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Continuity and change in rural organisation in Nicaragua:
from cooperative contracts to social capital

Ruerd Ruben, Zvi Lerman and Gustavo Siles

Colophon

NIRP Research for Policy Series

Part 16: Continuity and change in rural organisation in Nicaragua: from cooperative contracts to social capital

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Preface

This publication is based on a study carried out between February 1997 and August 2000 by researchers from Nicaragua, Israel and the Netherlands. It identifies the pros and cons of the participation of rural households in production cooperatives in Nicaragua and their motives for affiliation with various other types of rural organisations, such as secondary service cooperatives, farmers' associations, traders' networks, rural finance institutions, NGOs and development projects. It presents an innovative approach which makes use of the concept of social capital.

The study was funded by the Netherlands-Israel Development Research Programme (NIRP), which aims to encourage development-related research focused on socio-economic and cultural change. Being policy-oriented in nature, NIRP aims to make the results of research accessible to anyone interested in solving the problems under study. The target groups include policy makers, representatives of non-governmental and donor organisations, and the scientific community. With this aim in mind, the Publication Board has launched the NIRP Research for Policy Series as a channel for the publication of "user-friendly" summaries of more than 30 scientific reports.

The Publication Board wishes to thank Akke W. Tick (MA) for editing this booklet. Thanks are also due to Barbara Fasting (MA) for revising the English.

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I. General information

I.1. Framework of the study

Taking into account the high level of market fragmentation in Central American rural economies (Colburn, 1986), agricultural cooperatives historically offered farmers access to land and public goods and services such as credit and extension, as well as a safeguard against co-variate risks. Collective ownership was initially favoured for reasons of rural stability and the effective delivery of public services. The farmers also readily accepted collective ownership and their organisations for the advantages of risk-sharing and for a better negotiating position *vis-à-vis* the government. The newly established agrarian reform cooperatives received broad support from the state, but their internal organisation is still largely based on interactions between farm households (Carter *et al.*, 1993) which sometimes maintain close family ties. Different strategies of engagement with cooperative structures emerged on the basis of various configurations of legal ownership structure, organisational choice (individual or collective land and labour allocation), financial structure (debt finance, co-finance or equity capital), and the provision of services. Certain segments of the rural population prefer completely independent smallholder production, which often includes an important income component from off-farm employment. Others maintain their relationship with the former production cooperatives, though at different levels of collectivisation. Still other farmers are looking for linkages with secondary service cooperatives at the local or regional level, which are promoted by non-governmental organisations (NGOs) or farmers' associations (UNRISD, 1975; Carter, 1987). Moreover, farmers could choose to remain with the cooperative (receiving an ownership certificate) or leave the cooperative, taking with them their individual land title (parcellation). In the latter case, a cooperative relationship based on joint services could be maintained. The selling of titles on the land market was also possible (Ruben and Funez, 1993).

This study examines the dynamics of rural organisation and the emergence of new types of agrarian contracts. It presents an analysis of

different internal and external variables that influence the adjustment of contract choice and the intensity of land, labour and capital use by farm households engaged in different cooperative contracts.

The Nicaraguan situation provides a challenging environment for the analysis of changing patterns of rural organisation. Its institutional environment is quite complex and highly unstable. During the last three decades, the roles and functions performed by state, market and community organisation have been frequently modified. The former Sandinista government (1979-1989) placed great emphasis on the role of state agencies for commerce, credit and extension services, and the land reform programme favoured the establishment of a large number of production and service cooperatives in the agrarian sector. The rural cooperative sector in Nicaragua represented about 21% of agricultural land use, 20% of the rural population and 24.4% of agrarian production in 1989 (San Martin, 1992). Subsequent liberal regimes reduced the agrarian support and delivery services and permitted privatisation of the cooperatives, leading to a strong decline in cooperative membership. By 1999 the size of the rural cooperative sector was reduced to no more than 9% of the land and 8% of the rural population (Masset, 2000). The partial disintegration of the land reform cooperatives gave rise to a number of highly diversified pathways of organisational change.

The general economic stagnation since 1985 has reduced purchasing power and thus the farmers' marketing prospects, while the legal and institutional crisis after 1989 has made access to formal credit far more difficult. The federation of local farmers' organisations (*Federación Nacional de Cooperativas* – FENACOOB), municipalities and NGOs have become increasingly important for technical and economic assistance, especially in the more remote zones. Their specific rules and regulations also shape the procedures for getting access to these services, leading to a wide diversity of facilities for cooperative development.

In this particular context, the relative importance of different types of capital resources (physical, financial, human and social) is subject to profound modifications. While the supply of financial resources received overwhelming emphasis during the Sandinista period, through high public investment rates and the expansion of rural credit at subsidised interest rates, the new regime is increasingly leaving the economic process to market forces. Since the functioning of rural input and commodity markets is highly imperfect, poor farmers are likely to rely more and more on local networks and formal and informal organisations to guarantee access to exchange platforms.

Box 1 Regional characteristics

Region	Characteristics
Occidental region (León, Chinandega)	Agro-export production (coffee, sugar cane, bananas) Large farms and small peasantry
Northern region (Matagalpa, Estelí)	Coffee production, horticulture and basic grains Small and medium-size farms
Interior region (Boaco, Chontales)	Extensive livestock, irrigated rice and migratory agriculture Large <i>haciendas</i> and medium-size farms
Southern region (Masaya, Granada, Carazo)	Intensive arable cropping (horticulture, basic grains, coffee) Small family farms and migratory labour

This study was carried out from February 1997 to August 2000 in four main regions of Nicaragua, which differ in terms of agro-ecological potential, land use and farm size distribution: the occidental departments of León and Chinandega, the northern departments of Matagalpa and Estelí, the departments of Boaco and Chontales in the interior zone, and the southern departments of Masaya, Granada and Carazo (see Box 1).

1.2 Objectives and research questions

The main objective of this study was to identify the pros and cons of the participation of rural households in production cooperatives in Nicaragua and their motives for affiliating themselves with various other types of rural organisations, such as secondary service cooperatives, farmers' associations, traders' networks, rural finance institutions, NGOs and development projects. Specific objectives were:

1. To identify internal and external factors that explain adjustments in cooperative contract choice and changes in cooperative organisation during the last decade.
2. To determine major socio-economic reasons for engaging in cooperative networks amongst individual producers.
3. To identify major causes of income differences between rural households engaged in different types of rural organisations.
4. To disentangle the pros and cons of various alternative types of cooperative networks for small rural producers.

The study is based on two major research questions. First, we wanted to identify factors that influence changes in organisational choice, such as different combinations of household production and involvement in

cooperative activities. Secondly, we focused on organisational and institutional factors that influence the process of income formation, giving special attention to the role of social capital. This includes, for example, access to resources and services, and the rules for efficient and sustainable resource management regimes.

I.3 Hypotheses and methodology

The underlying hypotheses of this study can be summarised under three major headings. First, the current diversity within the Nicaraguan cooperative sector gives rise to a number of specific pathways for cooperative transformation. Disintegration of the cooperative framework could be strongly related to individual characteristics (age, gender and education), patterns of land use and resource allocation (farm size, land quality, livestock and machinery) and internal resource management regimes (discipline and sanctions). Secondly, we assumed that differences in income level and income composition between present and former cooperative members and individual rural farmers were related to the degree of engagement in agricultural and off- and non-farm activities. Cooperative members are more likely to be engaged in wage-earning activities, which contribute to the stabilisation of their income. Finally, it was hypothesised that social capital has become increasingly important in Nicaragua, as a substitute collateral for borrowing by poor households, creating an opportunity to assume joint responsibility for a credit contract, and by contributing indirectly to income generation (Section II.3). Part of this social capital can be considered a result of earlier experiences of farmers' cooperation during the former land reform process.

This study is based on two major analytical procedures:

1. Panel data analysis of cooperative farms for which survey data were already available and supplementary data were collected. This permitted the development of a dynamic typology of cooperatives based on differences in contract choice and resource management regimes, indicating their most likely direction of development, as well as their potential for socio-economic consolidation.
2. Cross-section analysis of a random sample of farm households involved in production and service cooperatives, as well as individual farms for which data were collected by structured questionnaires. Cross-section analysis was used to explain differences in composition and level of income between members of cooperatives and individual farm households.

The field research took place in two phases. In the first phase, data collection relied on survey instruments that focused on the specific production and market conditions in each region, making possible a comparison with the data collected in previous periods. Panel data were derived from a stratified sample developed for earlier regional surveys by the School of Agricultural Economics (ESECA) of the National University of Nicaragua (UNAN) in the departments of León and Chinandega in 1985/86 and repeated in 1988 and 1992.

During the second phase, random sampling took place in four different homogeneous agro-ecological zones where major cropping systems exist. Data for cross-section analysis have been collected by a two-stage (village/farmer) random sampling procedure. The sampling frame for the random selection of villages and farm households is available from MAG (Ministry of Agriculture and Livestock) and FENACOOOP (National Cooperative Federation) listings. Fieldwork concentrated on the semi-arid León-Chinandega region with traditional agro-export crops (cotton and sugar), the semi-humid southern region comprising the Carazo mountains (coffee) and the Masaya-Granada plain area (horticulture crops and rice), the mountainous interior area of Boaco and Chontales (livestock, cereals) and the northern region of Matagalpa-Estelí (coffee). In each of these four macro-regions, a random sample of 200 farm households was taken, including 50 members of production cooperatives, 50 members of service cooperatives, and 100 small and medium-size private farmers. Only small and medium-size producers have been included in the sample, since this is numerically the dominant type of farm in Nicaragua.

