberalized trade and reduced intervention in the agricultural sector (Dutch embassy, 2005; WB, 2007). Although the macro economy stabilized, these policies worsened rural poverty (Davis and Stampini, 2002). More than two third of the rural population is regarded as poor. Health and education services are in minor condition. Less than half of the rural households have access to safe water and sanitary services and one of the five children is malnourished. In the study area 84% of the population possessed of a latrine in 2001 but according to the World Bank (2003a) a high percentage was unused, causing water contamination. Indecent garbage disposal formed another important contaminator; 77% was burned and 16% dumped into rivers or streams. Although 62% of the houses had electricity power failures were common. A high percentage of the rural population cooked on firewood (89%) contributing to deforestation. Only 13% of the households had a member with public health insurance (table 4.5).

Table 4.2: Access to services in rural pacific, 2001

<i>Main source of water</i>	<i>Type of Sanitary service</i>		<i>Garbage disposal</i>		<i>Type of lighting</i>		<i>Fuel for cooking</i>		
Pipes inside	5%	Latrine- not treated	44%	Collected by truck	1%	Electric	62%	Firewood	89%
Pipes outside	29%	Latrine treated	40%	Burned	77%	Generator	0%	Butane	11%
Public source	3%	Toilet discharges into sewers	0%	Buried	4%	Kerosene	34%	Kerosene	0%
Public or private well	45%	Toilet discharges into cesspool	2%	Dumped into river/stream	16%	Other	4%	Coal	0%
River/stream	6%	Toilet discharges into river	0%	Authorized dump	1%	None	0%	Electricity	0%
Truck/oxcart	1%	There is none	15%	Other	1%			Other	0%
From another house	9%								
Other	1%								

Source: WB, 2003a

National poverty declined from 50.3% in 1993 to 45.8% of the population regarded as poor in 2001. An important part of this reduction happened in the rural areas: rural poverty decreased from 76% to 68%. However it is assumed that the major driver of poverty reduction was growth in the agricultural sector, caused by high export commodity prices, use of unoccupied lands and return to normalcy after decades of war. These are factors that cannot deliver a sustained growth; the prices of Nicaragua's export products for instance have witnessed deterioration since 2000 and it is believed that the poverty decline between 1998 and 2001 was due to post-Mitch reconstruction programs. Nicaragua's economy still relies on the production of raw materials. The primary sector contributed a 30% to total GDP in 2001 and 38% of the economically active population was occupied in this sector. It was estimated that 14.4 % of the Nicaraguan GDP in 2001 were remittances (WB, 2003a). The limit on current agricultural growth indicates that high attention should be paid to possible growth drivers in the RNFE (ODI, 2003).

Rural households in Nicaragua rely on a variety of different income sources: 48.2 % comes from the agricultural sector, 19.9 % from the non-farm wages 10.9 % from RNFSE activities (table 4.3). The rural families that increased their welfare levels between 1998 and 2001 did this by increasing their participation in RNFSE activities or diversification of their traditional agricultural produce into market crops and livestock production (Davis and Stampini, 2002). For the extreme poor agriculture was not a strategy to escape poverty; it was used for subsistence and food security. The households that produce for subsistence mainly grow basic grains. Their main constraints for diversification into other activities or market crops are high transaction costs, lack of finance and low levels of agricultural technology (WB, 2003b). Limited availability of financial services and high costs of credit form a serious implication for the rural development in Nicaragua. Only 2% of the rural households in 1998 received credit from banks and 2.9% from micro finance NGO's (Sanchez 2001).

Table 4.3: Income patterns Nicaragua, 2001

	Managua	Pacific		Central		Atlantic	
	Urban	Urban	Rural	Urban	Rural	Urban	Rural
Work							
Agricultural Wage	3.1%	7.7%	16.5%	10.7%	24.9%	13.3%	13.7%
Non-agricultural wage	50.0%	42.6%	30.9%	39.9%	12.8%	36.7%	10.7%
Non-farm Self-employment	21.8%	26.2%	14.8%	25.3%	8.1%	21.2%	8.4%
Agricultural Self-employment	1.7%	2.2%	15.7%	5.2%	32.5%	8.7%	50.5%
Undetermined	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.1%
Imputed rent	16.4%	10.0%	11.7%	13.2%	12.7%	13.4%	12.3%
Education transfers	0.1%	0.3%	0.8%	0.2%	1.2%	0.2%	0.5%
Food, gifts	1.0%	1.6%	2.7%	1.0%	2.4%	1.8%	1.9%
Remittances	2.4%	6.5%	4.7%	2.1%	3.6%	2.1%	0.8%
Charities	0.0%	0.0%	0.1%	0.0%	0.3%	0.0%	0.1%
Capital returns	1.0%	0.4%	0.2%	0.2%	0.3%	0.2%	0.0%
Pensions	2.2%	2.2%	0.9%	1.6%	0.3%	1.7%	0.5%
Others	0.5%	0.5%	1.1%	0.6%	0.8%	0.6%	0.8%

Source: Nicaragua Poverty Assessment (WB 2003a)

In contrast to the Atlantic and the Central Region, the most important income for rural households in the Pacific comes from the non-agricultural activities. Agricultural activities amounted up to 32.2% whereas wage income counted for 30.9% of total income and the share of RNFSE income was 14.8% (table 4.3) Remittances amounted to 4.7% of total income for the rural population in the Pacific in 2001. Migration heavily increased between 1995 and 2005. With 53.4% of total migrates (figure 4.2). Costa Rica was the most popular immigration destination.

4.2 Risk

Households in Nicaragua face different types of risk that influence their livelihood strategies. Individual economic risks, low levels of nutrition and lack of adequate health services were regarded as the most serious shocks households underwent. A second group of risks was related to the environment: major natural disasters as well as daily environmental degradation (WB, 2003a). With regard to the first Nicaragua's environment is sensitive to inundations, tsunamis as well as volcanic eruptions, earthquakes and hurricanes. Within a period of twenty years (1980-2000) the country underwent three droughts, five floods and seven hurricanes (Berg, v.d. and Burger, 2006). The last extremely damaging natural disaster was hurricane Mitch, which affected the country in 1998. The total damage caused by this hurricane amounted to 54 percent of national GDP. Extreme poor families seem to be aware of individual and idiosyncratic risks, but perceive natural risks as normal occurrence. Their livelihoods strategies often even increase the exposure to these types of risk (WB, 2003b). Many poor for example engage in wood selling contributing to deforestation. Droughts affect the total territory of Nicaragua but to a higher extend the dry tropic areas. They have a severe impact on the cultivation of basic grains; with regard to animal husbandry they especially affect the worse lands and therefore small breeders. In general however droughts seemed to be perceived as normal rather than catastrophically. Figure 4.3 shows the natural threats; the brown areas are vulnerable to volcanic eruptions. The blue line shows the danger for storms, the blue hyphenated line the threat of hurricanes.

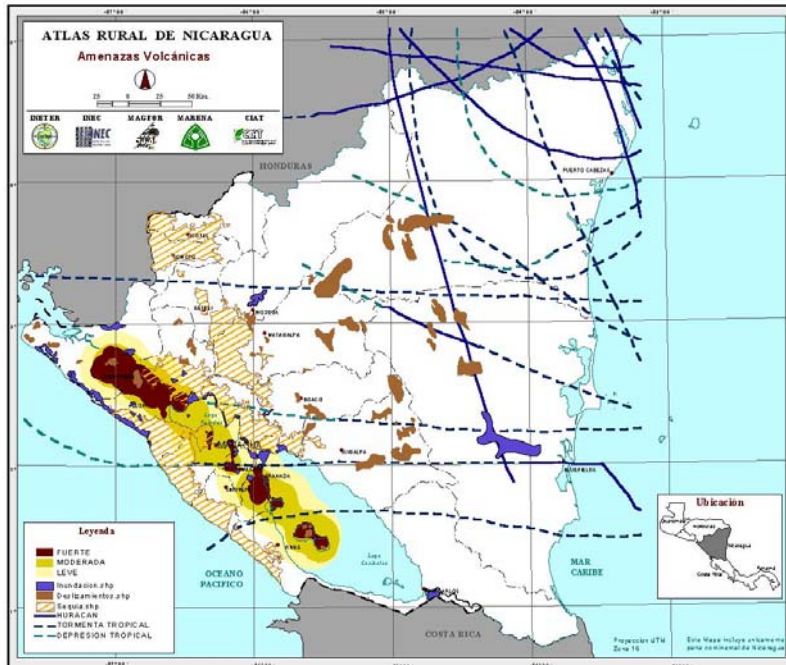


Figure 4.2: Map of natural treats for Nicaragua
 Source: MAGFOR rural atlas, 2002

As many regions in Nicaragua engage in the production of only one export crop, the risk for economic crisis is high; one example is the coffee crisis in the end of the 90's. The crisis affected labour demand, increased unemployment, and reduced income of wage workers causing reduction of spending and consumption, which in turn has affected commercial activities and services such as transport (Deininger et al, 2003). Health and live insurance are rare and most common risk strategies are informal and include reduction of consumption and diversification of family labour and physical assets, the first being a contributor to malnutrition. Remittances, informal credit and exchange of goods and services are important informal risk strategies also. Most seen formal strategies are loans offered at small shops. Some families share production and assets (WB, 2003b).

4.3 Political and Economic Challenges ahead

The World Bank (2007) identified the major challenges Nicaragua has to conquer in order to make progress. A first important activity is the strengthening and building of public financial management systems and implementation capacities. The country is still highly dependent on donor financing which in 2004 accounted for about 36 percent of the total central government budget. Another upcoming challenge is the CAFTA¹, in order to reap the benefits of this agreement Nicaragua should address the serious bottlenecks in its basic economic and social infrastructure and create legislation that favours investment and trade. Physical infrastructure, especially in energy and transport sectors, needs to be improved. A major challenge remains the prevention of and coping with natural disasters and external shocks (WB, 2007).

¹ CAFTA (Central American Free Trade Agreement) is a free trade agreement that was agreed in August 2005, between the US and the Central American countries with the goal of creating a free trade zone for the participant countries.

5 Research Population

To answer the research questions I followed theory and empirics in the literature and assumed that the level of productive asset endowment is an important determinant of the livelihood strategy chosen, in this case the decision to participate in the RNFSE sector. I grouped the households based on their level of agricultural productive assets in the so-called 'wealthgroups'. In this section I describe the characteristics of these different wealthgroups.

5.1 Wealthgroups

The LSMS defines a household as all the people living together under one roof and sharing the food. Nicaraguan households can be characterized as extended, vertically as well as horizontally. Vertically as often more generations live in a house, horizontally in the sense that many households also include children from migrated brothers and sisters or family in law. It is presumable that some household characteristics are correlated with a wealthgroup. It could be the case for instance that households with few agricultural productive assets engage in non-farm activities that demand some level of education, leading to a higher education level. Table 5.1 summarizes the characteristics of the households in the different wealthgroups. I used T-tests to indicate the significance of the mean differences between the wealthgroups.

Table 5.1: Household characteristics, averages 1998

Wealthgroup	1	2	3	4	T 1-2	T 1-3	T 1-4	T 2-3	T 2-4	T 3-4
Number of households	184	146	145	147						
Land assets (Standard deviation)	0.00 (0.00)	4.00 (3.92)	980 (166)	245276 (149416)						
Animal assets (Standard deviation)	2.5 (0.63)	194 (12.4)	1444 (196)	15221 (3836)						
Equipment assets (Standard deviation)	0.75 (0.62)	33.0 (7.5)	407 (78)	9735 (4725)						
Household size (Standard deviation)	5.02 (0.29)	5.89 (0.25)	6.20 (0.24)	6.47 (0.21)	-2.29*	-2.93**	-3.61**	-0.77	-1.67**	-0.49
Share of women (Standard deviation)	0.26 (0.01)	0.28 (0.01)	0.29 (0.02)	0.25 (0.01)	-1.25	-1.43	0.72	-0.27	2.09	2.17*
DR ¹ children and elderly (Standard deviation)	0.45 (0.02)	0.45 (0.02)	0.44 (0.02)	0.47 (0.02)	0.23	0.58	-0.78	0.30	-0.71	-1.14
Age head (years) (Standard deviation)	42.38 (1.43)	47.62 (1.37)	46.78 (1.66)	51.60 (1.44)	-2.66**	-1.92*	-4.15**	-0.39	-1.92*	-2.49*
Max. level of education (Standard deviation)	1.97 (0.04)	1.98 (0.04)	2.0 (0.02)	1.98 (0.03)	-0.09	-0.92	-0.29	-0.88	-0.13	0.72
Education level head (Standard deviation)	1.67 (0.05)	1.64 (0.04)	1.52 (0.04)	1.51 (0.05)	0.58	2.44*	2.83*	2.37*	2.15*	0.23

Source: LSMS 1998 ** significant at 0.01 * significant at 0.1, survey corrected, assets in Cordoba

¹ DR= dependency ratio

On average the households in the lower wealthgroups were smaller. Dependency ratio was almost equal indicating that households in the higher wealthgroups, which are bigger in size, have more labour available. The question rises whether this means that all members worked in one specialized activity (farm or non-farm), or whether this big size meant diversification into different activities. The average age of the householdhead is significant lower in the lowest wealthgroup and significantly higher in the highest wealthgroup. A first explanation would be that older households enjoyed more time to build up their wealth. However although Nicaragua tried to liberalize the land markets (Boucher, Barham and Carter, 2004), inheritance is still the most important determinant of the amount of land owned. The age of the household head therefore can not explain wealth accumulation. I grouped the different education levels in three categories: no education, basic education and high education. The average highest education level obtained in the household did not differ between wealthgroups. However the education level of the household head does. Heads of households in

lower wealthgroups were on average higher educated. This could be explained by the fact that wealth in this study was agriculture productive assets. In order to practice (large) agriculture or livestock activities, besides experience one does not need education. People grow up in agriculture and continue with this activity when having an own household, not demanding any education. The higher level of education for the lower wealthgroups could indicate that households in the lower wealthgroups diversify into non-farm activities. Jobs in construction and farm-wage labour usually don't demand education but jobs like teacher and judge do (Corral and Reardon, 2001).

