CHAPTER 3. MATERIALS AND METHODS

This research combines descriptive and analytical quantitative methods applied to large data sets obtained from national surveys of peasant households, small farms and EACs. It also includes a series of qualitative case studies of specific organizations.

It was very important to include quantitative analysis of large data sets. This is because given the current public policy debate in Chile, hard data is needed to establish the magnitude, effects and sustainability of the phenomena under study. After a decade of very large public investments to develop and strengthen EACs, it was simply not enough to ask how things could be done better without first understanding the actual impacts of policies defined 10 years ago. To make a credible argument for the need to improve public policies for EACs, I needed hard evidence to support my arguments. Have the efforts to date had any impact? Are we on the right track? Or do we need to fundamentally revise current strategies because we are not accomplishing what we set out to do?

Once I answered those questions, I could then identify the key factors needed to improve public policies for EACs. To do this I explored several case studies of EACs in great detail, looking at the issues of institutions, social interactions, meanings and perceptions, as well as the links between these factors and the economic performance and sustainability of the EACs.

The main methods used are as follows (all the methods I used are summarized in Table 3.3 at the end of this chapter):

3.1   Describing EACs in Chile (Chapter 4)

Surprisingly, despite investing hundreds of millions of dollars to support them, no-one in Chile could describe an EAC with any degree of precision before this research. My first task was to explore the characteristics of these organizations in Chile, which I had already defined as follows:

> *Legally constituted organizations whose members or owners are exclusively or mainly small farmers and peasants and who control the decision-making process in the organizations; the organizations carry out marketing or value-adding activities directly linked (upstream or downstream) to their members' primary production, and their main purpose is to improve the performance of their members' farms as economic units engaging in market transactions.*

In October 1998 I distributed a questionnaire to all the INDAP local and regional offices, the regional offices of the Solidarity and Social Investment Fund (FOSIS), and to all the rural organizations, NGOs and consulting firms registered in INDAP. The questionnaire went to a total of 1,050 rural organizations that I had identified by name and tax code from INDAP records. The purpose of this questionnaire was to obtain basic descriptive information that would allow me to identify those organizations which met the definition of an EAC. The questionnaire covered such aspects as when the EAC was formed and when it started operating, its size by number of members and gross annual sales, the products and markets it was working with, the services it provided to its members, the types and numbers of paid employees, and so on.

This questionnaire was completed by 407 organizations. I asked the INDAP local and regional offices to review these responses and to correct any mistakes. I also asked them to point out additional organizations missing from the list of 407. Through this process an additional 221 organizations were identified, giving a total of 628 organizations.

I sent a second questionnaire directly to the 628 organizations, asking them to complete, revise or approve the information. With considerable effort I managed a response rate of 85%. This allowed me to remove duplications, as well as organizations that were no longer functioning or that did not meet my definition of an EAC (i.e., they did not have a legal status, or their primary objectives were not of an economic nature). The end product was a list of 424 organizations, crossed-checked twice, which

met my definition of an EAC. Chapter 4 is based on this data set.

That still left 422 organizations out of the initial list of 1,050 that did not respond to either questionnaire. With the help of INDAP staff and contacts in the different regions, I eliminated 68 of these organizations because they seemed to be other forms of rural organizations or associations, such as trade unions, committees, and so on, rather than EACs.

This analysis allowed me to estimate the number of EACs in Chile (778), and to cross-check the representativeness of the sample of 424 EACs for which I did have descriptive information (about 50% of all EACs).

3.2   Description of EAC members (Chapter 5)

In the second semester of 1997 I coordinated a survey of 3000 small farms and households to evaluate the impact of INDAP's Technology Transfer Program (General Survey - see Table 3.3). This was under contract to the Ministries of Economics and of Agriculture, and was done with a team of experts from RIMISP and other organizations. The survey sample is statistically representative of farms smaller than 12 equivalent irrigated hectares[20], in 15 agroecological and agroeconomic zones in five of Chile's administrative regions, which is where 72% of all small farms are located. The same impact study surveyed a sub-sample of 602 of these farms using a larger questionnaire covering detailed farm and off-farm production costs and income (Costs Survey, Table 3.3). These two surveys have yielded the best and most representative recent data set on small farms and households in Chile by far.