Data collection included information regarding land use, factor intensity, capital portfolio, on- and off-farm labour use, access to finance and services, and prices for products and inputs paid at the farm gate. The information was collected by the fieldworkers during a single visit to each sampled farm. The survey instruments also provided comprehensive data on a number of relevant household characteristics, production variables, and external as well as internal characteristics of the cooperative system (see Box 2).

Data collection for the panel analysis was carried out in the summer of 1997 by two Nicaraguan and one Dutch researcher. Fieldwork for the sample review took place in the period January-June 1998 and involved all six senior researchers and ten students from Nicaragua. Two Dutch graduate students assisted in data processing and analysis.

Box 2 Selected variables for field research

A. Household variables

Family size
 Dependency rate
 Age structure
 Education / knowledge / training
 Occupation (on/off-farm)
 Gender
 Housing
 Income sources (farm / non-farm)
 Households assets

B. Production variables

Land ownership
 Farm size
 Farm assets (machinery, equipment)
 Land quality (fertility)
 Cropping and livestock systems
 Input use
 Marketing (outlets)
 Credit use (amount, sources, interest rate)
 Time allocation (own parcel, cooperative, off-farm)

C. External factors

Access to financial services (credit, co-investment)
 Access to technical assistance (state, NGO)
 Market information/knowledge
 Administrative support
 Institutional support

D. Internal organisation

Legal framework
 Age of formation
 Membership composition
 Administrative systems
 Profit redistribution

For data processing we made use of different analytical procedures. First, income functions were estimated for the whole sample, differentiating between sources of income (own farm, collective farm and off-farm) and relating income differences to structural farm household characteristics. This involved an in-depth analysis of various aspects of income formation, farm production and organisation, and systems of resource mobilisation. Second, the sample was used to analyse differences between types of cooperation within each zone. The level of involvement in the cooperative production or services was used as an independent variable that influences household income, taking into account a continuum ranging from parcelled individual to fully collective production. Data on factor allocation (especially on cooperative member and family labour, off-farm employment and the use of wage labour), access to cooperative services (credit, marketing and processing), and management practices (labour supervision, production planning and control, and internal decision-making procedures) were used to distinguish different types of cooperative engagement.

The field data were used to develop a cooperative stratification according to different resource management regimes. To that end, cluster analysis was used to identify groups of households that are similar in major characteristics, using structural parameters (management structure, financial structure and use of services) as major independent variables,

while correcting for more general regional and cropping systems parameters. This analysis permitted us to identify the potential impact of different policy instruments (pricing, titling and management training) on cooperative performance. Subsequent analyses were made to construct an index of social capital based on relationships with state, market and voluntary organisations, and indicating the importance of this factor for farm household expenditures and access to credit. Individual characteristics (education, age, gender and family size) and the availability of physical and social capital were used to explain income variation. These individual and organisational characteristics can be considered as underlying factors that determine access to information and financial services.

The research made use of standard Ordinary Least Squares (OLS) regression techniques to identify factors that determine differences in income level and composition among small and medium-sized individual producers and cooperative members. Factor analysis and other multivariate techniques were applied to assess the reasons and motives for selecting different organisational options. Likelihood analysis was used to detect relevant household characteristics associated with membership in service and/or production cooperatives.

The research team relied on several secondary data sources, such as farm surveys, official documents, statistical documentation (agrarian and cooperative census), bank accounts (lending operations) and cadaster (inscription land titles). The data collected during the field survey refer to factor mobilisation (land, labour and capital use), production techniques, marketing operations, balance sheets (assets and liabilities), practices of internal organisation and management, reliance on services, and access to information. Some relevant aspects of cooperative behaviour were analysed in-depth through case studies. Major issues included: appraisal of co-financing arrangements with private lenders, reasons for land selling by titled farmers, transactions with cooperative membership certificates, and prospects for sustainable land use within cooperatives. Graduate students from Nicaragua, Israel and the Netherlands participated in field research on these issues.

1.4 Theoretical orientation

New Institutional Economics approaches are particularly useful in addressing the dynamics of rural organisations. They provide an interdisciplinary framework to combine concepts derived from economics,

law, organisation theory, political science, sociology and anthropology in an effort to understand the development of social, political, and commercial institutions. They are designed to explain what institutions are, how they arise, what purposes they serve, how they change, and whether – and how – they should be reformed (Klein, 1998). Within this tradition, institutional organisation contributes to a reduction in transaction costs. Since most markets in developing countries are highly complex due to uncertainties, imperfect information and the interdependence of agents, individuals operate under conditions of bounded rationality and opportunism, which generates costs when the market is involved (Williamson, 1985). Therefore, enterprises must constantly compare the costs of using the market with the costs of internal organisation, and the market will be used only when the costs are lower (Saccomandi, 1995). When information is imperfect and information asymmetries prevail among agents, market prices cannot reflect all the dimensions of a transaction, and the price mechanism is therefore not always an adequate coordination mechanism (Douma and Schreuder, 1991). Consequently, farmers may prefer institutional exchange between peers, based on long-term arrangements. Moreover, engagement in contractual relationships may be helpful in controlling the opportunistic behaviour of members who are not willing to comply with the internal regulations (free riding).

The process of land reform (1979-1989) in Nicaragua resulted in the establishment of a large number of agricultural production cooperatives as way for poor farmers to get access to land and credit. Farmers' engagement in cooperative production has traditionally been attributed to motives of income generation and risk sharing. However, several problems of internal organisation and reduced access to state services make farmers reluctant to fully participate in collective resource management. Current policies of market liberalisation, financial reforms and new legislation regarding the ownership status enhance the parcellation of land reform cooperatives. Consequently, a wide range of contract-choice arrangements have emerged, including farmers who maintain membership of production cooperatives, farmers who prefer independent production, and others who seek cooperative arrangements that guarantee access to services. It is important for local support agencies to understand which categories of farm households are likely to opt for each of these strategies, and what the underlying factors are that determine their contract choice. The results can also contribute to the current debate on agrarian transition and rural organisation, enabling the identification of suitable instruments for reinforcing rural organisation.

The potential disadvantages of large-scale, capital-intensive state farms are generally acknowledged (Deininger, 1993), and medium-size agricultural cooperatives that can rely on inter-linkages with subsidiary family plots are considered more efficient. The latter are still a widespread phenomenon in both Central America (Thiesenhusen, 1989) and the former socialist countries (Brooks and Lerman, 1993). However, access to bank credit is substantially reduced, and cooperatives are forced to raise equity or rely on private loans and co-finance arrangements. While the new legal framework emphasises the emission of individual titles or ownership certificates, the farmers face three possible institutional choices:

1. The choice between factor allocation (land, labour, capital) to household parcels or engagement in collective production.
2. The decision to remain a member of the cooperative (with corresponding access to services and information) or to rely on parcellation and become a fully independent farmer.
3. The decision on whether to join a secondary-level service cooperative, involving both members of production cooperatives and individual farmers at the village level.

Previous studies on cooperative adjustment under conditions of economic transition indicate that problems of under-investment, labour shirking, membership desertion and low productivity are challenging cooperative efficiency (see Deininger 1993 for a concise summary). In practice, however, cooperative members are reluctant to complete parcellation and prefer instead to maintain certain risk-sharing opportunities through primary or secondary cooperation (Putterman, 1981; Carter, 1987; Hussi *et al.*, 1993). It has been demonstrated that portfolio management through service cooperatives is not necessarily inferior to that carried out by investor-owned firms (Lerman and Parliament, 1993), while the resource use efficiency of production cooperatives is not necessarily inferior to private-parcel production (Ruben, 1999). This implies that inter-linkages between production and service activities could be beneficial to farm performance and household income. Those inter-linkages are related to specific characteristics of the firm and/or cooperative organisation.

Most research on agrarian cooperatives is related to large-scale (mechanised) farms under specific political regimes. This study focuses on small and medium-sized cooperatives established during land reform under different socio-political conditions, which are subject to a process of institutional change. Contrary to the implications that follow from the theoretical disadvantages of common resource management, these small

and medium-sized cooperatives are reluctant to proceed with full parcellation of land to individuals, and instead maintain a wide variety of inter-linked relationships among members. Considering cooperative organisation as an endogenous aspect permits us to analyse the relevant internal and external factors that determine differences in organisational choice and cooperative performance.

Modern theories of rural organisation (Hoff *et al.*, 1993; Bardhan, 1989; De Janvry *et al.*, 1995) focus on aspects of risk sharing, access to information, and transaction costs to explain the potential advantages of cooperative production and the linkages between cooperation in production and services. Moreover, common property resource management is seen as a possible device to control resource depletion (Bromley, 1992; Wilson and Thompson, 1993). Scientific research is therefore more directed towards a detailed review of resource mobilisation and management regimes, as well as an analysis of reasons and motives for farm households to engage in cooperative exchange. This contributes to the generation of new knowledge and empirical experience in the field of cooperative resource management regimes, applying the insights of institutional economics to the subject of consolidation of land reform enterprises. The scientific interest lies in the creation of innovative academic knowledge of the factors that influence the process of cooperative consolidation in Central American countries.