As the households are grouped based on their wealth there are significant differences in the total assets owned by households in the different wealthgroups. It is interesting however to compare the procentual contribution of different types of agricultural assets to total wealth. Notable is that the difference in total amount of land owned between the first and the second group were very small (table 5.2). The most important assets owned by these groups were animals. Many landless households in the rural areas do own some chickens or goats on their patios. These animals are regarded as important buffers in order to cope with risks. Contrary to agriculture products, animals can be sold and eaten when necessary (*pers.com*, Jorge). Although the share of land owned increased, also for the third wealthgroup animals formed the most important contributor to total wealth. As they both own land and animals it could be that they engage in mixed farming systems with intensive livestock practicing. For the fourth group the value of land assets was obviously the most important. The absolute animal value for the fourth wealthgroup is high compared to the other wealthgroups, this can be explained by the fact that big plots in Nicaragua besides to produce export crops, such as sugarcane, peanuts and sesame, also are used to practice extensive livestock (*pers.com*, Bismarck).

Table 5.2: Wealth composition, 1998

Wealthgroup	1	2	3	4
Average total assets	3.3	231	2832	270231
(Standard deviation)	(0.86)	(10.94)	(184.33)	(150551)
% Land assets	0.0%	1.7%	34.6%	90.8%
% Animal assets	77.1%	84%	51%	5.6%
% Equipment assets	22.9%	14.3	14.4%	3.6%

Source: LSMS 1998, survey corrected, assets in Cordoba

6 RNFSE activities

Households in the rural Pacific engage in a wide range of farm and non-farm activities. In Nicaragua the choice for participation in RNFSE activities compared to participation in wage labour activities is based on lack of or low paid and indecent wage labour or attractive RNFSE activities. For some households RNFSE activities are the only source of income. Most households however also have income from activities other than RNFSE. Often there is a correlation between their activities (Start, 2001). One can think for instance of selling cheese, tortilla or other products processed from own agricultural crops or animals.

Location and local demand are very important for the type of RNFSE activities practiced. The activities which are related to basic needs and daily use can be seen everywhere. Each hamlet seems to have some kind of a small grocery, selling the most basic needs. Some activities however are clustered in more populated regions. To find an iron shop, hairdressers' shop or cafeteria one needs to go to a village. Services like washing and housekeeping are mainly located in the better-off regions. Handicraft activities can be found in tourist areas or rural areas supported by some external project that facilitates the link to the market. People try to make the best use of their location and the demand in this location. Each bus stop has its women of nearby villages selling snacks. In this chapter I give an overview on the activities practiced in the research area.

The 191 participating households of 1998 engaged in 234 activities. The 180 engaging households of 2001 participated in 224 activities. Table 6.2 gives an overview of the activities practised by the research population and how the LSMS divided them over the categories production, commercial and services. In both 1998 and 2001 most RNFSE activities engaged in were commercial. In 1998 service activities were more popular than production activities. In 2001 this was the different way around. In the service sector most participants owned bars and canteens and also washing services were numerous. Within the production sector especially clothes making and finalizing construction of buildings were much practiced. Commercial activities mainly concentrated on selling drinks, foods and tobacco products in specialized as well as non-specialized and non-stable locations. A survey study of the World Bank found that commercial activities were also most popular in 2005 (WB, 2006).

Especially the activities practiced by households as a 'surviving strategy' are very dynamic. Often they are not the mayor income source and when necessary (in case of sickness, or agricultural high season) they are paused or quit. Small activities like selling or washing services don't need business capital and when better alternatives pop up, such as migrating, they are left behind (*pers.com*, interviews). Construction and painting jobs are often on contract basis and temporary (*pers.com*, painter). Activities that generate the mayor income (these can also be small and low remunerative activities) are more stable. Micro Finance institutions reported that the majority of RNFSE activities for which people borrow are sustainable and exists at least a few years (*pers.com*, FDL).

Table 6.1: Transition matrix of RNFSE activities, households engaging in 1998 and 2001

98 \ 01	Production	Commerce	Services	Multiple
Production	41%	14%	23%	23%
Commerce	10%	71%	17%	2%
Services	24%	29%	35%	12%
multiple	14%	43%	21%	21%

Source: LSMS 1998 and 2001, survey corrected

The commercial sector was most stable, 71% of the households that engaged in commercial activities in 1998 did so in 2001. Important to note is that change could have happened within the commercial sector also, a women that sells tortillas but gets the opportunity to avail of a loan stays in the same category when starting a small grocery store. With regard to production activities in 1998, 23% of the households engaged in 2001 took on an extra activity in another sector. These can be totally different activities but also extended activities of the production activity they already had. Households with a bakery, besides producing mostly also engage in selling. The most dynamic sector was the service sector, a high percentage of the households moved to commercial and production activities. Remarkable is that many households with multiple activities in 1998, left one or more activities and engaged in only one activity in 2001.

Table 6.2: RNFSE-activities engaged in per sector, 1998 and 2001

Activity 1998	Nr.	% total	Activity 2001	Nr.	% total
Services 67	67	10.1%	Services	52	10.6%
vegetable production	1	0.2%	vegetable production	1	0.2%
Services linked with agricultural and animal production	1	0.2%	Services linked with agricultural and animal production	3	0.6%
Services linked with wood production	1	0.2%	Services linked with fish production	3	0.6%
Services linked with fish production	3	0.5%	Department manager education	1	0.2%
Repairing personal and domestic materials	4	0.6%	Restaurants, bars and canteens	12	2.4%
Restaurants, bars and canteens	19	2.9%	Person transport (over land)	2	0.4%
Person transport (over land)	2	0.3%	Cargo transport (land)	5	1.0%
Cargo transport (land)	5	0.8%	Renting office equipment	1	0.2%
Handling in cargo	5	0.8%	Juridical activities	2	0.4%
Immobile activities realized with own assets	1	0.2%	Medical activities	1	0.2%
Renting transport equipment	2	0.3%	Other activities relating to health	1	0.2%
Renting construction equipment	1	0.2%	Music, theatre and other artistic activities	1	0.2%
Juridical activities	1	0.2%	Washing services	14	2.9%
Security activities	1	0.2%	Hairdressing	1	0.2%
Other public activities	2	0.3%	Other services activities	4	0.8%
Primary school teacher	1	0.2%			
Social services	1	0.2%			
Activities for Employer organisations	1	0.2%			
Other hobby activities	3	0.5%			
Other entertainment activities	2	0.3%			
Washing services	8	1.2%			
Hairdressing	1	0.2%			
Other services activities	1	0.2%			
Production	53	8.0%	Production	68	13.9%
Mineral extraction	2	0.3%	Mineral extraction	2	0.4%
Processing milk products	1	0.2%	Stone and clay extraction	1	0.2%
Processing bread products	9	1.4%	Salt extraction	1	0.2%
Processing other food products	1	0.2%	Processing meat products	2	0.4%
Producing textiles	1	0.2%	Processing milk products	5	1.0%
Weaving	2	0.3%	Processing wheat	8	1.6%
Clothes making	11	1.7%	Processing bread products	7	1.4%
Making shoes			Processing cocoa, chocolate and other sweetness	1	0.2%
Making wood products except furniture	1	0.2%	Making carpets	1	0.2%
Ceramics making	2	0.3%	Making ropes	1	0.2%
Making products of concrete and cement	3	0.5%	Making other textile products	2	0.4%
Producing metal for construction	1	0.2%	Weaving	1	0.2%
Treating metals etc for contracts	1	0.2%	Clothes making	9	1.8%
Producing other metal products	1	0.2%	Making wood products except furniture	1	0.2%
Construction works	1	0.2%	Making decoration ceramics	4	0.8%
Adjusting buildings	1	0.2%	Useable Ceramics making	1	0.2%
End up buildings	14	2.1%	Making boxes and containers	1	0.2%
			Treating metals etc for contracts	2	0.4%
			Making furniture	6	1.2%
			Constructing buildings	2	0.4%
			End up buildings	10	2.0%
Commerce	114	17.1%	Commerce	104	21.2%
Repairing motorized vehicles	2	0.3%	Repairing motorized vehicles	1	0.2%
Wholesale of agricultural products and animals	3	0.5%	Repairing domestic materials	3	0.6%
Wholesale of tobacco, drinks and food products	2	0.3%	Contract wholesale	1	0.2%
Small sale in non- specialized shops (drinks, food and tobacco)	48	7.7%	Wholesale of agricultural products and animals	2	0.4%
Small sale other products in non-specialized shops	6	1.0%	Wholesale of tobacco, drinks and food products	1	0.2%
Small sale in specialized shops (drinks, food and tobacco)	22	3.5%	Wholesale of construction materials	1	0.2%
Small sale of textiles, clothes and shoes	2	0.3%	Small sale in non- specialized shops (drinks, food and tobacco)	47	9.6%
Small sale of domestic equipment	1	0.2%	Small sale other products in non-specialized shops	1	0.2%
Small sale of hardware, paintings and glass products	2	0.3%	Small sale in specialized shops (drinks, food and tobacco)	13	2.7%
Small sale other specialized products	5	0.8%	Small sale other specialized products	3	0.6%
Other small sale in not-stable places	21	3.4%	Small scale in mobile places	3	0.6%
		35.2%	Other small sale in not-stable places	28	5.7%
No RNFSE- activities	431	64.8%	No RNFSE- activities	267	54.5%

Source: LSMS surveys 1998 and 2001

6.1 RNFSE capital

Barret, Reardon and Webb (2001) state that there is a strong positive correlation between income from an activity and its capital requirement. Interviewees however stated that the influence of other factors, such as location and personal skills are of higher importance for remuneration (*pers.com, interviews*). The activities scaled by remuneration can be placed on a spectrum with two extremes: RNFSE activities engaged in as a surviving strategy (pushed) and RNFSE activities engaged in to reach a higher level of wealth (pulled) (Lanjouw P, 2001). In the first group one encounters for instance participants in ambulant activities like selling of tamales, tortillas and snacks. The margins on their sales are small and often they have other income sources also. Activities that demand a high amount of inputs are often small in remuneration as well (*pers.com, INDE*). Inputs are costly in Nicaragua and the added value therefore is small. The activities at the other extreme of the spectrum are activities that sell or produce products and services with high added value for example beauty saloons and iron shops. Often these activities form the main income source. Similar activities can be low as well as high in remuneration: a small shop without competition can earn a lot, whereas a bigger shop in a poor area does not. Contrary to expectations many jobs that demand education in Nicaragua are low in remuneration. Professionals that work in the public sector (teachers, nurses etc.) earn little money. The same counts for constructors which often work on temporarily contract base (*pers.com, FINCA*). According to Ojoche the activities that sell expensive products which are often consumed are best in remuneration (*pers.com*). Examples are sellers of agricultural inputs and animals. It is possible that an activity develops from being a 'surviving' activity into a growing activity that provides the main income.



Picture 6.1: A low capital-input activity: making baskets from pine-needles

Although there's a correlation between the activity participated in and the average level of assets assigned to this activity, investigating the amounts of capital owned for different activities could give an indication of the capital requirement for self-employment in this sector.

Table 6.3: Average capital assigned to the activity sector, 1998

	Low capital intensive			High capital intensive		
	Production	Commerce	Services	Production	Commerce	Services
1998						
N Activities	47	107	56	6	7	11
Average capital	527	625	335	22443	6784	27173
(Standard deviation)	(89)	(99)	(91)	(12296)	(1045)	(7393.6)
2001						
N Activities	61	89	44	7	15	8
Average capital	847	759	592	24809	17808	32180
(Standard deviation)	(190)	(126)	(144)	(10461)	(3915)	(8983)

Source: LSMS 1998 and 2001, survey corrected

With regard to low capital intensive activities the amount of RNFSE capital owned for production activities increased between 1998 and 2001. In both years the least capital is owned for the service sector. With regard to high capital intensive activities the least capital is owned for the commercial activities and the most for the services sector.

High amounts of RNFSE capital owned can indicate either that households are pluriactive or that they specialize and assign high capital amounts to only one activity. Based on the total amount of RNFSE capital they owned I grouped the households in a low (less than 5300 Cordoba) and a high capital group.

Table 6.4: % Households in the low- and high capital group, 1998 and 2001

Wealthgroup	1998			2001		
	Low	High	N	Low	High	N
1	89%	11%	54	87%	13%	56
2	93%	7%	49	90%	10%	39
3	87%	13%	43	88%	12%	45
4	87%	13%	45	71%	29%	33
Total	89%	11%	191	85%	15%	173

Source: LSMS 1998 and 2001

There was no relation between the wealthgroups and belonging to the low or high-capital group (table 6.4). This could be explained by the possibility of starting with a low capital intensive activity and developing it into a high capital intensive activity. Or starting with one and taking more RNFSE activities causing total business capital to rise. In both cases a household stays in the same wealthgroup. It is assumable that, provided that the activity is remunerative, the longer an RNFSE activity exists the more investments for this activity are done. Nevertheless in the research area the percentages for both years, except for the fourth wealthgroup, are comparable. There was an increase in the percentage high-capital participants in the fourth wealthgroup.

Table 6.5: Average capital assigned to RNFSE-activities, 1998 and 2001

Wealthgroup	1998				2001				% change			
	1	2	3	4	1	2	3	4	1	2	3	4
N households	54	49	43	45	56	39	45	33				
Total	3985	1268	5632	3115	4439	3937	5300	5221	11%	68%	-6%	40%
(S.D.)	1996	501	2826	1112	1983	2500	2525	2678				

Source: LSMS 1998 and 2001, survey corrected, S.D.= standard deviation

Table 6.5 shows the trend in the total amount of RNFSE capital. We can see that this trend differs per wealthgroup. In the first wealthgroups the total amount of RNFSE capital rose between 1998 and 2001. In wealthgroup 3 we see a decrease in the total amount of capital owned for RNFSE activities. And again in wealthgroup 4 the total amount of owned RNFSE capital increased. T-tests however didn't show any significant difference between the two years for any of the groups.