One of the sections in the survey allowed me to identify farms and households affiliated to an EAC, and to compare them with a control group comprised of non-members of these organizations. One crucial limitation of my data set is that I do not have information to compare EAC members before and after they joined the organization. For some factors such as size of the farm or education of the household members, this may not be an important consideration, for one can reasonably argue that in a period of five or six years an EAC is highly unlikely to have such a great impact that it could alter these types of variables. But for other variables, such as for example annual income or access to credit, that is not the case, as theoretically participation in an EAC could cause a significant change even in a relatively short period of time.

Therefore, the results of Chapter 5 should be interpreted carefully, resisting the temptation to imply that there is causality between participation in an EAC and a given variable. For example, if we were to observe that EAC members are less poor than non-members, we cannot say whether membership *caused* a reduction in poverty rates, or if the poor were *excluded* from EAC membership.

After a descriptive section in Chapter 5, I analyze the survey data for the effect of different variables on the probability of a small farmer being an EAC member. For this purpose I used a Probit model, where participation in an EAC is the dependent variable, and the independent variables were:

(1) Location, represented by a total of 14 dummy (yes/no) variables for geographic location relative to a 15th site (e.g., does being located in zone Z affect the probability of being an EAC member, relative to being located in zone 15?). In my model, location is a proxy for natural capital and economic environment, and the 15 zones have been defined so that they account both for agroecological and agroeconomic differentiation. Each of the 15 zones is readily recognizable by anyone familiar with the Chilean countryside; they are defined by their specific bio-physical and socio-economic characteristics.

(2) Product orientation, represented by a series of dummy variables that show whether the farmer produces milk, potatoes, wheat or beans; these being the most common crops in small-scale

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[20] An Equivalent Irrigated Hectare (HRB) is a measurement unit defined during the agrarian reform. It uses soil and climate variables to establish a production potential equivalent throughout the country. It is formally defined as the number of hectares needed in each zone to yield the same production as one irrigated hectare in the Maipo river valley. Detailed conversion tables are available for most rural areas in the country. The limit of 12 HRB is the legal ceiling for a farmer to be an INDAP beneficiary. The limit is widely used for broad demarcations of small-scale agriculture in Chile.

agriculture in Chile for which I had sufficient data.

(3) Human capital, represented by variables that measure the age, sex and education of the head of the household, as well as the number of household members.

(4) Physical capital, represented by two variables: total farm size and percentage of the farm with access to irrigation.

(5) Access to agricultural advisory services.

(6) Position of the household relative to the official poverty line, represented by dummy variables that show whether the household is poor or extremely poor.

I tested the auto-correlation between 'access to agricultural services' and each of the different 'product orientations' (e.g., milk producers might get more advice than potato producers), and found that the correlation coefficients were not statistically significant. Using Hausman's test, I analyzed the model for endogeneity[21] for the variables 'access to agricultural services', 'household is poor', and 'household is extremely poor'. All of the variables were shown to be exogenous, that is, uncorrelated with the error term of the model.

In July 1998 I held a three-day workshop for EAC leaders to explore the most significant factors in their decision to set up an EAC. Twenty-seven EACs participated, each represented by one board member. The 27 participants had already been chosen as potential case studies for this research (see Section 3.5.1 in this chapter for a detailed description of the selection method). Participants worked in three groups based on their enterprise: milk, potatoes, fruit and vegetables. All groups were given the same questions for each session; a note-taker recorded the results and conclusions, but was not allowed to join in the discussion. In Chapter 5 I report the results of the session dedicated to the question: *"What were the most important factors that stimulated the formation of the EACs present in this group?"* The participants of each group were asked to identify and list all the factors that they thought were relevant, and then to rank them in order of importance.

3.3   Analysis of impacts on farm and household income (Chapter 6)

I used three sources of information to determine the relationship between EAC participation and members' farm and household income:

(1) During the field work for the case studies (Chapter 8 and Section 3.5.1 below) I surveyed 223 small farmers involved with the 16 case study EACs, and 234 small farmers who live in the neighborhood but who do not work with the EACs (Case Study Survey - see Table 3.3). As part of the survey I asked farmers to identify the costs and benefits of EAC involvement. I have pooled their answers to compare the opinions of EAC members and non-members. I should emphasize, however, that the results from this 'quasi-opinion poll' cannot be extrapolated to any population other than the 457 farmers who were asked the questions.

(2) To test whether participation in an EAC affects members' farms' net margin (operational revenue minus direct and fixed costs), as well as annual household income, I analyzed the data from the two farm and household surveys described in Section 3.2 (General and Costs Surveys) using Heckman's two-stage procedure (Heckman, 1979). Heckman's approach allows the impact of a program to be controlled for the possible effect of selection bias, as I shall explain below.