This study directs specific attention to the concept of social capital. The importance of social organisation for small farmers' livelihood strategies in rural Nicaragua is widely acknowledged (Jonakin, 1992; Carter *et al.*, 1993). Therefore, we need to develop operational methods for the "measurement" of the major dimensions of social capital, based on the social, commercial and institutional relationships that farm households maintain at the community level. The analysis of the importance of social and institutional factors for farm household incomes and access to resources demands a framework that addresses the following main issues: the institutional environment in which farm households operate, the major economic dimensions of social capital, the mechanisms through which social capital influences household incomes, and the additional household characteristics that influence household incomes.

Understanding the economic role of social capital is highly important for both analytical and policy purposes. In an analytical sense, social capital can be considered as the network of relations generated through human interaction, providing vital information on technically and economically optimal production systems. It also refers to the implicit

selection criteria applied by different local institutions for input or service delivery. Social capital is thus expected to reduce information and insurance costs, and lower transaction costs. This, in turn, facilitates market transactions, such as obtaining credit and finding off-farm employment, which could lead to higher incomes. The theoretical research based on the tradition of New Institutional Economics (NIE) can help to reveal these different dimensions of social capital (Picciotto, 1995).

II. Results

An analysis of the field data has allowed us to draw conclusions concerning the adjustments that took place during the period 1989-1997 within the cooperative organisation in the occidental León-Chanandega region. In addition, differences in current performance between cooperatives with various degrees of joint activities have been analysed, with special attention to income levels and the economic role of social capital. Finally, the new role of the cooperative organisation as a buffer against distress sales is analysed; a development which became apparent after hurricane Mitch in October 1998.

II.1 Changes in cooperative organisation

The prime focus of this study was the analysis of medium-term tendencies of rural organisation, in particular adjustments in the degree of cooperation in the areas of production, marketing and service provision. A dataset was compiled with information on cooperatives and households in two different periods (1989 and 1997) from a sample of farmers and firms located in León-Chinandega (occidental region). We analysed the general level of changes that took place within these cooperatives during the previous decade. Table 1 provides an overview of the changes within the cooperative sector of the region, comparing data from 1989 and 1997. The trends of decollectivisation and parcellation are confirmed, particularly among groups that have less availability of machinery and livestock.

The total area and the number of members declined significantly between 1989 and 1997. Former members often took with them a piece of land when they left the cooperative. The share of members with family ties did not increase, and the other cooperatives did not evolve into full family enterprises. The share of founder members increased, which can be explained by the fact that non-founders were often excluded from the initial collective title. Therefore, having no claim to collective land and low claims to other collective resources, non-founder members were the first to

Table 1 Cooperatives in León-Chinandega: resources and membership (1989-1997)^a

Characteristics of the cooperative	1989 (n = 72)		1997 (n = 62)	
	Average	Standard deviation	Average	Standard deviation
Total area (mzs) ^b	481.7	537.4	354.4	407.8
Number of members	18.3	10.4	12.4	6.2
Area per member (mzs)	23.6	18.0	28.0	28.7
Percentage of members related to each other: kinship	58.0	28.0	59.0	33.0
Percentage of male members	92.0	15.0	90.0	15.0
Percentage of founder members	42.0	25.0	56.0	30.0
Number of collective livestock	71.9	113.6	10.5	36.7
Units of collective machinery	8.8	6.6	3.6	5.5
Collective production (share of production)	100.0%		20%	

^a Averages and standard deviations.

^b 1 *manzana* is 0.7 hectares.

leave the cooperative. The drastic decline in collective livestock and collective machinery is in line with the overall tendency of parcellation. Individual ownership of capital goods is increasingly preferred, as it provides independence in decision-making regarding land use, crop choice and labour allocation.

The latter tendency is also illustrated by the fact that in 1997 only 20% of the production cooperatives still in existence were involved in some form of collective production. Compared to 1989, this is a decline of 80%. Production systems changed considerably between 1989 and 1997. The economic decline in the beginning of the 1990s and the changes in relative prices have led to a decrease in the production of commercial crops, mainly cotton. Individual production, hampered by the same problems as collective production, relies on abundant labour and is concentrated on the production of basic grains (mainly maize and, to a lesser extent, sorghum). Other crops and livestock are much less important.

The 62 cooperatives in the 1997 sample have been divided into three groups, based on the existence of collective activities in the cooperative (see Table 2). The three groups are identified as collective, services and disintegration (Vaessen *et al.*, 1999). Thirteen cooperatives maintained collective organisation, 16 changed to a more service-oriented form of

Table 2 Pathways of cooperative change (enterprise characteristics)

	Collective (13 coops; 44 families)	Services (16 coops; 58 families)	Disintegration (33 coops; 114 families)
Advance payments to members (1989)	no: 7.7% yes: 92.3%	no: 20.0% yes: 80.0%	no: 20.0% yes: 80.0%
Application of sanctions (1989)	no: 0% yes: 100%	no: 37.5% yes: 62.5%	no: 30.0% yes: 70.0%
Input provision to members (1989)	no: 92.3% yes: 7.7%	no: 43.8% yes: 56.3%	no: 55.0% yes: 45.0%
Machinery for use by members (1989)	no: 100.0% yes: 0%	no: 43.8% yes: 56.3%	no: 52.5% yes: 47.5%
Individual livestock on joint land(1989)	no: 23.1% yes: 76.9%	no: 31.3% yes: 68.8%	no: 35.0% yes: 65.0%
<i>Production system (1989)</i> (% of land use)			
- Basic grains	30.8%	50.0%	25.0%
- Cotton and other	38.5%	12.5%	7.5%
- Livestock and grains	7.7%	18.8%	27.5%
- Livestock and other	23.1%	18.8%	40.0%
Land sales (1997)	no: 92.3% yes: 7.7%	no: 50.0% yes: 50.0%	no: 36.4% yes: 63.6%
Partial division of collective land (1997)	no: 53.8% yes: 46.2%	no: 0% yes: 100%	no: 6.1% yes: 93.9%
Total division of collective land (1997)	no: 91.7% yes: 8.3%	no: 12.5% yes: 87.5%	no: 18.2% yes: 81.8%
Collective debt (1997)	no: 38.5% yes: 61.5%	no: 81.3% yes: 18.8%	no: 72.5% yes: 27.5%
Off-farm work in dry season (1997)	no: 84.6% yes: 15.4%	no: 56.3% yes: 43.6%	no: 39.4% yes: 60.6%

cooperation, and 33 became fully disintegrated. Group and membership characteristics have been examined in relation to the shifts in contract choice. The classification of the cooperatives in distinct groups and the directions of change towards these groups are referred to as pathways of change, reflecting the differential dynamics of resource-use regimes (see Box 3 for an example). Small households with less land tend to maintain the collective framework as a guarantee for income generation. These poorer households have fewer options for alternative income generation such as

off-farm activities and have little capital resources (cattle, machinery) to start an individual farm. They are highly dependent on advance payments for activities performed on the cooperative land to maintain their food security.

The highest level of collective organisation is maintained in firms involved in agro-industrial production (cotton, sesame and sugar cane) that are characterised by some economies of scale in transport and processing. Disintegration is seen mainly among firms that are more involved in livestock, characterised by a low labour intensity. Intermediate forms of cooperation through service provision tend to be preferred by farmers engaged in basic grain production who need financial and technical support for input purchase, machinery for land preparation and marketing operations.

Various factors related to the internal organisation and certain characteristics of production systems were responsible for the shifts in contract choice. The existence of operational systems for control and sanctions proved to be the most important variable for stable cooperation. These rules included the obligation to deliver labour to the collective land, control of the quality of the labour performance and the right to weekly advance payments. These rules, which reduced free riding, are still maintained effectively in the more collectively organised cooperatives.

Successful cotton-producing cooperatives – many of which belonged to the collective group in 1989 – require a strict organisation of labour. Since they use more machinery and require high labour standards and better labour discipline, they have a higher probability of successful cooperative performance and thus better prospects for the continuance of collective production. This was even the case when cotton was reduced in area and other crops (sesame) took over. Otherwise, the provision of services of the collectives to their members has promoted the development of the individual production and clearly influenced the parcellation and decollectivisation processes within these cooperatives. Making available collective pastures for individual use has had no influence on the direction of change.

Land sales have proved to be a major cause of cooperative disintegration, since some former members who received individual titles preferred to sell their land and migrate to other urban or frontier areas. In the collective group almost no land sales took place, while in the services and disintegration group land was sold in 50% and 64% of the cooperatives,

Box 3 Example from a cooperative: the pathway of consolidation of the San Juan cooperative in El Sauce

The agricultural production cooperative 'San Juan' was founded shortly after the Sandinists took over power in July 1979. The founders had all previously worked as wage labourers at private farms in the village El Sauce (located at 45 km east of León) and took possession of the 145 hectares of land that belonged to a family member of the former dictator. San Juan started with 22 members, most of them close relatives. Only one member was female, the widow of the brother of one of the founders. They initially received a generous loan from the National Development Bank for the purchase of cattle and the payment of salaries (about US\$ 1 day) to the members. For their food production, all families were allowed to use a small parcel of land that was sown with maize, banana and beans.