It is not clear whether the changes in RNFSE capital between 1998 and 2001 are due to households that left or entered the sector or whether there are also changes for households that had RNFSE activities in both years. In total 90 households participated in both years. 75 stayed within the same capital group (67 in low capital, 8 in high capital) 10 households moved from high to low capital and 5 households moved from low to high capital.

Table 6.6: Average capital assigned to RNFSE-activities, households engaging in both years

Wealthgroup	1998				2001				% Change			
	1	2	3	4	1	2	3	4	1	2	3	4
N households	27	22	24	17	27	22	24	17				
Total	6859	2015	8138	3519	7454	5513	4974	7526	8%	63%	-64%	53%
(S.D.)	3921	1157	4877	1586	4269	4225	3735	4309				

Source: LSMS 1998 and 2001, survey corrected, S.D.= standard deviation

Total RNFSE capital increased between 1998 and 2001 except for wealthgroup 3: households faced a big decrease. The trends between 1998 and 2001 for the engaged households are in line with the trends for the total group. As we can see that total capital in wealthgroup 2 rose much more compared to the total of all the households, it might be interesting to compare RNFSE capital of households that left with that of households that entered (table 6.7).

Table 6.7: Average capital assigned to RNFSE-activities, entering and leaving households

Wealthgroup	Households Entered				Households Left			
	1	2	3	4	1	2	3	4
N Households	27	27	19	28	30	21	23	16
Total	1721	1848	5587	2197	1136	740	2748	2798
(S.D.)	(509)	(797)	(3294)	(1099)	(585)	(273)	(1401)	(1522)

Source: LSMS 1998 and 2001, survey corrected, S.D.= standard deviation

It is remarkable that both the households that entered between 1998 and 2001 and the ones that left had less average RNFSE capital than the households that engaged in both years. Except for wealthgroup 4, the households leaving between 1998 and 2001 had lower capital averages than the households entering.

6.2 Hurricane Mitch

As mentioned before there are many external factors that influence the level of assets a household has and therefore the total amount of capital it assigns to RNFSE activities. As rural households rarely have the possibility to use risk-coping strategies, they use risk management strategies (Alderman, H. and Paxson, C., 1992, Dercon, S, 2002). Risk management strategies can be used ex-ante, for example by diversifying activities, or ex-post after a hardship occurred.

Besides income smoothing a household can use assets smoothing and sell off some of its RNFSE capital. It is also possible that post-disaster aid programs contained micro finance components that stimulated increase of total RNFSE owned. To learn about the possible effects of a natural shock, in this case hurricane Mitch which affected Nicaragua in 1999, I carried out above analysis again but distinguished between hit and not-hit households.

Table 6.8: Comparison average RNFSE capital households that are hit versus non-hit, 2001

Wealthgroup	Not hit=1				Hit=2				T-test 1-2			
	1	2	3	4	1	2	3	4	1	2	3	4
Left households	20	21	13	26	7	6	6	2				
Average capital	5747	1584	4401	1503	527	606	7211	6815	1.89*	1.28	0.46	1.75
(S.D.)	(2760)	(712)	(2053)	(449)	(209)	(288)	(5768)	(2996)	(0.064)	(0.205)	(0.648)	(0.085)
Entered	24	14	9	11	5	3	12	5				
Average capital	5814	5281	6085	2721	1166	336	4752	8032	1.75	1.48*	0.25	1.01
(S.D.)	(2602)	(3335)	(4259)	(1207)	(558)	(197)	(3113)	(5174)	(0.087)	(0.146)	(0.802)	(0.319)
Both years 1998	19	16	14	9	8	6	10	8				
Average capital	10553	2575	5064	2572	573	955	11258	4362	1.87*	0.89	-0.65	0.61
(S.D.)	(5344)	(1716)	(3496)	(794)	(235)	(592)	(8806)	(2814)	(0.069)	(0.378)	(0.517)	(0.544)
Both years 2001	19	16	14	9	8	6	10	8				
Average capital	11548	8386	8659	2825	485	78	1232	11713	1.9*	1.38	1.08	1.2
(S.D.)	(5795)	(6036)	(6836)	(1525)	(399)	(25)	(736)	(7277)	(0.064)	(0.176)	(0.287)	(0.239)

Source: LSMS 1998 and 2001, survey corrected, S.D= standard deviation

* Significant at 0.1

The comparison of households that were hit by Mitch and households that were not, in different groups enables to conclude that the differences are not due to Mitch. When looking at the household group that left between 1998 and 2001 one can see that in the first wealthgroups the households that were going to be hit already had less business capital than the households that were not (table 6.8). This also comes back in the comparison of the households that engaged both years: In 1998 before Mitch, the households that were going to be hit owned already less business capital. This could indicate that the locations that were affected by Mitch deal with other factors that cause households owning less business capital.

7 Participation

Households have different motivations and abilities to participate in RNFSE activities. This is due to differences in location features (remoteness, access to water), household characteristics (number of members, number of children), characteristics of the individual members (age, education level) and differences in other assets owned. It is assumed that especially the level of productive assets a household endows is an important determinant of how households develop in the RNFSE (Barret, Reardon and Webb, 2001, Lanjouw, 2001, Haggblade e.a. 2002). Several studies on diversification strategies found that distress-push diversification attracts households that are less well endowed. These households enter activities that face low entry barriers but are mostly low in return also. The well-endowed households are attracted by demand-pull diversification and engage in higher-return activities (Davis and Bezemer, 2004). In this section I focus on the relation between wealth and participation.

In 1998 191 households (of the 622 surveyed) participated in the RNFSE sector. In 2001 180 (of the 447 surveyed) households engaged in self-employment. As the households are grouped based on their wealth one might expect different ratios of participation in RNFSE activities. In the research area participation in RNFSE activities in general increased between 1998 and 2001 (table 7.1). In 1998 there was not much difference in the procentual engagement: in 2001 more households in the lower wealthgroups than in the higher wealthgroups participated. Without revealing anything about the activity sectors engaged in, it is clear that there are no barriers, with regard to wealth, to enter the RNFSE sector in general.

Table 7.1: Participation in RNFSE activities, 1998 and 2001

Wealthgroup	1998		2001	
	Engaged	Total	Engaged	Total
1	54	162	57	110
(% total)	(29%)	(100%)	(52%)	(100%)
2	49	154	43	101
(% total)	(34%)	(100%)	(43%)	(100%)
3	43	153	47	114
(% total)	(30%)	(100%)	(41%)	(100%)
4	45	154	33	122
(% total)	(30%)	(100%)	(27%)	(100%)
Total	191	622	180	447
(% total)	(31%)	(100%)	(40%)	(100%)

Source: LSMS surveys 1998 and 2001, survey corrected

Table 7.2 shows the household characteristics separately for households that engaged and households that didn't. The only significant difference between households that engaged and households that did not was the household size, which was bigger for the engaging households. In the first wealthgroup the size was bigger due to more women and children in the household. In the second wealthgroup the number of men as well as women, children and elderly was bigger for the participating households. Age of the household head in the highest wealthgroup is significantly higher for engaging households. Although it seems that the households that did engage had a somewhat older and higher educated head, the differences are not significant.

Table 7.2: Household characteristics, participating versus non-participating households, averages 1998

Wealthgroup	Engaged= 1				Not- engaged = 2				T-test 1-2 (p)			
	1	2	3	4	1	2	3	4				
Number of households	54	49	43	45	108	105	110	109				
Land assets (Standard deviation)		12 (11)	135 (351)	24391 (6990)			839 (180)	346621 (214063)				
Animal assets (Standard deviation)	2.9 (1.1)	188 (17)	1074 (207)	14008 (5617)	2.4 (0.7)	197 (17)	1586 (248)	15777 (4927)				
Physical assets (Standard deviation)		15 (7)	714 (241)	5784 (3195)	1.0 (0.9)	43 (10)	291 (65)	11547 (6733)				
Housholdsize (Standard deviation)	6.22 (0.80)	6.40 (0.40)	6.54 (0.59)	7.06 (0.46)	4.55 (0.19)	5.63 (0.29)	6.07 (0.28)	6.20 (0.26)	2.09*	1.65*	0.68	1.53
Share of women (Standard deviation)	0.26 (0.02)	0.29 (0.02)	0.27 (0.03)	0.25 (0.02)	0.25 (0.01)	0.27 (0.02)	0.29 (0.02)	0.24 (0.02)	0.44	0.64	-0.63	0.24
DR children + elderly (Standard deviation)	0.48 (0.03)	0.46 (0.03)	0.44 (0.04)	0.46 (0.04)	0.44 (0.02)	0.44 (0.03)	0.44 (0.03)	0.48 (0.03)	1.19	0.46	0.02	-0.24
Age householdhead (Standard deviation)	43.5 (2.16)	47.5 (2.14)	48.1 (2.38)	54.4 (2.38)	42 (1.79)	47.7 (1.85)	46.3 (1.89)	50.3 (1.6)	0.55	-0.09	0.72	0.47*
Max obtained education (Standard deviation)	2.04 (0.06)	2.06 (0.05)	1.97 (0.04)	2.02 (0.04)	1.94 (0.04)	1.93 (0.04)	2.02 (0.03)	1.97 (0.04)	1.41	1.99*	-1.02	0.99
Education head (Standard deviation)	1.70 (0.09)	1.69 (0.08)	1.58 (0.08)	1.47 (0.09)	1.66 (0.05)	1.61 (0.05)	1.50 (0.05)	1.52 (0.06)	0.38	0.79	0.89	-0.52

Source: LSMS 1998 ** significant at 0.01 * significant at 0.1, survey corrected, assets in Cordoba

¹ DR= dependency ratio

Table 7.3: Wealth composition participating versus non-participating households, 1998

Wealthgroup	Engaged				Not-engaged			
	1	2	3	4	1	2	3	4
N households	54	49	43	45	108	105	110	109
Average total assets (Standard deviation)	3 (1)	214 (16)	3138 (364)	44184 (14513)	3 (1)	240 (14)	2715 (227)	373945 (215441)
% land assets	0	5.4	43	55.2	0	0	30.9	92.7
% animal assets	100	87.7	34.2	31.7	69.5	82.3	58.4	4.2
% equipment assets	0	6.9	22.7	13.1	30.5	17.7	10.7	3.1

Source: LSMS 1998, survey corrected, assets in Cordoba

Although T-tests showed that there were no significant differences one can see that in the first wealthgroup the wealth for the households that do not participate also consists for an important percentage of equipment assets. This could indicate that household with very few assets that do not participate in RNFSE work as agricultural labourers. In the second wealthgroup one can see few differences. In the third wealthgroup households that participate own procentually more land. Households that do not participate own more animals. In rural Nicaragua livestock and especially small animal husbandry like growing pigs, is regarded as more income secure than agriculture. This can be explained by the risky natural environment which causes fluctuating harvests but also by the fact that livestock can be sold or consumed year-round. Participating in the RNFSE sector could be a risk management strategy for households in the third wealthgroup that own procentually more land and equipment than animals. In the fourth wealthgroup it is the other way around; the households that do participate own procentually less land and more animals than the households that do not engage. Of the participants in 2001, 90 households had self-employment activities in 1998 also. This means that 83 new households entered the sector between 1998 and 2001 and 101 households left the

sector. The total number of participating households in wealthgroup 2 and especially in wealthgroup 4 decreased but we have to take into account that the group surveyed was smaller which makes total participation in self-employment higher in 2001 (table 7.4).

Table 7.4: Dynamics in the self-employment sector, 1998 and 2001

Wealthgroup	Left sector between 1998 and 2001*	Entered sector between 1998 and 2001**	Engaged in both years	Engaged in 2001
1	27 (50%)	30 (53%)	27	57
2	27 (55 %)	21 (49%)	22	43
3	19 (44 %)	23 (49%)	24	47
4	28 (62 %)	16 (48%)	17	33
Total	101 (53 %)	90 (50%)	90	180

Source: LSMS 1998 and 2001

* % on total engaged households in 1998, ** % on total engaged households in 2001

The data analysis shows dynamics in participation for all four wealthgroups, there was a lot of dynamics in entering and leaving the self-employment sector.

Table 7.5: % Engaged in multiple activities, 1998 and 2001

Wealthgroup	1998	2001
1	3.6%	8.9%
2	7.7%	10.3%
3	17.8%	6.7%
4	0%	12.1%

Source: LSMS 1998 and 2001,

% on total RNFSE participating households

According to the literature it should be either the households with the smallest asset endowment that are pluriactive in order to spread risk or the households with the highest level of assets that have the possibility to assign assets to different activities (Lanjouw, 2001). However the data analysis only focuses on agricultural productive assets and with regard to these shows no clear relationship between the wealthgroups and being pluriactive.

7.1 Sector participation

The previous sections gave an overview on the activities and characteristics of participating and non participating households. In terms of percentages there was no difference in participation in RNFSE between the wealthgroups. This could indicate that there were no entry barriers with regard to wealth to engage in RNFSE activities in general and that the level of productive assets was not an important determinant when talking of participation only. As there are many activities in rural Nicaragua with low entry barriers, like selling tortilla or washing clothes, it is indeed assumable that participation in general is possible for everyone. Nevertheless the RNFSE sector embraces a broad range of activities. These activities differ in asset requirement. For some activities a certain level of education is needed for others experience is more important. Most activities demand some capital input. The productive assets (including education and experience) one possesses and the RNFSE activities one engages in are correlated at the start of an activity. Households with more assets can start in higher capital demanding activities. They set up bakeries and repairing shops. (*pers.com*, Jorge). The assets one possesses at the start of an activity are important for another reason also: people with more assets often do have better access to finance and information (*pers.com*, Fuente Verde). Assuming a positive relation between physical assets endowment and access to financial capital it would not be surprising when more households in the higher wealthgroups would engage in activities that are high in capital intensity. In this section I focus on participation in the different activity sectors in depth.