The conceptual model is as follows: the net profit margin of a small farm, or the annual income of the household, will be affected by the human, financial, physical and natural capital of those households and farms, as well as by participation in an EAC. The hypothesis to be tested is whether the farm's net margin or the annual household income increases with greater access to any of these assets, and with participation in an EAC. These assets are represented in my model by the size of the household and

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[21] One key assumption of valid regression models is that the explanatory variables in the model will vary independently of each other, including the error term. If this assumption is met, it is said that the models fulfill the condition of exogeneity.

the number of its members in the labor force; by the age, gender, and educational level of the household head; by the size of the farm and the proportion under irrigation; by its location in an agroecological region; and by a dummy variable for participation in an EAC.

One way to test this conceptual model would be through a regression model where the dependent variable (the net margin of the farm or the household's annual income) would be explained by the factors mentioned above. However, the conceptual framework (Chapter 2) and findings reported in Chapters 4 and 5 indicated that EAC participation may depend on the specific markets in which the EAC operates (i.e. for milk, potatoes or wheat). Thus, I needed to control for this potential bias and to do this I used Heckman's two-stage procedure. If one has reason to believe, for example, that milk producers' income-generating behavior is fundamentally different from that of wheat producers, then the two sets of households should be modeled separately. However, if one just segregates the two groups and runs regressions separately, there is an implicit selectivity bias (that is, one is not controlling for the conditional probability of a household being included in a particular group). Heckman's two-stage procedure uses a Probit analysis to determine the factors that condition whether a household is in a particular group, say potato producers; the algorithm then calculates, for each household, an observation on a variable called the inverse Mill's ratio (IMR); the observation is the conditional probability of the household being included in the potato-producers group. The second stage is, in our case, the income multiple regression equation, estimated with the Ordinary Least Squares procedure (OLS), only for, for example, the potato-producing households. In that equation, the IMR is included on the right hand side to control for selectivity bias. If the coefficient of the IMR is not significant, this indicates that the selectivity bias is not statistically significant. The second stage also includes EAC membership as an independent variable. This approach ensures that the results for the independent variable 'participation in an EAC' are not confounding effects that in fact are due to the crop or enterprise.

To make sure that participation in an EAC is not endogenous to the farm's net margin or the household's annual income, I also ran a test of endogeneity using Hausman's procedure. This test confirmed that participation in an EAC is exogenous to both the farm's net margin and the household annual income. I could not show income before and after EAC membership because the data come from a cross section survey.

(3) In 1996, the *Universidad Austral de Chile* was contracted by the Ministry of Planning and Cooperation (MIDEPLAN) to survey rural households in 15 areas spread across six regions (V through X) in Chile's interior and coastal dryland zones (MIDEPLAN, 1999). This large area is characterized by much higher poverty levels than other rural areas. Agriculture is facing a sharp decline here due to its dependence on traditional crop and livestock systems which are increasingly unable to compete with imports.

In the year 2000 INDAP contracted RIMISP to conduct a survey of 779 of these households, covering 51 municipalities in five regions (VI through X) (Ramírez et al., 2001). Of the 779 original households, we were able to re-contact 617 (79% of the original MIDEPLAN-*Universidad Austral* sample). Of these, about 60 had such large and inexplicable discrepancies between the 1996 and 2000 data that we removed them from the data set. Thus, we ended up with 555 households with consistent data for 1996 and 2000 (Drylands Panel Survey - see Table 3.3). Of these, 193 were households with access to land (owned, rented, sharecropped, etc.), while the remaining 362 were rural households but not farmers. I have therefore limited my analysis to the 193 small farmer households. Of those 193 households, 76% were not members of an EAC. I use these data to compare EAC members and non-members, in terms of the changes in a number of income variables between 1996 and 2000. This analysis allows to me discuss the impact of EAC membership on household income in poor and marginalized rural regions.

3.4   Economic and financial performance of EACs (Chapter 7)

In early 2000, INDAP contracted RIMISP to conduct an appraisal of the economic and financial status of EACs in Chile. I coordinated this study. I asked the INDAP local and regional offices to supply me

with the balance sheets and income statements of the 1,050 small farmers' organizations that had outstanding loans with INDAP in 1999. We received 543 balance sheets and income statements. According to the information provided by the local and regional officials, the remaining 507 organizations did not maintain such accounts.