The first few years, things went fairly well and the cooperative was able to buy more cattle and start some new activities in sesame production. With the support of the Agrarian Reform Agency, statutes and by-laws were agreed that established clear rules for the delivery of labour services by each of the families to the cooperative. A few members who did not comply with these obligations were forced to leave.

From 1986 onwards, the incursion of armed groups of contra soldiers made the area less secure, and in October 1987 all the cattle that belonged to the cooperative were stolen. The bank was willing to offer a settlement for the outstanding debts, and only one member decided to retire from the cooperative in this occasion. The remaining members decided to invest in a more secure activity, and expanded the successful sesame production, which proved to have a stable export market. They even had to call in some outside contract labour for the harvesting activities. Bank credit was now more restricted, but an international NGO provided a cheap loan for the purchase of an old Belarus tractor. Some local labourers asked for cooperative membership, but the old members decided not to accept them, since profits were still small.

In 1990, the new Government offered the cooperative members an individual title on the land. The members had a meeting and decided not to accept this proposal, since they were afraid that they would have to pay for the outstanding debts. In addition, the advantages offered by the cooperative, such as the tractor services and the stable sesame marketing outlets might be lost. They now opted for a legal inscription of the cooperative enterprise and permitted some former soldiers to be integrated as new members.

During the 1990s, the economic affairs of the cooperative gradually improved. With the profits from the sesame production, some new dairy cattle were bought. This enabled the involvement of women in milking activities and the local marketing of milk, butter and cheese. The cooperative offered employment to local landless and poor farmers during certain periods of the year. Some members reduced their agricultural activities within the cooperative (or delegated the work to their sons) and became more involved in the local sesame factory. Others found a job in the regional agrarian development office or started their own retail shop in the township.

The cooperative was able to increase daily salaries to US\$ 2-4 a day and during monthly meetings the members discussed and decided on major investment activities. The remaining surplus from operations has recently been used for the repair of the local clinic and for improvements to the entrance roads to the village.

respectively. The loss of income from collective activities, insufficient income from individual production and the restricted entry to the labour market were motives given by many members for selling their parcels. A clear division of land took place significantly more often in the services

and disintegration group than in the collective group, both for economic reasons and in order to escape from the debt burden.

The division of land, one of the initial steps in the decollectivisation process, has been the engine for many other processes, such as the division and sale of livestock and machinery, and the increased mobility of members. There is also a clear association between collective debt and the continuation of collective production. Collective debts oblige farmers to continue collective production. Cooperatives that used to be involved in commercial cotton production and were affected by declining world market prices in the late 1980s are often faced with debts stemming from this period. In many cases the collective debt was the basic obstacle to the division of the land. In addition, collective members' engagement in off-farm labour is substantially lower when they are assured of internal employment, while in the services and disintegration groups members have to seek employment elsewhere. In other words, members with substantial off-farm employment activities are not willing to sacrifice their off-farm source of income for a labour discipline in a collective production framework with lower expected returns.

In general, three distinct pathways of cooperative change have been identified. The lack of individual resources and/or the presence of a collective debt are sometimes a motive to continue some collective activities. The better-endowed (in terms of land and machinery) and better-organised cooperatives (in terms of sanctioning and supervision systems) have proved to be those most likely to consolidate their collective production activities. They offer the best protection against adverse external conditions and provide a suitable alternative in terms of guaranteed income from collective production, compared to other contractual agreements available to their members, like daily labour or renting land. Cooperatives oriented towards commercial crop production in the 1980s (especially cotton) seem to have an advantage in terms of labour organisation and are thus better protected against risks than livestock-oriented ones. On the other hand, livestock fits in better with personal strategies of accumulation and security, since cattle can be sold to counter income shortages. The provision of productive services (borrowing of machinery, input purchase, and marketing) by the cooperatives to individual members during the 1980s has stimulated individual agricultural production and made the shift towards parcellation much easier. Cooperatives from the disintegration group have already stopped providing services to members, since collective resources are exhausted or fully

distributed among members. Cooperatives belonging to the services group have continued to provide these services to members. The services category can thus be considered either as an intermediate phase towards fully parcelled production, or as a stable type of enterprise that can further improve and enlarge the service network.

Since the legal framework permits a wide variety of organisational options, the cooperatives are often changed from within by their members. They respond quite rationally to the organisation and the external environment. Individual contract choice is directly influenced by members' judgements concerning expected benefits from income risk diversification, based on a variable income from cropping and livestock activities (in some cases reinforced by the access to services) or on a stable (but low) income from collective production activities. The cooperatives in the collective group have been able to maintain a collective organisation with continued prospects and incentives for collective production. Membership turnover has been higher than in the other groups and the free entry of members has prevented a concentration of founder members with superior claims to collective resources.

As a result of disappointing prospects for collective production, businesses in the other two groups have fallen prey to claims on collective resources by members. Founder members, anxious to preserve their accumulated rights, restricted the entry of new members. In addition, they negotiated higher claims to collective resources than non-founders, thus introducing different classes of membership. Different levels of provision of services to members, whether negotiated by the founder members or not, further stimulated existing tendencies towards parcellation and shifts of contract choice towards individual production. Having secured their position within the cooperative, founder members were pioneers in a strategy of individual accumulation of collective resources in order to diversify and improve their agricultural production or to guarantee security or self-financing potential. Less fortunate members within the services and disintegration group were confronted with loss of employment and little opportunities for individual production. This obliged them to perform wage labour or to engage in other agricultural or non-agricultural activities in order to ensure a secure income. In some cases, restricted access to labour markets made it difficult for members to find other income-earning possibilities to compensate for the loss of income from collective activities. To ensure survival, these members often had to sell parts of their individual land.

II.2 Income differences

Taking into account the co-existence of different strategies for institutional choice, this study looked at the relative competitiveness of cooperative producers *vis-à-vis* individual farmers of similar size (farms up to 40 *manzanas* or 28 hectare per family). Differences in labour remuneration, income levels and income composition were compared for three types of households: former members of cooperatives who subdivided their farms; members of production and/or service cooperatives who still maintained some degree of cooperation; and private or individual farmers who had never participated in land reform.

The analysis is based on a survey of income differentiation between farm households related to specific types of social organisations. Data were collected for a stratified sample of farms in the four macro regions described in Section 1.3. A total number of 488 households were interviewed, comprising 176 farmers who divided their farms (parcellation), 165 farmers who were still in some sort of cooperative, and 147 who became private farmers.

Table 3 Levels and composition of income

Income category	Parcellation (n = 176)	Cooperation (n = 165)	Private (n = 147)	Total (n = 488)
Total income (¢) ^a	28.117	25.982	34.561	29.525
Farm arable cropping profit (%)	56	41	30	43
Agricultural wage (%)	14	19	9	14
Non-agricultural wage (%)	12	15	14	14
Livestock (%)	7	16	27	16
Other income (%)	11	9	20	13

^a US\$ 1 = 10.7 ¢ (1998).

There are major income differences between private farmers and former cooperative members who subdivided their farm (parcelled farmers). The farm-level net profits, revenues for family labour engaged in arable cropping activities after payment of variable input costs and hired labour, are much higher (56%) for former cooperative members who subdivided their farm than for private farmers (30%). Private farmers receive a fairly higher income share (27%) from livestock activities, while parcelled farmers get more than half of their income from arable cropping operations on their own farm. An important difference between currently active cooperative members and private farmers is the higher income share that the former receive from agricultural wage labour, both on collectively owned and operated areas and outside the farm.

Household incomes are somewhat lower but also more diversified for families belonging to the cooperatives. This can be attributed to the fact that income from different sources (cropping, livestock, and off-farm) provides them a better safeguard against unexpected shocks. Private farmers have the highest family income and are able to generate a major share of their income from farming activities. Livestock is their major income source, given the limited labour intensity of this type of activity. In addition, they have more capital to start up non-farm activities. Parcelled farmers depend most on cropping activities and supplement their income with temporary wage labour.

In order to gain further insight into the dynamics of income composition between different categories of farmers, an income function has been estimated. This function relates the household income to the rewards from different cropping, livestock and off- or non-farm activities (see Appendix 3 for further details). The family income of cooperative members proved to be closely related to the remuneration rates of farm and off-farm employment and other income sources (remittances). The income of private farmers depends more on revenues from cropping and livestock, while parcelled farmers strongly depend on revenues from cropping activities. Consequently, cooperative members are most sensitive to changes in the farm wage rates, while parcelled farmers are less sensitive to these changes. The cooperative members are also more sensitive to changes in the on-farm wage compared to the agricultural wage rate. On the other hand, private farmers are more sensitive to changes in the on-farm wage in comparison with the non-agricultural wage rate.

Results derived from this income analysis can be used for an appraisal of policy instruments that contribute to the stabilisation of rural farm households. In general terms, income derived from arable cropping activities remains the single most important income source, hence all categories of farmers are likely to react strongly to improved marketing opportunities or more efficient input and credit delivery systems. Cooperative members benefit twice as much from an increase in their farm income than from a similar increase in wage income. This is explained by the fact that they receive a higher remuneration for the farm activities paid on an advance basis by the cooperative firm. Contributions from non-agricultural income sources still remain fairly small and only have a strong positive effect on cooperative farmers, given their better opportunities for off-farm work after having finished their seasonal cropping activities.