When looking at table 6.2 it becomes clear that besides the washing services (washing services are manual in rural Nicaragua) all activities in the service sector demand a reasonable amount of assets, either in the form of education and skills, with regard to teaching and juridical activities or in the form of capital, when speaking of hairdressing and renting equipment. Inputs (agricultural as well as raw materials) in Nicaragua are relatively expensive compared to the prices of outputs. With regard to production activities that demand agricultural inputs (processing milk into cheese and corn into tortillas) it is presumable that these are least popular in the lower wealth groups. A production activity that demands a high quantity of inputs is a bakery (*pers.com*, Finca). Production activities like

construction are often temporal and on contract basis, whereby the instructor provides the tools. Whether activities like wood processing and ceramics demand capital depends on whether the inputs are bought or (illegally) collected by the processors themselves. For most production activities experience or instruction is more important than level of education (*pers.com*, interviews). Selling activities in general have low entry barriers, one can set-up a table along the road and sell mangos or other easily acquired products. The most popular commercial activity was small shops. As in rural Nicaragua the shops are often attached to the houses, one does not need extra capital to buy a stable shop. However shops are characterized by continuous availability of products and therefore demand capital for goods in stock. Commercial activities like repairing services demand equipment, tools and sometimes experience or education.

Table 7.6: Participation in self-employment, 1998

Wealthgroup	Production		Commerce		Services		Total households	Total activities	Total RNSFE activities*
	No RNSFE	Low High	Low High	Low High	Low High				
1 (% total)	130 (71%)	12 3 (7%) (2%)	33 2 (18%) (1%)	13 1 (7%) (1%)	184 (100%)	194 (105%)	64 (33%)		
2 (% total)	97 (66%)	19 1 (13%) (1%)	27 0 (19%) (0%)	15 1 (10%) (1%)	146 (100%)	160 (110%)	63 (39%)		
3 (% total)	102 (70%)	8 0 (6%) (0%)	28 2 (19%) (1%)	13 6 (9%) (4%)	145 (100%)	159 (110%)	57 (36%)		
4 (% total)	102 (69%)	8 2 (5%) (1%)	19 3 (13%) (2%)	15 3 (10%) (2%)	147 (100%)	152 (103%)	50 (33%)		
Total	431 (69%)	47 6 (8%) (1%)	107 7 (17%) (1%)	56 11 (9%) (2%)	622 (100%)	665 (69%)	234 (8%)		

Source LSMS 1998, survey corrected
*% of total activities

In general households engaged mostly in the low-intensive commercial capital activities. Remarkable is that there is no significant difference in participation in high-capital activities between the different wealthgroups. Participation was highest in commercial activities. In wealthgroup 1 households participated in as much production as service activities. For wealthgroups 3 and 4 the service sector seemed of higher importance, with almost half of the households participating in high-capital intensive activities in wealthgroup 3 (table 7.6).

Table 7.7: Participation in self-employment, 2001

Wealthgroup	Production		Commerce		Services		Total households	Total activities	Total RNSFE activities*
	No RNSFE	Low High	Low High	Low High	Low High				
1 (% total)	53 (48%)	17 1 (15%) (1%)	28 4 (25%) (4%)	15 2 (14%) (2%)	110 (100%)	120 (109%)	67 (61%)		
2 (% total)	58 (57%)	14 3 (14%) (3%)	25 2 (25%) (2%)	9 2 (9%) (2%)	101 (100%)	113 (112%)	55 (54%)		
3 (% total)	67 (59%)	18 1 (16%) (1%)	19 5 (17%) (4%)	14 2 (12%) (2%)	114 (100%)	126 (111%)	59 (52%)		
4 (% total)	89 (73%)	12 2 (10%) (2%)	17 4 (14%) (3%)	5 2 (4%) (2%)	122 (100%)	131 (107%)	42 (34%)		
Total	267 (60%)	61 7 (14%) (2%)	89 15 (20%) (3%)	43 8 (10%) (2%)	447 (100%)	490 (110%)	223 (50%)		

Source LSMS 2001, survey corrected
*% of total activities

Also in 2001 all wealthgroups participation was highest in the commercial activities. With regard to service and production activities there were some differences between the groups. In wealthgroup 1 participation in the service sector was equal to participation in the production sector. In wealthgroup 2, 3 and 4 production activities were more practised than service activities. In all groups participation in high capital intensive activities summed up to only 7%.

7.2 Hurricane Mitch

Previous analysis showed that hurricane Mitch did not have a clear effect on the total amount of RNFSE capital owned. Although all the institutions and experts interviewed stated that the effect of

Mitch on the type of activities practised was also minimal it is interesting to investigate the effects on participation of the research population. It would be unsurprisingly when engagement in RNFSE activities had increased as a diversification strategy to cope with the shocks effects. FDL (*pers.com*) stated that the only reason people started to engage in RNFSE activities was because of the support of remittances or post-Mitch reconstruction programs. According to Fuente Verde (*pers.com*) the people that changed from No-RNFSE to RNFSE activities did this after moving to an urban area, not in the affected area itself. The areas affected were left poor and without demand for the products and services delivered by RNFSE activities. The general perception is that the percentage of people migrating to work elsewhere was higher. People migrated because of lack of labour or the will to gain money quickly and be able to reconstruct land and houses (*pers.com*, Promujer, Jorge). 8 years after the hurricane most people regressed to their pre-Mitch location and continued with the activities they had (*pers.com*, Chinatlan). Risk for natural threat doesn't seem a reason for people to stay away. The population is better trained and prepared to deal with natural risks and disasters and many vulnerable areas are also regarded as areas with economic potentials, for example fertile volcanic soils or coast sides that could attract tourists (PDD, 2006).

The research area composed of zones that were highly affected as well as zones that were not affected at all. Analysis so far only showed an overall rising participation (especially in the lower wealthgroups) and a slight shift towards activities in the production sector in the higher wealthgroups. Table 5.12 gives an overview of the number of households hit on: households that entered the RNFSE after 1998, households that left between 1998 and 2001 and households that participated in both years.

Table 7.8: % Hit households, total group, group that left, entered and stayed, 1998 and 2001

Wealthgroup	Total		Left		N	Entered			Both years		
	No	Yes	No	Yes		No	Yes	N	No	Yes	N
1	76%	24%	74%	26%	27	83%	17%	30	70%	30%	27
2	77%	23%	78%	22%	27	82%	18%	21	73%	27%	22
3	56%	44%	68%	32%	19	43%	57%	23	58%	42%	24
4	75%	25%	93%	7%	28	69%	31%	16	53%	47%	17
Total	72%	28%	79%	21%	101	70%	30%	90	64%	36%	90

Source: LSMS 1998 and 2001

The households that left had a lower total percentage of households hit, mainly due to households in the 4th wealthgroup. Remarkable is that it is this fourth wealthgroup in which most households left. In the first two wealthgroups the households that entered seemed to have a lower percentage of hit-households compared to left and already engaged households. In contrast in the third wealthgroup the households that entered had a higher percentage that was hit compared to households that left and that still engaged. The group of households engaging in both years had a higher percentage of hit household then the group of households that left.

Table 7.9: Comparison sector participation households going to be hit versus not hit, 1998

Wealthgroup	No RNSFE	Production		Commerce		Services		Total activities	Total RNSFE	Chi2
		Low	High	Low	High	Low	High			
1	130	12	3	33	2	13	1	194	64	28.04
not hit	74%	5%	3%	17%	1%	7%	1%	108%	34%	
hit	76%	9%	0%	21%	0%	3%	0%	109%	33%	
2	97	19	1	27	0	15	1	160	63	29.97
not hit	72%	11%	0%	18%	0%	13%	1%	115%	43%	
hit	80%	10%	0%	27%	0%	17%	0%	133%	44%	
3	102	8	0	28	2	13	6	159	57	37.08
not hit	71%	6%	0%	18%	0%	11%	5%	111%	40%	
hit	65%	6%	0%	25%	0%	4%	2%	102%	37%	
4	431	47	6	107	7	56	11	152	50	12.31
not hit	63%	7%	2%	11%	1%	14%	1%	100%	37%	
Hit	66%	0%	0%	20%	3%	3%	6%	97%	31%	

Source: LSMS 1998, survey corrected

Procentual participation in RNFSE activities in general doesn't differ between the two groups (table 7.9). It seems that participation in low capital intensive commercial activities was somewhat higher by the households that were going to be hit.. Except for the second wealthgroup, the group that was not

going to be hit participated more in service activities. Chi-square coefficients indicate that there are no significant differences between the groups.

Table 7.10: Comparison sector participation households hit versus not hit, 2001

Wealthgroup	Production			Commerce		Services		Total activities	Total RNSFE	Chi2
	No RNSFE	Low	High	Low	High	Low	High			
1	53	17	1	28	4	15	2	120	67	15.81
not hit	(43%)	(18%)	(1%)	(28%)	(5%)	(16%)	(1%)	(113%)	(62%)	
hit	(59%)	(9%)	(0%)	(21%)	(0%)	(9%)	(3%)	(100%)	(41%)	
2	58	14	3	25	2	9	2	113	55	
not hit	(54%)	(13%)	(4%)	(28%)	(3%)	(11%)	(3%)	(115%)	(54%)	
hit	(67%)	(17%)	(0%)	(17%)	(0%)	(3%)	(0%)	(103%)	(35%)	
3	67	18	1	19	5	14	2	126	59	
not hit	(65%)	(11%)	(0%)	(12%)	(5%)	(11%)	(3%)	(106%)	(39%)	
hit	(50%)	(23%)	(2%)	(23%)	(4%)	(15%)	(0%)	(117%)	(57%)	
4	89	12	2	17	4	5	2	131	42	52.38
not hit	(63%)	(11%)	(3%)	(23%)	(3%)	(6%)	(3%)	(111%)	(44%)	
Hit	(77%)	(9%)	(1%)	(10%)	(3%)	(3%)	(1%)	(106%)	(27%)	

Source: LSMS 2001, survey corrected

Except for the third wealthgroup the households that were not hit had more RNFSE activities then the households that were hit. Participation for this particular group was especially higher in the commercial activities. Participation in service activities was in general higher for the not-hit households. In the first and the fourth wealthgroup participation in production activities was higher for not-hit households, whereas for the second and the third wealthgroups participation was higher for hit households. Again Chi-square tests indicated that there were no significant differences between the groups.

7.3 Determinants of participation

Data analyses so far didn't show a relation between a households' wealth, the RNFSE capital owned and the type of RNFSE activity engaged in. The level of agricultural productive assets certainly is important for the type of RNFSE activity started and the ability to develop it. However the fieldwork supported that with regard to wealth level engagement in the different RNFSE categories is possible for anyone. The conceptual framework showed that besides wealth there are other assets that influence the livelihood strategies chosen, including the choice for participation in RNFSE activities. To assess to what extent different factors contribute to participation in the different activity categories a multinomial logit model is suitable. In this paragraph I focus on personal, household and regional variables that influence participation in the different RNFSE categories. First I describe the variables included in the model, after that the results are presented and triangulated with findings in the fieldwork.

Variables used in the model

Based on the conceptual framework and my fieldwork I assumed the following variables to be of influence on participation in the different RNFSE activity categories. They are all included in the empirical model.

Personal variables: **Head:** is a dummy variable for whether the individual is head of the household or not. In rural Nicaragua, especially when male, the head of the household often is dedicated to agricultural activities. RNF activities are mostly practiced by other household members. **Wealthgroup** is a dummy variable for the different wealthgroups. **Wealthgroup 1** indicates whether the household of an individual belongs to wealthgroup 1 (1) or to another group (0), **Wealthgroup 2** indicates whether the household of the individual belongs to wealthgroup 2 or not, and so on. In this multinomial logit model wealthgroup 1 is used as the reference category for the other wealthgroups. **Gender:** the variable Gender is a dummy variable where male is referenced as 0 and female as 1. The mayor economic activity in the Pacific region is agriculture. Men and women engage in this activity but traditionally the activity is regarded as a 'male-activity'. Women assist their husbands but usually don't own land. The men engaging in RNFSE activities are mostly those without land. MAGFOR and INDE (*pers.com*) stated that there are indeed single women with their main activity in agriculture but mostly they are member of a cooperative. The perception is that in general RNFSE are more practiced by women, especially the small 'surviving' activities. As a surviving strategy men migrate or work as wage labourers. When talking about RNFSE activities as principal income source there is no difference

between the sexes (*pers.com*, FDL, Caruna). Gender is regarded as an important determinant not only for participation in general but also for the type of activities practiced. Especially the rural areas of Nicaragua are conservative and characterized by a division of male and female tasks. Taxi drivers, owners of repairing shop, construction workers and technicians are mainly men. All interviewees were convinced that women are more responsible and better in bookkeeping. Fuente Verde (*pers.com*) stated that there is another reason that more women participate: most microfinance institutions are directed to women. Age is a variable that measures the individuals' age. All interviewed organizations and institutions were of opinion that age does not matter for participation. Children already help their parents. In general the owners are 18 years and older. However an analysis on second activities of farmers in Chinandega (Cenagro III, 2001) showed a relation between age and participation. Up to the age of 35 working as agricultural worker was most popular whereas selling was very popular from the age of 35 onwards. Construction work was most practised between the age of 25 and 35. Age squared is the square of the age variable to determine nonlinearity. Literate indicates whether an individual can read and write. Participants of commercial and service activities reported that it is necessary to avail of both skills (*pers.com*, interviews). Education 1 is a dummy variable indicating that the individual did not complete any education (1). Education 2 is a dummy for whether or not the individual completed adult, primary, secondary or basic technical education and Education 3 is a dummy for whether or not the individual completed high technical, teacher, university, master or doctor education. The general perception is that education is a minor determinant in the decision whether or not to engage in RNFSE activities in Nicaragua (*Pers.com interviews*). Being able to calculate and read is necessary but more important required skills would be feeling for the market, personal will and being able to deal with people. Although the RNFSE sector would be accessible for anyone and experience and instructions seemed of higher importance than education, there are activities that do require a certain level or type of education.