I hired a team of six Certified Public Accountants to help me analyze these documents. Of these 543 balance sheets and income statements, 133 were incomplete or had obvious errors and thus were not useful for our analysis. As we did not have the resources to conduct an external audit of each of the remaining 410 reports, we proceeded with our analysis on the assumption that the information they contained was complete and correct. Unfortunately, the conditions under which I obtained authorization to use this information severely restrict how I can use the data; in particular, I cannot use the variables that would have allowed me to cross-reference this data set with that described in Section 3.1 above, matching individual EACs or even to disaggregate the analysis by crop or enterprise to relate it to the analysis on the impact of EACs on farm and household income (Chapter 6).

It is probable that there are biases in the final sample of 410 EACs, but it is not easy to establish with any certainty the direction of the bias. On the one hand, one may think that the EACs that were less successful as business-oriented organizations, would be less willing to make their accounts public. On the other hand, well informed sources at five of 12 INDAP regional offices and 12 of the 100 or so local offices, told me that many of the EACs that do not maintain proper accounting books are among the smallest and most simple in their operations; they do not feel the need to spend scarce resources on paying an accountant to keep their books. According to these sources, one can not conclude that these EACs are less successful than those that do keep proper accounts. Still, as this issue could not be settled, the reader is advised to avoid extrapolating from the results for these 410 EACs.

Fortunately, as I was finishing writing this book, I had access to the results of an in-depth study conducted independently by a consultant firm (FUNDES Chile, 2001). Their study focused on 156 EACs that INDAP considers to be among the most financially exposed. The FUNDES study's methods included a proper audit of the books and accounts of these EACs, as well as an expert assessment of operational and management issues. The FUNDES results can therefore be used to indirectly cross-check my study's results. Their conclusions are more optimistic than mine concerning the economic and financial viability of EACs as business-oriented organizations.

Each of the 410 balance sheets and income statements was processed using standard accounting procedures to calculate the values of the variables required for this analysis. These variables are listed in Table 3.1. Using these variables, three performance indicators were calculated as shown in the last three rows of Table 3.1:

(1) Operational performance: measures whether an EAC is capable of generating sufficient income to cover its expenses.

(2) Financial performance: measures the EAC's degree of indebtedness relative to its assets.

(3) Financial dependence: measures the extent to which an EAC relies on public programs and agencies to generate its income, either through direct transfers, grants or services sold to them.

One should note that I do not propose a threshold level above or below which an EAC should be considered sustainable or unsustainable. However, if an EAC has an income much higher than its expenses, has a low level of indebtedness, and has little or no dependence on public subsidies, common sense dictates that it will be more sustainable in the short run than one which cannot cover its expenses, is highly indebted, and is highly dependent on external grants.

All of the information refers *only* to the EACs' *own* accounts; that is, these accounts do not include the income, expenses, assets or liabilities of the EACs' members. From a legal and managerial point of view, the EAC is a separate entity from its members. It is of course linked functionally to its members through different exchange operations, but this in no way affects the fact that EACs are separate legal and management units from their members' farms and households. Of course, the transactions between an EAC and its members will be reflected in the EAC's accounts; for example, the cost of the products sold by the members to the EAC is reflected in the organization's operating expenses, and the

price charged by the EAC for the services provided to its members constitutes part of its sales revenue.

In addition to this analysis, I was able to obtain official information from INDAP about the amount owed by 1,050 small farmers' organizations (SFO). These SFOs not only include EACs as defined in my study, but also other types of peasant and small farmers' groups and organizations. Since INDAP protected the identity of these 1,050 SFOs, I cannot cross-reference this information with that obtained from the balance sheets and income statements.