Land transfers and membership desertion increasingly challenge the economic stability in the Nicaraguan countryside. Parcellation of cooperative property has enabled some farmers to improve their income position. This is accompanied by a higher concentration on income derived from arable cropping, resulting in substantially lower income elasticity for on-farm labour efforts. The incomes of cooperative members demonstrate a fairly balanced composition and are not significantly lower than those gained by individual farmers with similar resources at their disposal. Poorer farmers therefore are less likely to perceive parcellation as an option for improving economic performance. Deteriorating income levels probably have far more to do with the declining opportunities on the labour market, due to low agrarian investment rates. A preference for reducing coordination costs might be a reason for parcellation as well. Individual private farmers distinguish themselves mainly through higher livestock incomes and less dependency on the labour market. Individual ownership is preferred in this case in order to generate perspectives for a genuine peasant strategy of creating capital and wealth at the farm-household level.

While the relative attractiveness of the cooperative sector for poorer households is acknowledged, some specific reasons for membership desertion and/or selling of cooperative land can be identified. Membership desertion is a typical individual strategy for leaving the cooperative framework which is usually associated with dissatisfaction with internal rules and procedures, unclear definition of membership rights, and incomplete insurance mechanisms (Ruben, 1999). Most members who leave the cooperative organisation continue as independent farmers within the same region. The decision to sell the cooperative can also be seen as a collective strategy related to the possibility of getting access to capital funds that go to the cooperative. This occurs widely in the case of more mature cooperatives with more elderly members that are looking forward to their pension (Ruben and Funez, 1993). The breakdown of the cooperative framework is thus related to the relative success of earlier operations. Finally, external market conditions and institutional support regimes tend to be important for cooperative consolidation. Accumulation usually takes place when access to rural financial markets or off-farm employment is guaranteed. In both cases, funds become available for the purchase of yield-increasing inputs such as fertilisers and improved seed or livestock, giving rise to positive income effects.

II.3 Social capital

In the analysis of the importance of social capital, the role of cooperative experience is seen as a factor which enhances household food security or access to rural financial markets. Therefore, the dataset compiled earlier in the four macro-regions of Nicaragua was used to determine whether farmers who are more involved in social and economic cooperation are actually better off in terms of welfare and borrowing options.

The kind of social and institutional networks the households are involved in affect the way different types of rural organisation take shape. Attention has therefore been given to family and community ties, various types of exchange relations (for input provision and marketing), joint production and service provision, which are all indicators of social capital. This provides an innovative quantitative approach to the analysis of the relative importance of physical and social capital for farmers' access to financial services, and the implications for farm household income.

The empirical analysis addresses the significance of social capital for the welfare of farm households. Attention is given to the direct contribution of social capital to the level of household expenditures and the indirect role of social capital as additional collateral for borrowing. Household expenditures include food, clothes, education, transport, medicines and electricity. The monthly expenditure is quite a reliable indicator for a household's permanent income. Social capital, physical capital and institutional networks are used as major explanatory variables for differences in expenditure, together with relevant individual and household characteristics. Access to credit is not categorised: there is access or there is not. One of the underlying factors of access is the preference of financial agents (banks, money lenders). Again, this depends on relevant household characteristics.

Social and physical capital are both variables that are constructed through factor analysis. This makes it possible to analyse the interrelationships between different variables and to explain their common underlying dimensions. For social capital, the following variables were used in the factor analysis: the number of connections of the household with different institutions (*e.g.* farmers unions, traders, moneylenders, banks and village authorities), the level of participation in cooperative organisations, the number of activities coordinated with other producers (*e.g.* shared input purchase, marketing and joint machinery services) and the percentage of crop output marketed jointly with others. In a similar way, physical capital is approached as an integrated variable that includes the number of capital goods a household owns (tools, tractor, implements

and silos), the number of luxury goods (radio, television, motorbike and vehicle) in a household, the number of large livestock (cows and horses) and the amount of land owned by the household (in *manzanas*). Instead of calculating the precise value of each of these somewhat dissimilar capital goods, we used a composite index for the aggregation of capital stock.

Finally, institutional linkages of farm households with different agents, such as the state, market and voluntary sector, are included. Only a few households maintained substantial connections with the state sector, so that state dependency could not be analysed separately; the only differentiation was between market agencies (traders, moneylenders and shops) and voluntary organisations (NGOs and development projects).

Comparing the relative importance of social, physical and human capital (education) leads to the conclusion that all these factors have a positive and significant impact on household consumption, but that the impact of social capital is by far the most important. Moreover, the older the head of the household, the higher the expenditures are, but this relation declines after a certain age. The relation between household size and expenditure is also positive, so it would appear that additional household members contribute extra income.

Access to credit is analysed by considering the farmers' response to the question of whether they could borrow money if they had to. About one-third of them claimed to have no organisation or person they could borrow money from and they are considered here as being excluded from sources of credit. Social capital contributes to increased access to credit for rural households, while physical capital appears to have a negative effect on the access to credit (see Appendix 3, Table 6). The latter result is surprising since one would expect that as more physical capital becomes available, access to credit will improve because capital serves as collateral for borrowing. A possible explanation can be found in the highly insecure legal environment in Nicaragua, where registration of property rights is deficient and many overlapping claims exist. This situation makes that most physical property (land and houses) is seldom used as collateral for borrowing, since it cannot be sold in case of default. Therefore, the availability of social capital tends to be the preferred collateral, enabling group members to assume joint responsibility for the credit contract.

Distance appears to have a positive impact on the access to credit (see also Appendix 3, Table 6), which can be explained by the fact that most farmers obtain credit through NGOs and rural development projects.

Donors generally assume that these agencies prefer to target more remote households. Access to credit apparently improves when a household maintains more connections with the voluntary sector. No indications were found for an effective gender bias in borrowing. Most NGO programmes give a higher weight to poverty targeting and the existence of social organisations, and tend to disregard the traditional strong male dominance in traditional institutions and remote regions.

The analysis reveals the expected positive effect of social capital on household income and access to credit. While working or doing business with others, new ideas are picked up and information on such subjects as sources of credit and new jobs is obtained or exchanged. As a rule, the overall level of knowledge improves. Improved availability of information permits lower transaction costs, since less effort is required to find the necessary inputs or appropriate market outlets, which, in turn, increases household welfare.

The research approach used here permitted us to gain insight into the organisational factors that influence the access to rural services provided by state, market and voluntary agents, as well as the potential income effects that result from different institutional arrangements. Moreover, the analysis drew attention to the structural and individual characteristics that influence differences in market access and income levels. The procedures for disentangling various dimensions of social capital and specifying the quantitative relationship between socio-economic variables on farm household behaviour have been generally acknowledged by local stakeholders and donor agencies to be a promising approach.

II.4 Land markets

In the final phase of the study, we focused attention on the role of cooperative membership as a strategy for risk reduction. In the case of external shocks, poor farmers might have to sell their land in order to provide for their families. The devastating occurrence of hurricane Mitch in Nicaragua in October 1998 was such an event, and new data became available that made it possible to analyse land sales by cooperative members.

The role of land tenure can be seen as a protective device for the stabilisation of small farmers' income. Making use of a new dataset from the Ministry of Agriculture and Livestock (MAG) and the University of Madison-Wisconsin Land Tenure Centre (LTC), attention was focused on distress sales that occur after extreme shocks (Masset, 2000). In

neighbouring countries (Honduras, El Salvador and Costa Rica), a direct relationship between full tenure rights (titles) and access to credit could not be confirmed, probably because major limitations were already effective on the supply side (Tom, 2001).

Sales of land reform areas in Nicaragua represent about 25% of all land transactions, but total sales represent only a small fraction (2-3%) of all farmland. Land sales occur among both poor and wealthy farmers. In the first case, the sales are mainly a defensive strategy prompted by unexpected income shortfalls (to maintain consumption), while the latter transactions are part of a strategy to increase or intensify agricultural operations. Individual farmers with a low level of income diversification are more frequently forced to sell their land, while land reform beneficiaries receive low but relative stable wages and can still rely on their off-farm income as an alternative income source. Cooperative membership thus offers a kind of insurance against unexpected income shortfalls and the likelihood of land sales for reasons of exogenous shocks tends to be of limited importance.

II.5 Conclusions

The main objective of this study was to identify the dynamics of organisational change and the motives for the participation of rural households in rural cooperatives and for their affiliation with various other types of rural organisations, such as secondary service cooperatives. In addition, attention is given to the role of cooperation in the mobilisation of institutional support from farmers' associations, traders' networks, rural finance institutions, NGOs and development projects. Nicaragua provides an interesting laboratory for such a study, since the country has experienced substantial changes with respect to the political and economic regime, giving rise to increasing uncertainty for rural households. In these circumstances, cooperation is usually considered as a suitable device for risk management. While production cooperatives established under the land reform process of the 1980s have become increasingly unpopular, at the local level other types of more informal and participatory organisation emerged.

Changes in cooperative organisation

Our detailed study of changes in cooperative organisation in the north-western region of Nicaragua during the late 1980s and 1990s reveal wide differences in the pathways of institutional adjustment. Full parcellation of cooperatives usually involves about half of the enterprises that were

initially only marginally incorporated into market production and that provided limited services to their membership. Consequently, members had no good reason to remain within this framework.