Household variables: Gender head: The dummy variable Gender head indicates whether the head of a family is male (0) or female (1). According to the interviewees (*pers.com*) households with a female head were more inclined to engage in self-employment than male headed households. Different reasons however were noted: all acknowledged that the lack of land owned by women played an important role. Besides that some interviewees stated that often male heads prefer their wives to stay at home instead of having their own business. Single women would not have to deal with machismo as limiting factor. Plan International however was convinced that the need to gain extra income in many cases is much more pressuring than machismo. The variable Age Head stands for the age of the household head. The education categories used for the individual is also used for household head, defined as Education head 1, Education head 2 and Education head 3. Household size indicates the number of members living in the household. Household was defined by the LSMS as all the people living together under one roof and sharing the food. The fieldwork didn't find an obvious relationship between participation in RNFSE activities and the size of the household. Some interviewees (*pers.com*, Chinatlan) stated that bigger households have more ability to assign different members to different activities. Others however stated that care for many children and elderly constraints the possibilities to participate (*pers.com*, Promujer). It became clear that with regard to the relation between household size and activity also the size of the activity and the age of the different household members is very important. A big family with a small amount of land is inclined to engage in more activities than only agriculture. A big family with young children however limits the possibility of participation in hours-demanding activities. Household size squared: the square of the family size to determine nonlinearity. Dependency represents the share of household members <6 and > 65. Care for young children or elderly could prevent individuals, especially women, from taking part in RNFSE activities. Some interviewees (*pers.com*, Chinatlan) stated that this would not prevent participation but lead to activities close to the house. Washing services and small shops are examples.

Location variables: Mitch is a dummy variable that reflects whether a household was affected by hurricane Mitch (1) or not (0).

Omitted variables that could have been of influence:

The fieldwork showed that location variables are of high importance. Vicinity to a tourist area, access to water and quality of infrastructure are examples. Many studies use proxies based on access to water, electricity and roads to measure the influence of location factors. The fieldwork however showed that the LSMS data were not suitable to proxy these variables. Villages that do have electricity in theory endure malfunctioning in reality. Villages that have a road according to the database are in practice only accessible in the dry season. Therefore it is chosen to analyze the influence of location

factors with qualitative methodological tools (chapter 8). Other omitted variables that were regarded as important were experience and remittances. Dhaese, Ruben and de Wildt (2006) use years of existence of a business as proxy for experience. Fieldwork however showed that due to the dynamics in the RNFSE sector it is possible that an owner of a one year existing business did have other business before. The same counts for persons that got experience through their parents business. It is chosen to leave business experience out. The LSMS survey only provides information on the remittances received during the twelve months prior to the survey, whereas remittances preceding that period could have been of influence also. I chose to leave this variable out of the model. The same counts for access to finance. Finance could be of influence on participation in general as well as choice for a type of activity and development of this activity. With regard to the fieldwork, all activities requiring a high amount of capital were practiced by people who obtained an informal loan or had access to finance. The most important limitation to develop and start higher capital demanding activities was access to loans and high interests.

The descriptive statistics in table 7.11 show remarkable differences in participation between the lowest and the highest wealthgroup. The average participation in no RNFSE activities was low for the first wealthgroup and high for the fourth wealthgroup. The same counts for the multiple activity category. With regard to participation in commercial, service and production activities it was the other way around. Nicaragua has a very young population with more children than elderly. The households that participate in multiple activities had the highest average dependency ratio, whereas the households that didn't participate had the smallest dependency ratio. These non-participating households were on average bigger indicating that they had more labour available. The average age was youngest for the non-participating households. Both the commercial and multiple activities were more practiced by women than men. The number of participants from female-headed households was also highest in these categories. The number of participants without any education is lowest in the multiple activity category.

Table 7.11: Descriptive statistics for variables used in the multinomial logit model

Activity sector	No- RNFSE	Production	Commerce	Services	Multiple	F/ Chi2
N individuals	2365	67	118	52	13	
<i>Personal characteristics</i>						
Head (Standard deviation)	0.21 (0.01)	0.44 (0.08)	0.36 (0.05)	0.36 (0.06)	0.22 (0.15)	28.11**
Wealthgroup 1 (Standard deviation)	0.18 (0.02)	0.49 (0.10)	0.35 (0.06)	0.45 (0.11)	0.11 (0.11)	54.11**
Wealthgroup 2 (Standard deviation)	0.21 (0.03)	0.14 (0.07)	0.24 (0.04)	0.17 (0.06)	0.13 (0.11)	2.83
Wealthgroup 3 (Standard deviation)	0.29 (0.04)	0.29 (0.08)	0.20 (0.05)	0.30 (0.08)	0.43 (0.12)	3.86
Wealthgroup 4 (Standard deviation)	0.32 (0.04)	0.08 (0.04)	0.21 (0.05)	0.08 (0.07)	0.33 (0.12)	26.91**
Gender (Standard deviation)	0.48 (0.02)	0.48 (0.07)	0.65 (0.05)	0.52 (0.12)	0.82 (0.13)	13.88*
Age (Standard deviation)	30.5 (3.6)	35.94 (2.43)	38.33 (1.1)	35.71 (1.83)	38.04 (3.96)	1.89**
Age squared (Standard deviation)	1124.8 (24.01)	1417.95 (173.68)	1624.22 (80.38)	1425.07 (145.35)	1574.28 (288.89)	1.89**
Literate (Standard deviation)	0.77 (0.02)	0.72 (0.04)	0.72 (0.06)	0.85 (0.04)	0.99 (0.02)	0.07
Education 1 (Standard deviation)	0.24 (0.02)	0.22 (0.06)	0.30 (0.05)	0.13 (0.04)	0.05 (0.05)	6.38*
Education 2 (Standard deviation)	0.73 (0.02)	0.75 (0.07)	0.66 (0.05)	0.82 (0.05)	0.84 (0.13)	4.46
Education 3 (Standard deviation)	0.03 (0.01)	0.03 (0.03)	0.05 (0.02)	0.05 (0.03)	0.12 (0.11)	2.71
<i>Household characteristics</i>						
Gender Head (Standard deviation)	0.03 (0.01)	0.09 (0.04)	0.13 (0.04)	0.08 (0.04)	0.15 (0.12)	33.02**
Age Head (Standard deviation)	51.03 (0.69)	42.73 (2.24)	49.07 (1.49)	48.56 (2.07)	43.58 (3.35)	1.00
Education head 1 (Standard deviation)	0.46 (0.04)	0.30 (0.11)	0.39 (0.06)	0.43 (0.09)	0.41 (0.11)	6.01
Education head 2 (Standard deviation)	0.53 (0.04)	0.69 (0.11)	0.57 (0.06)	0.52 (0.09)	0.59 (0.11)	5.26
Education head 3 (Standard deviation)	0.01 (0.01)	0.01 (0.02)	0.04 (0.03)	0.05 (0.03)	0.00 (0.00)	7.98
Household size (Standard deviation)	8.12 (0.211)	7.67 (1.33)	7.10 (0.43)	7.59 (0.88)	6.90 (0.57)	2.58**
Household size squared (Standard deviation)	74.28 (3.96)	71.85 (24.2)	58.44 (8.37)	69.76 (17.07)	49.87 (7.07)	2.59**
Dependency (Standard deviation)	0.40 (0.01)	0.48 (0.03)	0.43 (0.02)	0.42 (0.04)	0.50 (0.04)	1.25*
<i>Location Characteristics</i>						
Mitch (Standard deviation)	0.41 (0.07)	0.40 (0.09)	0.34 (0.07)	0.43 (0.09)	0.52 (0.24)	0.86

Source: LSMS 2001 ** significant at 0.01 * significant at 0.1, survey corrected except F-statistic

Table 7.12: Multinomial logit model of participation in different RNFSE categories,2001

Activity sector	Production		Commerce		Services		Multiple	
	Coefficient	T	Coefficient	T	Coefficient	T	Coefficient	T
<i>Personal Characteristics</i>								
Head (Standard deviation)	-0.22 (0.60)	-0.37	0.23 (0.48)	0.48	0.39 (0.66)	0.58	-1.72 (1.31)	-1.31
Wealthgroup 2 (Standard deviation)	-1.09 (0.63)	-1.74*	-0.56 (0.36)	-1.57*	-1.1 (0.59)	-1.88*	-0.10 (1.26)	-0.08
Wealthgroup 3 (Standard deviation)	-0.62 (0.43)	-1.44	-0.92 (0.4)	-2.28*	-0.81 (0.58)	-1.4	1.57 (1.1)	1.42
Wealthgroup 4 (Standard deviation)	-1.88 (0.56)	-3.36**	-0.97 (0.36)	-2.69**	-2.2 (0.89)	-2.45*	1.35 (1.15)	1.18
Gender (Standard deviation)	-0.18 (0.64)	-0.28	0.73 (0.43)	1.68*	0.23 (0.81)	0.28	0.26 (0.92)	0.28
Age (Standard deviation)	0.26 (0.08)	3.35**	0.21 (0.06)	3.47**	0.21 (0.09)	2.35**	0.27 (0.19)	1.46
Age squared (Standard deviation)	0.00 (0.00)	-2.9**	0.00 (0.00)	-3.11**	0.00 (0.00)	-1.83*	0.00 (0.00)	-1.02
Literate (Standard deviation)	-1.26 (0.37)	-3.43**	0.04 (0.53)	0.07	-0.33 (0.54)	-0.6	3.48 (0.83)	4.18**
Education 2 (Standard deviation)	1.64 (0.29)	5.6**	0.15 (0.45)	0.34	2 (0.75)	2.66**	0.92 (1.17)	0.79
Education 3 (Standard deviation)	1.91 (0.95)	2.01*	-0.15 (0.51)	-0.29	1.53 (0.86)	1.78*	4.13 (1.73)	2.39*
<i>Household characteristics</i>								
Gender Head (Standard deviation)	0.74 (0.73)	1.01	0.49 (0.68)	0.72	0.31 (1.17)	0.26	3.12 (1.49)	2.1*
Age Head (Standard deviation)	-0.05 (0.03)	-1.48*	0 (0.01)	0.37	-0.01 (0.02)	-0.52	-0.09 (0.03)	-2.68**
Education head 2 (Standard deviation)	-0.019 (0.74)	-0.03	-0.09 (0.26)	-0.36	-0.98 (0.49)	-1.96*	-1.59 (0.62)	-2.57**
Education head 3 (Standard deviation)	-1.13 (1.45)	-0.78	0.58 (0.69)	0.84	-0.04 (0.54)	-0.08	-43.1 (1.94)	-22.15**
Household size (Standard deviation)	-0.63 (0.23)	-2.73**	-0.24 (0.26)	-0.94	-0.46 (0.2)	-2.27*	2.41 (2.68)	0.9
Household size squared (Standard deviation)	0.04 (0.01)	4.04**	0.01 (0.02)	0.45	0.024 (0.01)	1.88*	-0.17 (0.17)	-0.99
Dependency (Standard deviation)	0.72 (2.26)	0.32	0.66 (0.88)	0.75	-0.19 (0.93)	-0.2	1.54 (1.31)	1.17
<i>Location Characteristics</i>								
Mitch (Standard deviation)	-0.01 (0.5)	-0.02	-0.22 (0.3)	-0.73	0.06 (0.42)	0.13	0.57 (1.06)	0.53
constant	-3.55 (2.26)	-1.57	-5.8 (1.34)	-4.32	-5.23 (1.91)	-2.73	-20.22 (12.74)	-1.59

Source: LSMS 2001, survey corrected, ***significant at 0.01, ** significant at 0.1

The descriptive statistics in paragraph 7.1 did not show a relation between wealth and participation of a household. However the multinomial logit model does show influence of wealth on an individuals' participation. When the household of an individual belonged to the second or the fourth wealthgroup the chance that he or she participated in one RNFSE activity was lower compared to an individual belonging to the first wealthgroup. For the individuals of the third wealthgroup this only applied with regard to the commercial activity category.

Being a woman significantly contributed to the chance of participating in the commerce category. And when its household was female headed the chances that an individual engaged in multiple activities were higher than when the household was male headed.

The older the individual is, the bigger the chance he participates in one RNFSE- activity compared to no activities. Nevertheless the age of the household head has a negative effect on participation of the individual in the production and in the multiple activities category.

Being literate had a negative influence on participation in production activities compared to being illiterate, and a positive influence on participation in multiple activities. Having completed education level 2, increased the chance of participation of an individual in production and service activities compared to having not completed any education. Having completed education level 3 increased the chance of participating in production, service and multiple activities even more. In contrast to the positive influence of education level of the individual on participation, the education level of the household head negatively influenced an individuals' participation. When the household head completed education level 2, compared to no education, the chances of an individuals participation in service and multiple activities decreased. Compared to level 2 the chance of participation in multiple activities decreased even more when the household head completed education level 3.

The bigger the household the smaller the chance that an individual participated in production and service activities compared to participating in no-RNFSE activities.

8 Location and RNFSE

The assets a household owns, the livelihood strategies it chooses and the households well-being are all influenced by the context the household lives in (Berdegue, Ramirez, Reardon and Escobar 2001, Lanjouw 2001, Reardon, Berdegue and Escobar 2001, Ruben and Van den Berg 2001). In the data analysis I investigated only one factor of influence on the context the research population lived in: namely hurricane Mitch. The analysis didn't show any influence of this factor on the activities engaged in and the amount of capital assigned to them. In this section I try to capture the location factors that limit the development of RNFSE activities. First the case study area, the department of Chinandega, is introduced. After that I present the results of the SWOT-analyses.