However, another share of rural households (25% in our sample) decided to give more priority to joint service provision, such as machinery maintenance and loan provision, which proved to be helpful in reducing transaction costs. The cooperative organisation of services contributed to an improved efficiency on their individual parcels. Finally, a small group of farmers have continued their collective activities, basically because the agro-industrial and commercial orientation of their farming systems (cotton, dairy and sesame) provides advantages for economies of scale and scope. Interestingly, these more stable collectives are characterised by strict rules of discipline and sanctions, and are able to guarantee more permanent employment opportunities to the membership. In practice, these collectives are evolving in the direction of a shareholder firm.

The disintegration of a large number of the agrarian production cooperatives did not cause rural households in Nicaragua to turn their backs on other frameworks of cooperation. The history of land reform left behind an important tradition of rural networks for information sharing and joint planning of activities. This could be materialised into alternative systems of more horizontal cooperation that are extensively used by local NGOs and farmers' organisations such as UNAG and FENACOOP. Characteristics of age, initial founders and kinship have been identified as typical variables that favour local cooperation.

Income differences

Based on the empirical estimates of the income composition and income levels of rural households with different degrees of cooperation, the study demonstrates the importance of a stable wage income derived from labour operations in collective fields. The consolidation of different forms of rural organisation requires thorough attention to the internal organisation of sanctioning and supervision systems, and can be further reinforced through investments in fixed assets and clear prospects of service provision. Improving access to off-farm and non-farm employment opportunities can be considered as a suitable device for reinforcing cooperative performance. Experience with local cooperative organisations can be a suitable substitute for collateral for borrowing. Thanks to the tradition of rural organisation based on the experience drawn from land reform, there is a considerable amount of social capital in the Nicaraguan countryside that is effectively used by local NGOs.

Very little relevant information is available on the contribution of social organisation to the level and composition of household income. Our research made it possible to disentangle the different income shares derived from farm, off-farm and non-farm work for individual farmers and cooperative members. The latter category proved to be far less sensitive to exogenous income shocks and thus able to maintain a more stable – albeit lower – income position. Moreover, cooperative members benefit more from alternative income derived from non-farm activities. Consequently, the engagement of cooperative members in non-farm employment should not be considered as a threat, since it can substantially contribute to reinforcement of cooperative production (probably through higher savings and re-investment mechanisms). Instead of fully leaving the cooperative, individual members can take advantage of seasonal labour opportunities to supplement their income.

Social capital

Rural organisation is generally perceived as an important device for the survival of the poorer households (Putterman, 1981; 1985; Ruben, 1999). Being able to rely on social networks tends to be part of livelihood strategies that also include insurance aspects. In the Nicaraguan conditions of institutional change and market liberalisation, affiliation to local organisational networks has become increasingly important. The role of the organisation encompasses not only the traditional mediating functions, such as improving access to credit or input supply networks, but also provides better access to market information and employment opportunities.

The latter observation brings us to a more thorough analysis of the economic role of rural organisation as an income-generating factor. Recent contributions to the impact and measurement of social capital (Putnam, 1993; Krishna and Uphoff, 1999) provide a useful starting point for this discussion. Although social capital includes a wide number of different dimensions (rules, regulations, norms and values), this study focuses on the variables related to gaining access to and sharing information.

Introducing a composite index of social capital as a factor of production into the analysis of household expenditures and a factor explaining access to rural finance showed that the tradition of and experience with rural organisation is indeed a critical variable (Ruben and van Strien, 2001). This is especially true when other, more formal and legal procedures are operating imperfectly. Under such conditions, local voluntary organisations and development cooperation projects tend to look for other institutional mechanisms to guarantee compliance and reduce strategic default. Given

the strong reduction in state services for enhancing rural development and reducing poverty in the Nicaraguan countryside, the perspective of economic progress based on endogenous networks of popular organisation provides a new challenge to the international community. This means that development programmes should carefully consider the strength and weaknesses of local organisations, and be aware of their role in stimulating particular forms of local organisation. External interventions should be tailored to local experiences of cooperation, recognising the profitability of participatory processes. The analysis of information exchange networks and private supply chains should be in the front line of new development interventions. These approaches may be particularly successful in Nicaragua, since they can build on a long tradition of rural cooperation.

Land markets

Cooperative members experienced less forced selling of land in the case of unexpected income shortfalls, indicating that their low but relatively stable income offered a kind of insurance against shocks. The tradition of cooperative organisation thus offers a useful starting point for rural development programmes. Local voluntary organisations (NGOs) can take advantage of this stability and have already assumed a major role in the Nicaraguan rural development process, especially after the privatisation and decentralisation of former state agencies for rural finance and technical assistance. However, participatory rural development still demands for a substantial shift in emphasis with respect to the organisational concept. The change from vertically imposed forms of cooperation towards bottom-up processes of local organisation is still underway. In practice, primary attention has to be given to the creation of trust relationships and the establishment of mutual control mechanisms designed to reinforce the local democracy. This is not an easy task in a political environment where some of the basic principles of good governance, such as impartiality in legal procedures and a system of public financial accountability, are not always respected.

III. Discussion

III.1 Scientific relevance

Despite the longstanding tradition of regarding the availability of physical resources and financial capital as major factors in improving living standards in developing countries, the importance of capital assets may have been overestimated. The recent discussion on social capital as a driving force in the development process rightly gives renewed attention to the dimensions of social organisation and human interaction.

In economic analyses, institutional factors and organisational features that influence the process of rural income formation and distribution are often neglected. Although the importance of these processes is generally acknowledged in theory, little empirical research has been done devoted to obtaining an adequate quantification of institutional and social variables. It is only recently that some attempts have been made to quantify a number of dimensions of social capital in rural societies (Malucio *et al.*, 1999; Krishna and Uphoff, 1999; Woolcock, 1998; Narayan and Pritchett, 1997).

This study described the importance of social organisation for the livelihood strategies of rural households in Nicaragua. Social capital encompasses the institutions, relationships and norms that shape the quality and quantity of human social interaction. There is increasing evidence that social cohesion is critical if societies are to prosper economically and if development is to be sustainable (Putnam, 1993). This study focused on two typical dimensions of social capital: (i) the role of social capital as a welfare-increasing device (*e.g.* providing insurance and information to reduce uncertainties) and (ii) the importance of social capital as an enforcement mechanism to control default in obligations.

The adjustment of organisational arrangements for resource management appears to take different directions, depending on the individual and household characteristics of members and former members, the strength of their social networks and past experiences with entrepreneurial regimes. A distinction can be made between farm households that remain within the cooperative framework, due to

outstanding debts or the absence of alternative opportunities such as access to land or labour markets; and those families who prefer some level of cooperation as a positive strategy for reducing risks and improving competitiveness. The transition of production cooperatives into service cooperatives took place mainly within enterprises that already had some experience with joint input purchase or traction services. Full parcellation tends to be preferred by farmers with more market-oriented – but extensive – production systems who are better able to supplement their income through partial engagement in the labour market.

The process of change within the cooperative membership that took place during the last decade led to a substantial increase in the amount of arable land available per household. Although no detailed information on land quality was available, this may be one of the reasons why there was no significant difference in average family income between still existent and disintegrated cooperatives. Most variations did occur, however, with respect to the composition of the farm household income.

The analysis of the influence of farmer characteristics on the selection of different institutional arrangements for (non-)cooperation and related differences in income composition, led to a number of conclusions regarding (i) the attractiveness of cooperative membership and (ii) the competitiveness of production and service cooperatives *vis-à-vis* individual farmers. Membership in production cooperatives remains an important option for less-endowed farm households in more remote regions, who are devoted to subsistence crops and have few alternative employment opportunities. Affiliation with service cooperatives takes place when more commercially oriented crops are cultivated on individual parcels, and benefits can be derived from joint input purchase or marketing. Full parcellation occurs mainly when farmers are able to initiate their own accumulation process and can cover production and background risks.

Rural development depends on the presence of adequate local governance structures that enable farm households to participate in exchange. Under the Nicaraguan conditions of economic depression and legal pluralism, institutional relations and informal networks are especially important. Given the highly imperfect conditions of market development in Nicaragua, social networks are especially relevant when it comes to acquiring information on access conditions. Farmers want better information on exchange and access conditions, while institutional agents are interested in reducing risks of default.

The social capital analysis revealed that social capital has a clear positive effect on household income. It also increases the probability that

households can get access to rural finance. The two aspects are mutually reinforcing, since households with better access to credit also had higher average expenditures. Given the particular political and economic situation in the Nicaraguan countryside, the relative importance attached to social capital (compared with physical capital or assets) can be considered as the combined result of prevailing legal uncertainty and missing markets. The reduction in state involvement in the rural development process in Nicaragua has led to a disproportional growth of the voluntary sector (NGOs and regional development projects), especially in more remote areas. There is, however, no way of knowing whether this trend will continue.

The research design displays a clear shift in emphasis compared with earlier studies on cooperative behaviour and performance in Central America (Barham and Childress, 1992; Jonakin, 1992; Carter *et al.*, 1993) that only compared individual and collective production *within* the cooperative system. This study focused on the process of income formation at farm household level, taking into account a wide range of variables that explain commitment to and/or engagement in different types of cooperative structures. Moreover, a comparison of adjustments in contract choice over time was made, permitting the identification of the main factors that influence the process of cooperative integration and disintegration (Melmed-Sanjak, 1987; Meijer, 1989). Finally, considering organisational choice as an endogenous variable subject to household decision-making permits a more dynamic analysis of the heterogeneity of rural organisation, making possible the subsequent appraisal of relevant material and/or behavioural aspects that could contribute to a more balanced policy support for the agrarian cooperative sector.

III.2 Recommendations for further research

Further research on the dynamics of rural organisation and the impact of institutional networks on the transactions on factor markets such as land sales, access to rural finance and engagement in off-farm employment, is considered of fundamental importance to the identification of suitable incentive regimes that could contribute to poverty alleviation and sustainable resource management in rural areas (World Bank, 2002). Major attention should therefore be given to the analysis of the implications of different types of rural organisation for the composition of rural household income, wealth and risk management strategies.

The following initiatives have been taken to address these research topics. First, through the Land Tenure Centre (LTC) of the University of

Wisconsin, Madison, a new database has become available with information on land transactions in Nicaragua. This enabled an initial analysis of the importance of distress sales in relation to farm household wealth (Masset, 2000). Occasionally, small farmers appear to rely solely on land sales as a last-resort effort to maintain consumptive expenditures.

Secondly, in cooperation with the Centre for Rural Development Research (CDR) of the Free University Amsterdam, research has been initiated on the linkages between land use and access to rural financial services (Clercx *et al.*, 2000). Rural finance appears to be a less suitable instrument for directly enhancing more sustainable natural resource management practices, although its indirect impact as a safety net could contribute to a higher willingness to invest. Third, in cooperation with Michigan State University (MSU) an extensive analysis has been made of the relationship between land tenure and engagement in non-farm employment in several Latin-American countries (Ruben and van den Berg, 2001). The major findings indicate that off-farm income is as an important device for reinforcing food security and farming systems intensification.

Further research on these topics can be adequately addressed within the framework of contract choice theory and institutional economics approaches. The importance of rural organisation as a strategy for reducing market imperfections and/or for controlling risks deserves special attention. Since low incomes or limited investments can be the result of both demand and supply constraints, it is considered particularly important to develop analytical procedures that make it possible to disentangle these factors.

On the basis of the results of this study, research cooperation with partners in Latin America will be further intensified and extended to other countries in the region. Issues of poverty alleviation are central to new cooperation with the International Food Policy Research Institute (IFPRI), focusing on the identification of market and institutional factors that contribute to improved food security in the Central American highlands. Aspects of sustainable natural resource management have been addressed in studies on economic and institutional factors influencing input and labour use decisions at the household and village level.

Further research on the role of rural organisation within poverty alleviation strategies should devote more attention to the process of “constructing” social capital, *e.g.* the identification of variables that reinforce the integration of genuine and stable local and supra-local institutions. Therefore, a further examination of critical aspects related to trust-building, negotiation and conflict resolution will be of special

importance. Moreover, specific contributions of social capital to processes of natural resource management (control of environmental degradation) and agri-food chain management (increasing margins and aggregate value) can be incorporated into this analysis.

In analytical terms, social capital can be both a driving force and a result of the development process. Therefore, new procedures should be applied that permit an adequate historical separation of the two aspects. A detailed qualitative analysis of the characteristics of social organisation should be conducted before further meaningful quantitative analyses can be done. Stage regression procedures using instrumental variables may be helpful in arriving at an adequate solution.

III.3 Practical applicability

Rural organisation in Nicaragua has been changed considerably during the past few decades, due to frequent adjustments in the external legal framework and socio-economic production conditions, as well as growing pressure to rearrange internal rights, duties and entitlements.

Modifications in organisational regimes and contract choice can therefore be considered as an endogenous process of institutional re-engineering (Platteau, 1995). From the individual farmers' viewpoint, the attractiveness of cooperative membership is no longer guaranteed through supportive state delivery networks and subsidised financial services, but has to be made effective under competitive market conditions. At the enterprise level, access to factor and commodity markets and the availability of institutional support, as well as jointly supplied services are now considered as major incentives to maintain certain levels of cooperation, although the fully collective framework has been almost universally abandoned.

The policy relevance of detailed research on the determinants and implications of social capital for the farm household economy includes the identification of suitable institutional arrangements that favour rural development and farmers' welfare (Streeck and Schmitter, 1985). When markets are functioning imperfectly and the state then reduces its role in the economic process, voluntary organisations are likely to take over. Participation in local institutional networks becomes part of farmers' survival strategies. Contrary to the top-down approach for establishing rural organisation followed by the former Sandinista leadership, local participation is now becoming an endogenous process. This raises questions on how the "construction" of social capital can be reinforced and how equalising social capital will be at the community level. The latter issue is

related to the spatial and community-level distribution of social capital in comparison with structural variables (location and marketing possibilities) and personal characteristics such as age, gender and education. Contrary to common expectations, local networks have not lost their importance in rural Nicaragua. Cooperative frameworks are still based on horizontal family ties and vertical patron-client relationships that guarantee access to resources, information, finance and markets. The increasingly important role played by informal networks has been noted, due to the contraction of exchange networks caused by a general decline in purchasing power (“thin markets”), legal uncertainty regarding formal property rights on land and housing established in preceding periods (“legal pluralism”). Competing services are provided by a multiplicity of private institutions (“institutional overlap”).

While the number of institutions increased sharply after privatisation, the quality of the services provided is probably substantially reduced. This is particularly true in the financial market, where a great number of private banks, NGOs and local development projects all offer distinctive financial services to rural households (Uphoff, 1993). Given the high level of legal uncertainty, physical collateral requirements cannot be carried out and other types of guarantees become increasingly important.

IV. Recommendations

The recommendations for practical follow-up that arise from this study fall into four groups:

1. Measures for reinforcing and consolidating the cooperative and rural organisation.
2. Initiatives for stimulating rural income diversification.
3. Recognition of the cooperatives as an agent for borrowing.
4. Introducing rural organisation as a major variable in the design of rural development programmes.

IV.1 Consolidation of rural organisations

A wide variety of rural organisations co-exist in the Nicaraguan countryside, with different perspectives for becoming more stable institutions that can contribute to the welfare of their members. The analysis of the various pathways of cooperative change reveals that poor farmers have the fewest options for change and tend to remain within the land reform cooperatives. This segment could benefit substantially from assistance in the management and administration of agrarian enterprises, since clear rules and regulations have proved to be a major factor in their consolidation process.

The segment of rural households that maintain a more flexible relationship through service provision are most in need of support in the areas of marketing and input provision. Market information systems and storage and transport facilities could be a help to increase their land and labour productivity. Joint organisation of commercial activities could be helpful in reducing the marketing costs for this category of farmers.

Farmers who left the cooperative and set up their own business took advantage of land reform and were able to establish a viable family farm. Their major requirements were in the area of technical and financial support in order to maintain land and labour productivity through improved and more sustainable land-use systems. Options for crop diversification, intercropping practices, and fertility enhancement are of major importance

to this segment of the rural population. Their organisational perspectives are clearly centred around extension and technical support services.

IV.2 Options for income diversification

Rural development and poverty alleviation programmes tend to focus on improvements in cropping and livestock activities. In Nicaragua, however, rural households derive a considerable share of their income from wage labour and off-farm activities, as well as from remittances. Therefore, due attention should be given to the role of income diversification as a strategy for achieving socio-economic stability. This is particularly important in areas where natural disasters (earthquakes, hurricanes) can seriously undermine family income.

Cooperative members have a fairly balanced composition of income from farm and off-farm sources and are therefore better able to mitigate shocks. This cooperation provides a kind of insurance which is particularly attractive to poorer households. Introducing more advanced production and processing technologies within the cooperatives would enable them to further increase labour productivity and to intensify their involvement in off-farm activities.

Rural households that own and operate parcelled farms are most vulnerable to income shocks, given the high portion of their income which is derived from cropping activities and the limited availability of livestock. Their income depends to a large extent on market prices for inputs (seeds and fertilisers) and cereals. Offering more protection to this category of households would require efforts to stabilise the markets that are currently outside the focus of national policies.

Individual farmers who receive a higher income share from livestock activities and remittances have limited options for further income diversification. Access to financial services may be seen as a major strategy to reduce risk and could offer certain protection against distress sales.

IV.3 Facilities for cooperative borrowing

Rural finance is one of the major instruments used in rural development programmes in Nicaragua. Access to savings and credit facilities is considered important for reducing poverty and for stimulating sustainable natural resource management practices.

The institutional framework for the delivery of rural financial services has been seriously undermined in Nicaragua. Former state agrarian development banks are closed, private banks consider agricultural lending

too risky, and only NGOs and development projects are still active in the countryside.

The present study has revealed that the tradition of local organisation, based on a long history of sharing resources and knowledge, provides a unique basis for sustainable rural lending operations. Whereas physical collateral for borrowing is largely ineffective, social capital can effectively take over its role as a guarantee. In practice, NGOs and projects can take advantage of the established social networks among rural households for the screening and selection of clients and the distribution of credit.