8.1 Introduction to Chinandega

Chinandega is the most northern department of the Pacific. The department has a tropical savannah climate but possesses of a lot of micro climates. There are two seasons: a raining and a dry season and the yearly average temperature is 28 degrees. A diverse geomorphology ranges from mountainous in the north (the six northern provinces are in speaking mouth referred to as: 'the north') to a volcanic chain and fertile flat grounds in the west and south. Figure 8.1 shows Chinandega ordered per municipality.



Figure 8.1: Map of Chinandega
Source: MAGFOR rural atlas, 2002

The department has thirteen municipalities and a population of 378.970. It has a territory of 4822 km². Since 1995 urbanization increased with 1.7% (2.6% for the pacific lowlands in total). Currently 40.3% of the population is regarded as rural. Table 8.1 shows that the intra municipality differences are big with a minimum of 1% rural population in Corinto and a maximum of 86.7% in San Fransisco (Censo, 2005). The average percentage of analphabetic is 28.9% for rural Chinandega ranging between 19.3% and 34.3% for the different municipalities. Between 20 and 30% of the population did not get any education. 30% finished primary school, about 10% did enjoy the first three years of high school and only 3 % to 7% completed high school (Censo, 2005).

Table 8.1: Rural population, 2005

	Rural
Total Department	40.3%
San Pedro	86.2%
San Francisco	86.7%
Cinco Pinos	82.4%
San Thomas	82.7%
El Viejo	49.0%
Puerto Morazon	55.4%
Somotillo	54.2%
Villa Nueva	70.1%
Chinandega	21.5%
El Realajo	55.3%
Corinto	1.0%
Chichigalpa	23.5%
Posoltega	65.9%

Source: Censo 2005

Chinandega is situated in the economic strongest region of Nicaragua. Although there is a lot of interdepartmental difference, Chinandega deals with the lowest percentage of poverty in Nicaragua. Close to the capital and the Honduran borders, the department is situated strategically and therefore regarded as having a high development potential in the governmental development plans 2006-2015 (PDD, 2006). The actual economy is mainly based on agropecuario activities (44% of the farmers is dedicated to only agriculture, 6% to only animal husbandry and 46% engages in both, CENAGRO III) which can be divided in two sectors: cash crops like sugarcane, banana, peanut, coffee and sesame that are important export products and food crops like corn and to a smaller extend fruits, beans, rice and sorghum. (PDD, 2006) The cash crops are mainly grown in the southern municipalities of the department, where also the big animal husbandry can be found. The northern provinces are characterized by less fertile soils that are farmed by small producers, producing mainly basic grains (86.5% of the farmers produce basic grains). Figure 8.2, indicating the size of the farms, shows that the farms are smallest in the 4 northern provinces, Posoltega and the harbor municipality Corinto (CENAGRO III).

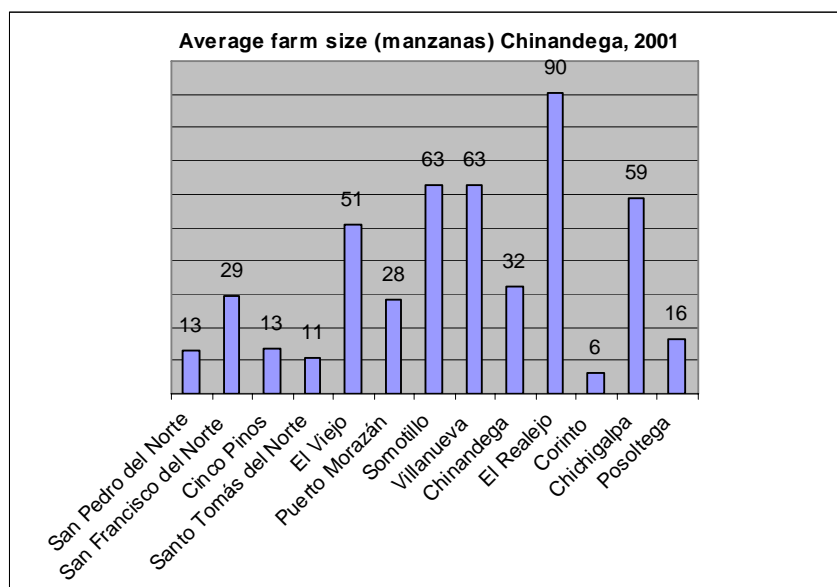


Figure 8.2: Average farm size Chinandega 2001
Source: CENAGRO III

Table 8.2: Soil use, 2001

	Surface (Manzana)	Agriculture	Pastry	Unused lands	Forests	Other
Pais	8935020	16%	48%	19%	14%	4%
Chinandega	455718	31%	42%	9%	9%	7%
San Pedro del Norte	8880.2	37%	40%	14%	4%	6%
San Fransisco del Norte	15334.5	21%	49%	20%	4%	5%
Cinco Pinos	6347.5	37%	33%	17%	6%	6%
Santo Tomás del Norte	4133.8	39%	40%	12%	3%	6%
El Viejo	121459	36%	33%	12%	14%	5%
Puerto Morazán	21031.9	23%	41%	13%	12%	10%
Somotillo	62635	12%	70%	7%	4%	7%
Villanueva	92977.8	12%	67%	11%	4%	6%
Chinandega	67504.1	50%	26%	5%	13%	6%
El Realejo	10119	63%	30%	5%	1%	1%
Corinto	210.1	25%	18%	11%	23%	23%
Chichigalpa	32860.5	62%	4%	3%	8%	21%
Posoltega	12224	57%	17%	6%	7%	13%

Source: CENAGROIII

Chinandega has pine forest areas in the north and tropical forests in the coastal municipalities El Viejo and Chinandega. Although there is a potential for production of tradable wood until now the forests are only exploited illegally (PDM, 2004). Table 8.2 shows the use of soil in 2001. The three coastal municipalities engage in small artesian fishery activities that produce for local markets and companies in Managua. El Viejo and Puerto Morazon have shrimp seed-beds. These are owned by two big enterprises that produce for export and several small cooperatives selling on national markets. According to the PDD (2006) however these cooperatives are not as remunerative as hoped. The coastal municipalities also have protected zones and are assigned a high potential for tourism. Furthermore Chinandega possesses of the primary harbour of Nicaragua: 'El Corinto'. Its high agropecuario potential and the localization of the department made that Chinandega also possesses of an important secondary sector. There is a strong agro-industry with related services and commercial activities that employ many labourers. This secondary sector however is concentrated in the southern municipalities. Tourist potential in the mountainous, volcanic and costal regions is big and under exploited (PDD,2006) Although Chinandega has a strong and diverse economy, the current economic activities are not enough to absorb the total labour force causing a migration stream to Costa Rica, Honduras and the USA.

Table 8.3: Households with migrated members, 2005

San Pedro del Norte	15%
San Francisco del Norte	7%
Cinco Pinos	16%
Santo Tomás del Norte	15%
El Viejo	10%
Puerto Morazán	9%
Somotillo	12%
Villanueva	10%
Chinandega	9%
El Realejo	11%
Corinto	6%
Chichigalpa	10%
Posoltega	10%

Source: Censo 2005

The northern provinces bordering Honduras do have a somewhat higher migration percentage. During the research period popular activities and destinations were construction or factory work in El Salvador, Honduras and Costa Rica for men, mostly in the low-season, and housekeeping in Costa Rica and Spain for women. Some family members migrate for longer periods to the U.S.A (interviews).

The department of Chinandega is provided with infrastructure regarded as 'good'. The Pan-American Highway runs through the department, connecting different municipality cities and Managua. The southern provinces are better equipped than the 4 most northern provinces, which do not have asphalt roads and are difficult to access during the raining season. Transport as well as electricity and water and public services are concentrated around the urban centres. The map and table 8.4, 8.5 and 8.6 give an overview on the current state of sanitary service, access to electricity and water in the rural areas.

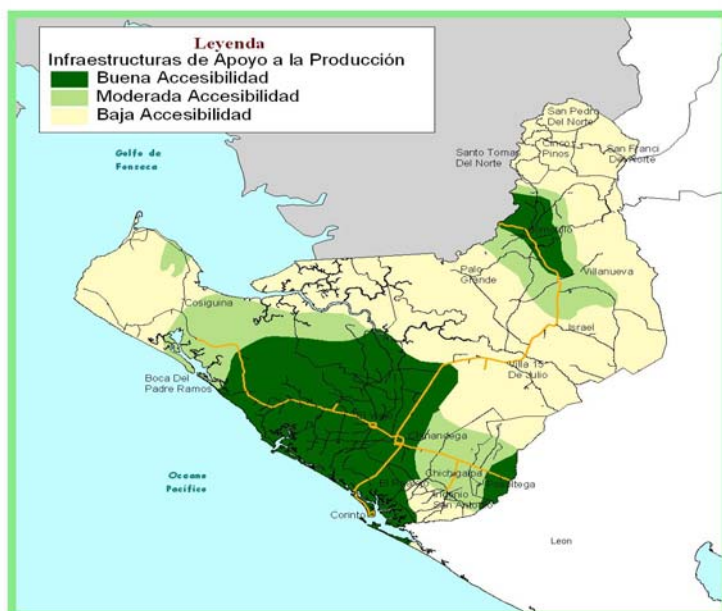


Figure 8.3: Infrastructure Chinandega, 2001
Source: MAGFOR rural atlas, 2002

Table 8.4: Type of sanitary services, rural population, 2005

	Sewer	Septic tank	River/stream	Latrine	No sanitary service
San Pedro	0%	3%	0%	58%	39%
San Francisco	0%	1%	0%	58%	41%
Cinco Pinos	0%	3%	0%	78%	19%
Santo tomas	0%	0%	0%	81%	19%
El Viejo	0%	2%	0%	73%	25%
Puerta Morazan	0%	0%	0%	86%	14%
Somotillo	0%	2%	0%	75%	23%
Villa Nueva	0%	0%	0%	76%	24%
Chinandega	0%	1%	0%	88%	11%
El Realaje	0%	19%	0%	64%	17%
Corinto	0%	4%	0%	44%	52%
Chichigalpa	5%	86%	9%	0%	0%
Posoltega	0%	10%	0%	80%	9%

Source: Censo 2005

Especially the municipalities of Chichigalpa, Cinco Pinos and San Francisco have a high percentage of households without any sanitary services.

Table 8.5: Type of water source rural population, 2005

	Tap in the house	Tap in the living area	Public pump	Small private pump	Small public pump	Small river	Streams	Lorry, vans	Neighbour, other livelihood or enterprise	Other	Ignored
San Pedro	0%	7%	2%	28%	26%	30%	7%	0%	0%	0%	0%
San Francisco	1%	6%	1%	22%	29%	17%	16%	0%	9%	0%	0%
Cinco Pinos	3%	17%	2%	29%	35%	4%	7%	3%	0%	0%	1%
San Tomas	0%	7%	3%	31%	38%	4%	8%	10%	0%	0%	0%
El Viejo	2%	3%	2%	66%	8%	2%	1%	0%	15%	0%	1%
Puerte Morazan	1%	1%	1%	70%	6%	2%	1%	0%	15%	1%	2%
Somotillo	7%	5%	2%	34%	31%	2%	7%	0%	10%	0%	0%
Villa Nueva	3%	11%	3%	42%	22%	3%	5%	0%	11%	0%	0%
Chinandega	16%	26%	4%	37%	7%	1%	0%	0%	8%	1%	1%
El realajo	36%	11%	0%	34%	2%	0%	0%	0%	12%	1%	3%
Corinto	4%	2%	0%	48%	0%	0%	0%	0%	39%	4%	2%
Chichigalpa	22%	27%	4%	36%	4%	0%	0%	0%	7%	0%	0%
Posoltega	28%	24%	5%	27%	3%	1%	0%	0%	9%	2%	0%

Source: Censo 2005

The most important water source in most provinces is the water pump. The province of El Realajo has the highest percentage of households that do have taps in the house. Public pumps are much used in the 6 northern provinces.

Table 8.6: Electricity provision, rural population, 2005

	electricity	generator	sun panel	Battery	gas/kerosene	candle	lamp	others	no electricity	not answered
San Pedro	60%	0%	0%	15%	0%	0%	23%	0%	0%	1%
San Francisco	45%	0%	0%	0%	46%	0%	7%	0%	1%	0%
Cinco Pinos	57%	0%	0%	0%	36%	1%	0%	0%	3%	2%
Santo Tomas	62%	0%	0%	0%	34%	1%	0%	1%	1%	1%
El Viejo	41%	0%	0%	1%	35%	8%	2%	2%	9%	2%
Puerte Morazan	56%	0%	0%	1%	28%	3%	0%	1%	9%	3%
Somotillo	36%	0%	1%	0%	53%	1%	0%	5%	3%	1%
Villa Nueva	31%	0%	10%	0%	47%	3%	0%	3%	4%	1%
Chinandega	68%	0%	0%	0%	16%	7%	0%	0%	6%	1%
El Realajo	73%	0%	0%	0%	11%	7%	0%	1%	4%	4%
Corinto	11%	0%	4%	0%	0%	41%	0%	37%	4%	2%
Chichigalpa	77%	0%	0%	0%	13%	5%	0%	0%	3%	1%
Posoltega	80%	1%	0%	0%	12%	5%	0%	0%	1%	0%

Source: Censo 2005

Provision of electricity is lowest in Somotillo, Villa Nueva and Corinto. The first two make great use of gas and kerosene.

8.2 Results SWOT analyses

Table 8.7: Context factors limiting RNFSE development

	Access to finance	Access to instruction	Low population density	Little money circulation	Primary roads	Secondary roads	Lack of market (information*)
San Pedro del Norte	X	X	X	X		X	X
San Fransisco del Norte	X	X	X	X	X	X	X
San Juan de Cinco Pinos	X	X	X	X		X	X
Villa Nueva	X		X	X		X	X*
El Viejo	X		X	X		X	X*
Chichigalpa		X	X				

Source: Swot Analyses, 2007

Table 8.7 summarizes the local factors that were the principal limitations for development of RNFSE activities in the different municipalities. Some limitations were confronted by all over the department; others were specific for a municipality. A box not showing a cross does not mean that the limitation did not exist for this municipality, just that it was not a mayor constraint. The limitations are interrelated. Bad access to finance for instance limits the circulation of money, and bad infrastructure confines the development of markets.

Most RNFSE activities were located in the urban zones of the municipalities. Secondary roads on average were in bad shape and formed a limitation for RNFSE activities and rural-urban linkages (primary roads are the roads that connect the municipality with other municipalities, secondary roads are the roads within a municipality) .The majority of non-farm activities seen in the rural areas of Chinandega were small selling activities carried out by women. Men engaged in agricultural activities, (temporary) migration and wage-labour. Most participants reported that they had RNFSE activities primarily as a surviving strategy and because of lack of other alternatives. The RNFSE activities were highly determined by their location. They were clustered around places where there was some money circulation for instance schools, bus stops and tourist zones. Selling activities in the better accessible communities were selling more diverse products. The municipalities of Villa Nueva and Chichigalpa are well accessible but they don't have a market which limits development of RNFSE activities also.

In all municipalities handicraft activities had problems with finding markets. Many RNFSE activities were related to agricultural produce which is also influenced by its location: selling of cheese, tortillas, vegetables and fruits took place in the regions that cultivated these products. The northern provinces reported that bad soils cause low agricultural produce. Low agricultural produce together with a lack of markets makes that people live in a subsistence economy in which it is hard to start RNFSE activities. In general there is a shortcoming of technical instruction. Technical instruction could contribute directly as well as indirectly to the development of RNFSE activities. Being able to grow different or more agricultural products would increase income and stimulate money circulation. Demand could increase and stimulate also development of selling- and processing activities.

All municipalities reported the lack of finance and low populated areas with little money circulation as a constraint for the development of RNFSE activities. It is important to realize that the limitations can be caused by different factors. The municipalities of San Pedro, San Fransisco and Cinco Pinos reported that due to isolation they could not access financial services, whereas El Viejo and Villa Nueva reported that due to lack of suitable credit products they could not avail of financial services. Also little money circulation had different causes in the different municipalities. In some municipalities low demand was caused by a small population in others by the lack of alternative work and therefore only seasonal income and demand. Chichigalpa and some regions in El Viejo had access to alternative jobs, which stimulated the circulation of money. However in general the Chinandegean population is too poor and lives too dispersed to stimulate a wide range of RNFSE activities.

9 Conclusions and discussion

This study aimed to provide more insight in the RNFSE sector of the Pacific region of Nicaragua by studying the determinants of participation. A useful approach to study the determinants of participation is an asset-based approach. Asset-based approaches assume that the quantity, quality and productivity of households' or individuals' assets determine the livelihood strategies chosen. The livelihood strategy studied in this thesis was the participation in the RNFSE sector. The assets analysed were agricultural productive assets (land, animals and agricultural equipment), human assets (education, age, householdsize etc.) and location assets. In this chapter I present the findings and conclusions of this study. The research questions were used as guidance throughout the whole thesis and will not be answered separately. After the conclusions I present the caveats and considerations of this research, these could be of use for future research.

9.1 Conclusions

Wealth and participation

In order to analyze the influence of productive assets on participation in the RNFSE-sector I grouped the research population in wealthgroups. In chapter 5 I described these wealthgroups in general and in chapter 7 I made a distinction between participating and non-participating households. The descriptive statistics showed that participating households were on average bigger than non-participating households, with the biggest average householdsize for the highest wealthgroups. The child and elderly dependency ratio was similar for all wealthgroups, indicating that the total labor availability of the highest wealthgroups is higher than for the lower wealthgroups. On average the head of households in the lower wealthgroups was younger and had a higher education level. Households that participated had on average a higher educated and older head compared to non-participating households.

To analyze in which activities the different wealthgroups took part I grouped the RNFSE activities in three categories: namely production, commerce and services. Table 6.2 shows that the commercial sector was most popular in both 1998 and 2001. Most activities in this sector were aimed at selling of food and drinks. With regard to the service sector bars, canteens and washing services were numerous. The descriptive analysis in chapter 7 made clear that there was no relation between the agricultural productive assets a household endowed and the participation in the RNFSE sector. I can conclude that with regard to wealth there were no entry barriers, all wealthgroups had similar participation ratios. Fieldwork confirmed this finding: in rural Nicaragua many small RNFSE activities, for instance selling of fruits and tortilla's, are practiced. Often these activities are related to agricultural produce and easy to engage in. Even after studying the participation in different activity categories, and splitting these categories in high and low capital intensive activities no significant differences between the wealthgroups were found.

Trends, capital and remuneration

There was no significant change in capital owned for RNFSE activities between 1998 and 2001. With regard to trends in participation the RNFSE sector turned out to be a dynamic sector with a high percentage of entering and leaving households between 1998 and 2001 (table.7.4). Also many households that engaged in both years switched between the sectors. Table 6.1 shows that the commercial sector, which was most popular, also appeared to be to be most stable.

Data analysis in chapter 6 was not suitable to analyze the capital requirement and the remuneration of activities. Fieldwork showed that the theoretical assumption that there exists a relation between capital demand and remuneration should be questioned when talking about a rural economy which most often deals with market imperfections. Putting up a capital intensive restaurant in an isolated rural area does not lead to high rewards. Inputs in rural Nicaragua are often expensive compared to the prices of the outputs produced. Activities that require a high capital input but add little value are not remunerative. There are many other factors besides capital input that influence the remuneration, regional factors, like infrastructure and availability of financial services, being a very important example. Professional jobs in Nicaragua often earn little; activities that require education like teacher or doctor are low in returns.

To analyse the effect of a natural disaster on participation in RNFSE activities and the total amount of RNFSE capital owned I investigated the influence of hurricane Mitch. Both, the descriptive as well as

the econometric analyses didn't show a direct effect, neither on participation, nor on RNFSE capital owned.

Determinants of participation

Although descriptive statistics didn't show a relation between a households' wealth and participation, econometric analysis (Table 7.11) showed that wealth was of influence on the participation of the individual: the average participation in the categories 'multiple activities' and 'no RNFSE activities' increased the higher the wealthgroup of the individual. With regard to the activity categories, production, commerce and services there was no clear trend. However for all three holds that average participation was highest in the first wealthgroup and lowest in the fourth. The results of the multinomial logit model confirmed this. When the household of an individual belonged to the second or the fourth wealthgroup, the chance that he or she participated in one RNFSE activity was lower compared to an individual belonging to the first wealthgroup.

Gender of the individual as well as of the household head was an important determinant. Female individuals had a higher chance of participating in commercial activities than males. Experts stated that the traditional activity division between man and women is important in rural Nicaragua and the fieldwork confirmed that most commercial activities were practiced by women. An individual belonging to a female headed household had more chance of participating in multiple activities than an individual belonging to a male-headed household. Both age and education level of the individual increased the chance of participation, whereas the age of the household head had a negative effect with regard to an individuals' participation in production and multiple activities. Household size decreased the chance of participation in production and service activities.

Local factors

Fieldwork showed that activities with regard to basic needs, like selling oil and soap, can be seen everywhere. Activities that deliver more specific and expensive services and goods are often clustered in more populous areas where there is more money circulation. Isolation limits the development of a RNFSE sector, due to high input costs, and low money circulation related with low demand. SWOT-analyses revealed that lack of financial services or appropriate financial products forms a general constraint. The location is very important for the type of activities practiced also: bus stops and schools were popular places for selling of food and drinks. Tourist activities were highly dependent on their location.

9.2 Research considerations

Wealthgroups

Population in this research was grouped in wealth groups. Wealth was based on productive farm assets, which in this study consisted of land, animal and physical assets. Many researches however state that heads of cattle tend to be associated with access to land, and therefore only use land as productive farm asset. Fieldwork showed the importance of patio animal husbandry, which makes that the definition of wealth in this study, stays closer to reality. However a typology based on land only would have provided the possibility to compare the results with other research and datasets.

Furthermore it was chosen to leave out human productive assets (education and experience) as these are hard to measure on the household level. Empirical research however showed that there is an important division in the group of households without productive farm assets, with regard to labour market participation. This division is based on differences in education level (Corral and Reardon, 2001, Davis and Stampini, 2002). Incorporation of human productive assets could have given a more accurate analysis.

Activity sectors

Chapter 6 showed that the RNFSE sector is very broad and heterogeneous. I chose to use a combination of two different typologies to categorize the activities. The first typology grouped the activities in three sectors: services, commerce and production. The second typology made a subdivision in high and low capital intense activities. Fieldwork showed the shortcomings of this typology. The division between the categories of the first typology is often vague (making and selling tortillas). Data analysis showed that it is impossible to relate results with the different activity categories. The sectors are still too broad; services include repairing activities as well washing services (picture 9.1). The second typology categorizes activities based only on the capital owned for

this activity. As it does not take into account the hours spent working in it, it does not say anything about labour productivity and the real capital intensity of an activity. In addition capital intensity does not say anything about well being outcomes, making it impossible to give advice on the type of activities that should be stimulated.

Remuneration

Literature assumes a relation between the capital required for an activity and its remuneration. First of all measuring the capital demand is difficult. The amount of capital spend on an activity is not the same as the amount of capital demanded. Besides that measuring remuneration is hard. Most studies use income as proxy for remuneration, however income of RNFSE activities is highly fluctuating and as the analysis showed the RNFSE sector is very dynamic. Secondly activities can differ in scale which makes it impossible to say something general about an activity, a bakery can be manual as well as high capital intensive. Thirdly the rural economies of Nicaragua deal with imperfect markets. A high percentage of the rural population lives in isolated areas and produces for subsistence. Rural communities deal with low demand and money circulation. Putting up a high capital demanding restaurant in a rural community does not make sense. Capital demand and remuneration therefore can not be related in studies on the RNFE.

Natural Disasters

To study the effect of a natural disaster on participation and capital assigned to the RNFSE sector the analysis was carried out before and after hurricane Mitch, for households that were hit and households that were not. The effects were therefore direct effects. Analysis in chapter 7 however showed that the context is very important for participation and capital assigned to RNFSE activities. The influence of Mitch might have been higher on this context and therefore indirectly on the RNFSE activities, than on participation and capital directly.



Picture 9.1: Selling in de streets and owning a shop: both belong to the category 'commercial activities'

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Experts, SWOT-analyses April-May 2007

San Pedro del Norte:	Oscar Bilches Sanches
San Francisco del Norte:	Mamerto Ordones Amardote
Cinco Pinos:	Christino Macareno
Villa Nueva:	Jose Abran Peranta
El Viejo:	Bertillo Perez Laines
Chinandega:	Mariano Maguna Salsa
Chichigalpa:	Jose Fransisco Hernandez Medrano

Financial Institutions April-May 2007

Caruna
Ceprodel
FDL
FINCA
FUNDESER
INDE
Rabobankfoundations

NGO's April-May 2007

ADECOSI
Asociación de Productoras 'El Ojoche' y/o fondo para el Equilibrio
CHINATLAN
Fuente Verde
Fundacion Leon 2000
LIDER
Plan Internacional
Promujer

Other Experts

UNAG: Jorge Delgado Cruz
Bismarck Caballero
MAGFOR: Edwin Bed

Interviews with referees above can be found in '*Interview report, Chinandega 2007*'

Appendix I

Questionnaire institutions and RNFSE activities, Chinandega

Note: this questionnaire was used as a basis for a semi-structured interview. The interviews did not see or fill in the questionnaire themselves

1 Introduction

I am Ellen Mangnus a student Development Economics in the Netherlands and I am conducting my thesis research here in Chinandega, with the help of UNAG. The topic of my research is 'RNFSE activities in the rural areas'. An RNFSE activity can be any activity, ranging from bakeries to shoemakers, as long as it is self-employed and in the rural areas. The two main questions I would like to focus on during this questionnaire are:

- Who are the people that engage in RNFSE activities?
- Which local factors stimulate or limit the development of RNFSE activities?

Thanks for assisting me

2 The organization/ institution

1 Description of the organization/ institution, its projects, mission and vision

2 To which social group is the organization/institution directed?

3 Why specifically this group?

4 Which area does the work of the organization/institution cover?

5 Is there any specific reason for choice of this area?

3 RNSFE activities in general

1 What are the mayor economic activities in the rural areas in which this organization/institution operates?

2 Now I want to focus on the people that do have RNFSE activities: Who are according to the organisations experience the people that do have RNFSE activities? Could you fill in the table, and when necessary distinguish between the different activity categories? Examples of activities per sector are given on page

Personal characteristics	<u>Services</u>	<u>Production</u>	<u>Commerce</u>
Sex			
Age			
Position within the family			
Education level			
Experience			
Family characteristics			
Wealth			
Family size			
Head of the family (male/female)			

3 In which aspects do the people that participate differ from the people that don't?

4 Based on which motives does a person start with an RNFSE activity?

4 Type of activities

1 Which activities are according to you most remunerative?

2 The persons that engage in these most remunerative activities, on which characteristics do they differ from the ones that have less remunerative activities?

5 Activities related to their local context

1 According to the organizations experience: could you mention me the five most important local factors that limit or stimulate development of RNFSE activities? When necessary the table might be

used. Local factors can climatologic (rain, soil fertility), geographic (vicinity to an urban centre) and technical factors (access to finance, road infrastructure)

	Services	Production	Commerce
<i>Stimulating factors</i>			
1 climatologic			
2 geographic			
3 technical			
<i>Limiting factors</i>			
1 climatologic			
2 geographic			
3 technical			

6 Activity Map

1 Imagine the map of Chinandega with its municipalities. Could you indicate which areas have which economic activities? Why are these activities based in those areas?

7 Natural Disaster

1 Chinandega has a vulnerable climate (volcanoes, earthquakes etc). What are according to you the consequences of natural disasters, like Hurricane Mitch . Does a natural disaster play a role in decisions on starting, continuing or quitting RNFSE activities?