IV.4 Design of rural development programmes

Nicaragua is a country that receives considerable development assistance from European and North-American donor organisations. Funding is gradually shifting from bilateral contracts to multilateral and non-governmental organisations. Global funding is oriented mainly towards macro-economic stability and sector programmes. A substantial number of NGO development cooperation programmes still focus on rural settings. The effectiveness of rural development programmes in the Nicaraguan countryside is relatively high, thanks to the fact that projects can take advantage of a long tradition of local popular organisation. NGOs tend to target the population in more remote areas making a substantial direct contribution to poverty alleviation.

The design of rural development programmes has to be based on appropriate ways of incorporating local networks into a successful framework of institutional cooperation. Participation of the rural population cannot be seen as a “mechanical” process, but must be based on a participatory approach with the full involvement of local stakeholders. In the conflictive context of Nicaragua, this means that projects should establish platforms for negotiation to discuss and analyse major bottlenecks and prospects for development. This might lead to the emergence of particular interest groups that share common ideas and values and may be seen as nuclei for interventions.

Finally, the recognition of the role of social capital as a starting point for development planning does not imply that all activities can be left to local agents and voluntary organisations. There is a decisive role to be played by the Nicaraguan state in reducing the costs of cooperation. This includes public investments in road and communication infrastructure, clear procedures regarding the recognition of property rights and legal recognition of local platforms as development agents. Such activities could

be part of the policy framework for decentralisation that has been adopted recently in Nicaragua.

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Appendix I

Participating researchers and institutions

The research was undertaken as a collaborative effort on the part of three institutions:

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Dr. Ir. Otto Hospes (agrarian law)

Ir. Jos Vaessen (rural organisation)

Ir. Danielle van Strien (income analysis and social capital)

MSc. Edoardo Masset (land markets)

MSc Willem Treep (income analysis)

MSc. Hans Ton (land titling)

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Valerii Khotemlyanskii (decision-making related to cooperative disintegration)

Appendix II

Follow-up of the project: capacity building and project-related publications

The collaborative research activities substantially contributed to the development of local expertise regarding quantitative methods for the analysis of economic implications of rural organisation in Nicaragua. The local partner ESECA-UNAN has been involved in previous field research on production cooperatives (Siles, 1992; Rodríguez, 1992; Cortez, 1987) within the framework of collaboration with the Land Tenure Centre (University of Wisconsin) and the Ford Foundation. This research focused on cooperative resource use and production systems and did not take into consideration household characteristics and management aspects as variables for organisational choice.

The research programme supported the development of analytical skills and knowledge of appropriate statistical methods to analyse the motives that influence farmers' involvement in cooperatives and the factors that determine cooperative performance. Therefore, staff training was provided on the theoretical framework underlying agrarian contract choice, while technical assistance included the strengthening of data-processing capacity.

Staff training and research activities supplied within the framework of the project will reinforce the institutional linkages with the Ministry of Agriculture and Livestock (MAG) and the Agrarian Reform Institute (INRA). Moreover, the research capacity of the Nicaraguan universities can be mobilised to support consultative services for IBRD, USAID and EU programmes on agrarian reform and land titling. Finally, academic cooperation with Central American institutes has been strengthened through participation in international congresses organised by professional associations.

The results of the research were presented during the CEDLA workshop 'Land in Latin America: new context, new claims, new concepts' (Amsterdam, 26-27 May 1999) and at the XIII ASERCCA Conference on

'Social Organisation and Rural Development in Central America' organised in Brussels on 3-4 December 1999). The programme also hosted a joint research seminar with ESECA (UNAN) and NITLAPAN (UCA) in Nicaragua in November 1999 to discuss the research findings with Central American colleagues.

Publications:

- Khotemlyanskii, V. (2001). 'Staying in a cooperative or farming independently: an individual choice decision for farmers in Nicaragua'. MSc thesis Hebrew University of Jerusalem.
- Masset, E. (2000). 'Land markets and distress sales in Nicaragua'. MSc thesis Wageningen University.
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- Ruben, R. and Strien, D. van (1999). 'Social capital and household income in Nicaragua: the economic role of rural organisation'. Paper presented at the XIII ASERCCA Seminar, Brussels, December 1999. (Spanish version published in H. Clemens and R. Ruben (eds). (1999) *Nueva ruralidad y política agraria: una alternativa neo-institucional para Centroamérica*. Caracas: Nueva Sociedad.
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Papers (in Spanish) presented at the ESECA Seminar in Nicaragua on 18-19 November 1999:

Alemán, M. (UCA Nitlapan) 'Rural financial markets in San Juan, Rio Coco'.

Cortez, O. 'Transfers of land in Nicaragua: buying, selling and leasing'.

Cortez, O. 'Processes of capital accumulation in the peasant economy'.

Davide Parilli, M. (UCA Nitlapan) 'Cities and villages in rural development: a change required'.

D'Excelle, B. (University of Antwerp, Belgium) 'Legal services as a new framework for rural development: a study of legal problems in Matiguas'.

Jarquín Mejía, J. 'Sustainable land use in the co-operative context: differences in cereal yields explained'.

Lopez, M. 'Institutional learning and rural development'.

Mordt, M. (UCA Nitlapan) 'Disputed space: meeting environmental objectives and community needs. A case study of Guatuzus village'.

Rodríguez, L. and Cervantes, M. 'Off-farm employment and agrarian income'.

Rodríguez, L. 'Internal and external relations of the co-operative sector in Nicaragua'.

Rodríguez, L. and Cervantes, M. 'Rationality of production, consumption and exchange amongst organised and not organised farmers.'

Zeledon, M. and Alemán, E. 'The economic role of women in rural organisations'.

Appendix III

Statistical data analysis

Income composition

The dynamics of the income composition between different categories of farmers is estimated by means of the following income function:

$$Y_{total} = a_0 + b_1*W_f + b_2*W_a + b_3*W_n + b_4*Y_l + b_5*Y_o$$

where a_0 is the intercept, W represents different labour reward categories for farm, off-farm agricultural and off-farm non-agricultural activities and Y represents income from livestock activities and other sources. The coefficients in this function can be understood as income elasticities that indicate the proportional effects of a change in a certain income category on the total household income.

Table 4 OLS regression: income elasticities for different farm types

Income category	Parcellation	Cooperation	Private farmers
Constant	19,500**	-2,525	5,284**
On-farm wage (W_f)	76.3**	401.1**	197.9**
Agricultural off-farm wage (W_a)	-283.1	202.0*	98.7
Non-agricultural off-farm wage (W_n)	-23.3	358.0**	31.3
Livestock income (Y_l)	0.92*	1.07**	0.99**
Other income (Y_o)	0.54	1.05**	0.94**
Adjusted R ²	0.54	0.93	0.93
Chow test (F-stat)	72.80	64.40	14.40
Income elasticities			
E_{W_f}	0.26	0.67	0.49
E_{W_a}	-0.06	0.05	0.01
E_{W_n}	-0.01	0.13	0.01

Note: ** significant at 0.05; * significant at 0.10.

Social capital

For the analysis of the impact of social and physical capital and other relevant farm household characteristics, the following expenditure function was estimated:

$$\text{Log (EXP)} = b_1 + b_2 \cdot \text{SC} + b_3 \cdot \text{PC} + b_4 \cdot \text{HS} + b_5 \cdot \text{E} + b_6 \cdot \text{A} + b_7 \cdot \text{A}^2 + b_8 \cdot \text{G} + b_9 \cdot \text{D} + b_{10} \cdot \text{S}$$

where:

- | | |
|-----------------------|--|
| SC = Social capital | G = Sex (0 = male; 1 = female) |
| PC = Physical capital | D = Distance (in km) |
| HS = Household size | S = Sector (0 = voluntary sector;
1 = market) |
| E = Education (years) | A ² = Age squared |
| A = Age (years) | |

To achieve normality the logarithm was taken of the dependent variable. It was not possible to take the log on both sides of the equation due to negative and zero values in some of the independent variables. The usual assumptions for multiple regression techniques hold, e.g. the error terms should have a constant variance for all observations as well as a normal distribution.

Table 5 Expenditure analysis (OLS estimates)

	Log (expenditures)	Significance
Constant	7.295573	***
Social capital	0.238823	***
Physical capital	0.179994	***
Household size	0.093301	***
Education	0.065697	***
Age	0.034586	**
Age-squared	-0.000268	*
Gender	0.069827	
Distance	-0.002166	
Sector	-0.031338	
R-squared	0.400	
Adj. R-squared	0.388	
N	478	

* p < 0,1 ** p < 0,05 *** p < 0,001.

Access to credit

The probability of having access to credit is defined by means of a probit function:

$$Prob.(AC) = c_1 + c_2 \cdot SC + c_3 \cdot PC + c_4 \cdot HS + c_5 \cdot E + c_6 \cdot A + c_7 \cdot G + c_8 \cdot D + c_9 \cdot S$$

In order to achieve normality, the analysis includes 151 households that said they had no access to credit and a random sample of another 151 households taken from the ones that had access to credit. Residuals are normally distributed.

Table 6 Factors influencing access to credit (probit analysis)

	Access to credit (n = 302)	Significance
Constant	1.156925	
Social capital	0.699410	***
Physical capital	-0.161933	*
Household size	0.017031	
Education	0.018772	
Age	-0.042966	
Age-squared	0.000382	
Gender	0.223937	
Distance	0.026720	**
Sector	-0.544963	**
McFadden R-squared	0.203	
% observations predicted correctly	71.52	

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