Classification of activities

Services

Services related to agricultural activities
Transport
Renting of buildings and equipment
Social services
Teachers
Washing services

Production

Mineral extraction (independent!)
Food procession (bread, cheese)
Production of clothes, textiles and shoes
Artesian activities
Metalica
Construction activities.

Commercial activities

Sellers of agricultural and livestock products
Sellers in the markets
Groceries or other shops
Repairing vehicles

Appendix II

Description municipalities used for SWOT-analysis

1 San Pedro

Local Situation

San Pedro belongs to the 4 northern and isolated municipalities. The road between the municipality of Cinco Pinos and San Pedro has recently been improved and stimulates the movement of people. The secondary roads however are in very bad condition.

54% of the population uses pumps for water and 30% uses small rivers. With regard to sanitary services: 58% has a latrine and 30% has no sanitary service at all. Electricity provision, due to the dense population is high compared to the departments' average: 60% of the municipality avails of electricity (Censo, 2005). There is a health post in Cinco Pinos and the closest hospital is situated in Somotillo (PDM, 2004)

Economic Activities

The majority of the population is dedicated to agriculture. The farmers mainly are small producers that produce (basic grains) for own use and sell locally or to intermediaries when having more than needed. There are some bigger producers. They sometimes rent land or employ agricultural workers. Migration to other countries forms an important income source. Two groups of migrates can be distinguished, a group that migrates only temporarily to El Salvador or Honduras and a group that migrates for a longer period to the U.S.A or Costa Rica. The latter engage in other activities (they change from agriculture to more remunerative animal husbandry) or go to better places after regressing. The group that migrates temporarily invests in their houses and lands. (UNAG 1)

RNFSE activities

The majority of RNFSE activities in the municipality are located in the city of San Pedro. There are small groceries and some restaurants, which only work with reservations. The rural areas do have some small shops and table sellers; these mainly provide the most basic needs. There are some non-traditional products grown (Ojoche-nut and Noni-fruit) but there is no market for them yet. The border with Honduras does not stimulate development of RNFSE activities as the Honduran bordering area is even poorer (UNAG 1)

Limitations

The interviewees acknowledged different limitations. All agreed that access to finance is a limit for development of RNFSE as well as agricultural activities; there aren't suitable credit products for the type of population of San Pedro. Another limit is the lack of government investment, few is invested in infrastructure, health and administration. There is local demand for vegetables but a lack of technical capitation which causes few people to grow vegetables. Soils are not fertile and not used in the right way.

2 San Fransisco del Norte

Local situation

San Fransisco del Norte is situated in the north of the department and has one city San Fransisco (according to LSMS definitions it should however be regarded as a rural community) and 13 rural communities. The municipality is situated in a mountainous zone and has two rivers. Current infrastructure is in bad shape, rural areas are only reachable by sand roads which are only reachable (PDM, 2004). There is daily public transport from San Fransisco city to Somotillo, Chinandega and Estelli.

The urban zone and some of the rural communities are provided with electricity. About 45% of the municipality has electricity and 46% uses kerosene. 51% of its population has water access by pump, 33% percent extracts water from rivers or streams. There is no waste collection which causes water contamination. Another cause of water contamination is lack of sanitary service: 58% has a latrine, 41% does not have any sanitarian service (Censo, 2005). With regard to education, there are primary schools and one secondary school but there is a shortness of teachers and teaching material. The municipality has a health centre but no hospital or ambulance. Medical service in the communities is rare (PDM, 2004).

Economic Activities

The majority of the population of San Francisco del Norte engages in agricultural or animal husbandry. They grow corn, sorghum, and beans. According to UNAG2 about 70% are small producers (between 1 and 5 manzanas) and 30% medium producers (more than 10 manzanas) Most produce is for own consumption, some is sold to neighbors and the rest is commercialized via intermediates. The medium farmers do have more chance to develop but in general development is generated only by remittances. (Hidden) unemployment is high and migration is an important income source, 7% of the households have members that migrated for some period (Censo, 2005). Honduras and El Salvador are regarded as popular temporal migration destinies and the USA and Spain for longer periods. Remittances are mainly used to improve the houses, the farm or to take a bank account (UNAG 2).

RNFSE activities

The field visit showed that there are some RNFSE activities in the communities; all of them are related to agricultural produce and low in remuneration. In some communities bargaining is still common. The closest market is in Somotillo and rural-urban trade is rare. The urban zone of San Fransisco del Norte does have more RNFSE activities, predominating activities are small artisan industry like bakery, cloths making, tapestry, milling corn and commercials like small restaurants and groceries (PDM, 2004) The activities visited can be divided in two groups: activities which generate the mayor income source and are more remunerative then agriculture, and activities that are practiced for a bit of extra income, because of the lack of other working possibilities. The latter are low in remuneration and without access to finance they are not expected to expand (UNAG 2).

Limitations

The mayor limits to develop RNFSE activities are the road to San Fransisco del Norte and the infrastructure within the municipality. The large absolute and relative distances make farm inputs and other consumer goods expensive. The soils are another limit: produce is low and the soils are deteriorating. Farmers sell their products to intermediaries for low prices. As they only earn money during the harvest and as there is a lack of wage labor there is few circulation of money in the communities, limiting the development the RNFSE activities. This lack of RNFSE activities and infrastructure also prevents micro finance institutions to come to the municipality and make it for the existing RNFSE activities difficult to expand or develop.

3 San Juan de Cinco Pinos

Local situation

The municipality of San Juan de Cinco Pinos consists of 1 urban centre called Cinco Pinos and 13 rural communities. The municipality is situated in a hilly to mountainous area vegetated with pine trees and small valleys used for agriculture and animal husbandry. The soils carry many stones and have a low production capacity. There are a lot of small streams but due to the soils the potential to irrigate is low. With regard to social services; there is a health centre and 2 health posts and primary and secondary schooling (PDM, 2004). 64% of the rural population has access to water by pump. About 78% has a latrine and 19% does not have any sanitary service. About 57% of the municipality has electricity, 36% uses gas or kerosene (Censo, 2005). There is daily public transport to Somotillo, Chinandega, San Pedro and San Francisco, except the road to San Francisco infrastructure to these cities is permanently accessible. There is no inter municipality public transport and during the raining seasons roads to the rural communities are difficult to access. Due to the lack of labor demand there are a lot of men that work temporarily in Chinandega, Somotillo or even El Salvador, 16% of the households have a member that –temporarily- migrated (PDM, 2004, Censo, 2005).

Economic activities

The majority of the population of Cinco Pinos is dedicated to agriculture followed by small animal husbandry. People engage in growing beans, corn, sorghum and in some areas cultivation of sesame is practiced. Most products are for own use and extras are sold to intermediaries. The soils are regarded as unsuitable for agriculture; they have potential for forest growing and are suitable to produce bricks, roof tiles and ceramics. There is no market in the municipality (UNAG 3).

RNFSE activities

In the city of Cinco Pinos there are different RNFSE activities, from an iron shop to a bakery and some restaurants and clothes making. In the communities there is little movement of money and the RNFSE activities mainly are small shops and informal trade of agricultural products, mostly hold by women. There are women groups making artesian but as they don't have an output market the income is minimum.

Limitations

An important limitation for rural development is the soils. For more remunerative products, like vegetables one needs water. Water level is very low and the soils are deteriorating. There is lack of finance with regard to RNFSE activities but also with regard to capacitating farmers to make better use of the soils. There are 2 micro finance institutions but they're not accessible for all persons, the least for the most poor. Rural activities are low in remuneration which limits circulation of money and development RNFSE activities. As Cinco Pinos is the central municipality to go to the 3 other northern provinces it has a strategic position.

4 Villa Nueva

Local situation

Villa Nueva consists of 7 urban communities and 53 rural communities. The municipality can be divided in two parts: a mountainous part with diverse vegetation in the west and an eastern part existing of a low and flat plain. This eastern part represents 60% of the municipality and has animal husbandry activities and growing of corn, sorghum and sesame (UNAG4) Soils is suitable for forest production (MAGFOR, 2003). Especially in Villa Nueva and Somotillo is land very unequal divided. The municipality has a lot of water sources which make that there is potential to irrigate. Thanks to the Pan-American Highway that runs trough the municipality, Villa Nueva is well accessible. Secondary roads however are in minor condition. With regard to services; 31% of the municipality has electricity, 47% uses gas or kerosene for light. 14% has tap water and 64 % uses private as well as public pumps. 76% of the community has latrines; the other 24% does not have sanitary service (Censo, 2005). There is telephone and mobile phone service. Villa Nueva possesses of primary as well as secondary and adult schools. There are different health posts and one health centre (PDM, 2004).

Economic activity

The biggest part of the population is farmer and grows rice, corn, sesame and sorghum. The soils are very fertile and have potential to be used more intensive (MAGFOR). A second important activity is animal husbandry, practised by small as well as big producers. Other primary activities include gold mining and exploiting Jicaro, the last most often practised by people that do not have land. Villa Nueva carries a high industrial potential with regard to processing the primary materials it produces. Until now there are only small industrial family activities like tapestry, clothes making etc. With regard to commercial activities small shops are most popular, followed by small canteens and pharmacies (PDM, 2004)

RNFSE activities

Some bigger communities do have a small bakery, but the main RNFSE activities that can be seen are small shops and selling of tortillas. With regard to small restaurants and canteens: they're not there on regular basis, sometimes women sell nacatamales on Sunday or people sell fried chicken when they slaughter.

Limitations

The interviewed people stated that main limit was lack of market. Villa Neuva has no local market and many goods are bought in Chinandega. There is little movement of rural people that go selling in the city of Villa Nueva. However a bigger problem seems that people don't have market information. There are artesian activities like ceramics, jicaro and making of honey, but people don't know where to sell it. Another limit is the lack of alternative work. There are no commercial and industrial activities that employ people.

5 El Viejo

Local situation

El Viejo has 4 urban communities and 50 rural communities. The municipality has many natural resources which makes the development of a diverse scale of agro ambient and economic activities possible. Soils are regarded as being the countries most fertile ones. The municipality has a flat plain altered with volcanic hills produced by the volcano Cosiguina in the north of El Viejo. The maritime coast with its beaches and protected areas has, although under-exploited, fishing and tourist activities. The municipality has mangrove forests and 3 protected reserves. The water level provides the possibility for irrigation which would improve and increase agricultural production (PDM). The climate is with treat of hurricanes, tsunamis and earthquakes. A highway runs from Chinandega to the north of El Viejo. Although accessible year round the secondary roads are in bad shape (UNAG 5). There are primary, secondary and special schools. There are 2 health centres and 7 health posts. 41% of the houses is provided with electricity and 35% uses gas or kerosene. People have access to water mostly by pumps (74%). With regard to sanitary services; 73% of the population has latrines. 25% does not have any sanitarian service (Censo ,2005). There is telephone service, but the capacity is too low to answer the demand. Waste collection only takes place in the urban communities.

Economic activities

The major activity is agriculture with a variety of products: peanuts, sugarcane, sesame and on a minor scale shrimps for export and soy, corn, sorghum, rice, banana, beans, tomato, melon, yucca and chilli for national markets. Around the protected areas tourism services are provided. The tropical forests could be exploited more to engage in wood trade (MAGFOR, 2003). El Viejo has a strategic position with its northern harbour Potosi, close to El Salvador, an important importer. However this harbour is underexploited. The shrimp seed-beds and big sugarcane and banana producers generate employment like also the free trade zones do. Furthermore there is processing industry for agricultural products, shrimps and construction material. All other industrial activities are regarded as small industry. The coastal zones are characterized by small fisheries and agropecuario activities. The majority of the commercial activities are small shops.

RNFSE activities

RNFSE activities are very few as there is little money circulation or as there are better alternatives: in the off-season both men and women work on the big sugarcane plantations. There are selling activities and small shops in the communities. Furthermore there can be seen RNFSE activities around tourist centres; around a natural spring, on the beaches, by the nature reserves and near the bus stops along the Pan-American Highway. However as tourist potential is under exploited these activities are small.

Limitations

The rural population lives very dispersed and secondary roads are in bad shape. There is a concentration of social services around El Viejo. There is a lack of land to grow. Although there are financers, it is hard for the rural population to access. The north of the municipality is very isolated and has a high underemployment rate.

6 Chichigalpa

Local situation

Chichigalpa can be divided in three zones: 75% of the area belongs to the Pacific plains, 15% has the volcanic hills and 10% is coastal area (PDM, 2004). Two rivers run through the municipality. Chichigalpa, like the other southern municipalities, has the most fertile soils of the country with a high potential for agropecuario activities. There are forests and production of coffee beans in the higher zones of the municipality. With the volcano San Christobal, Chichigalpa possesses a big protected area that carries tourist potential (MAGFOR, 2003). Primary and, due to support from the big enterprises, also many secondary roads are in good condition and there is good connection with Chinandega. With regard to basic services: 86% uses a septic tank for sanitary service. 49% has tap water and 40% uses pump water. Access to electricity is the best of the whole department: 77% avails of electricity (Censo, 2005). Telephone service mainly only exists in the urban areas as the volcanic and hilly areas don't permit telecommunication (PDM, 2004).

Economic activities

The soils are suitable for agricultural activities. Witnessed in each municipality but especially in Chichigalpa the division of land is highly unequal giving opportunities to big producers of export crops. These big producers grow sugarcane, peanuts and sorghum using strategies that deteriorate the soils and pressure water level. The small producers grow basic grains. Currently there is some animal-husbandry and coffee production in the higher zones, According to MAGFOR (2003) they carry an unexploited high potential for wood trade. Agro industry is very important for Chichigalpa's economy : the liquor, sugarcane and shrimp industry bring a lot of employment. The percentage of rural population is very low as the population is clustered around the agro industry zones.

RNFSE activities

As there are few people living in the rural zones, and as everyone makes use of the services in the urban zones, few RNFSE activities can be seen. Access to Chichigalpa is good, so that is where the people buy their needs.

Limitations

The communities are too small to have RNFSE activities. Only small activities related to consumption like selling of daily products. Access to Chichigalpa is good (UNAG 5)