Table 3.1 Definitions of economic and financial indicators

Variable	Definition
Current assets	Assets expected to be consumed or converted into cash during the next operating cycle. Include cash, amounts receivable, inventories, etc.
Non-current assets	Assets expected to be consumed or converted into cash after the next operating cycle. Include fixed assets, non-current receivables and long term investments.
Total assets	Current plus non-current assets.
Current liabilities	Funds payable during the next 12 months.
Non-current liabilities	Funds payable after 12 months.
Total liabilities	Current plus non-current liabilities.
Net assets	Total assets minus total liabilities.
Sales revenue	Income from sales of goods and services that constitute the EAC's stock-in-trade.
Revenue from other sources	Income from sales and sources that do not constitute the EAC's stock-in-trade, such as interest.
Total revenue	Sales revenue plus revenue from other sources.
Operating expenses	Expenses incurred in activities that constitute the EAC's stock-in-trade.
Non-operating expenses	Expenses incurred in activities outside the EAC's stock-in-trade, including depreciation, provision for taxes, etc.
Financial costs	Interest expense.
Total expenses	Operating plus non-operating expenses plus financial costs.
Operating income	Sales revenue minus operating expenses.
Income from public sources	Income from public programs and agencies (grants plus sales of services to INDAP programs).
Indicator of operational performance	Total revenue / total expenses.
Indicator of financial performance	Total liabilities / total assets.
Indicator of financial dependence	Income from government programs / total revenue.

3.5   Case studies (Chapter 8)

My case study approach corresponds to what Stake (1994, p. 237) has defined as collective instrumental case studies: *"a particular case is examined to provide an issue or refinement of theory. The case is of secondary interest; it plays a supportive role, facilitating our understanding of something else... with even less interest in one particular case, researchers may study a number of cases jointly in order to inquire into the phenomenon, population or general condition."*

3.5.1   Selection of case studies

I selected the 16 EAC case studies in the following way:

(1) I started with the registry of 424 EACs described in Section 3.1 above.

(2) To reduce field work costs, I excluded EACs in the more remote northern and southern parts of the country.

(3) I also excluded all EACs with fewer than 10 members.

(4) After applying these screening criteria, the database was left with 107 records from which I randomly chose 10 EACs from each of the following product areas: milk, potatoes, fresh market vegetables, and raspberries[22]. This gave me a total of 40 EACs.

I chose milk, potatoes and vegetables because they are the EACs' most common products in Chile. I also included raspberries because they are a new product and the whole chain from production to export is still taking shape. I thought it would enhance the study to observe how EACs fared in this environment of intense change and innovation.

The 40 EACs were invited to a workshop in July 1998, although 13 did not attend since they had decided not to participate in the study. At the workshop I gathered additional information from each of the 27 remaining EACs, and found that seven did not really meet my selection criteria. Of the remaining 20, 16 were happy for me to do the field work.

Table 3.2 describes these 16 case study EACs. In Chapter 8 I discuss the results of 14 of these case studies. I dropped one of them because I could not get reliable information about its financial and economic performance. I decided not to include the second one because it was so different to the other case studies in terms of size and organizational complexity.

3.5.2   Field methods

For each of the 16 case studies, I sent a detailed letter to the formal head of the EAC, the intermediate agencies that worked with them (e.g., an NGO, an extension firm), the head of the local INDAP offices, and representatives from the market agents with whom the EAC interacted (e.g., the buyers of their products). The letter detailed the work involved, the objectives of the study, the type of information required, and my methods. I then phoned each of these people to answer any questions or doubts, and to arrange a date to do the field work.

I conducted the following field activities for each case study:

(1) Individual interviews. For each study I interviewed:

- farmer members on the EAC board (usually two or three)

- farmer members who were not and had never been members of the board (usually three to five)

- local farmers who were not members of the organization (usually two or three)

- hired technical and management staff, if any

- the head of INDAP's local office

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[22] Unfortunately, the opportunity to do the financial and economic analysis of 410 EACs described in Section 3.4, arose when the case studies where almost finished. Otherwise, I would have undoubtedly used the results from that analysis to guide me in the preliminary selection of the potential case studies.

Table 3.2 Description of the 16 case study EACs

Name	Year of birth	Major enterprises	Services provided	Members	Annual sales
Centro de Acopio Lechero Ranchillo	1997	Milk	Milk collection, cold storage, marketing	10	$ 130,000 (1998)
Centro de Acopio Lechero Lo Ovalle	1994	Milk	Milk collection, cold storage, marketing	10	$ 76,000 (1998)
Golden Berries S.A.	1997	Raspberries	Cold storage, quality control, packaging, marketing, technical assistance, input supplies	339	$ 1.5 million (1998)
Cooperativa Campesina El Renacer del Cajón Ltda.	1991	Tomatoes	Marketing, seedling production, accounting, quality control, technical assistance	10	$ 84,000 (1998)
Cooperativa Campesina We Tekucan Ltda	1996	Fresh vegetables	Quality control, marketing, technical assistance, investment projects (drip and sprinkle irrigation)	27	$ 530,000 (1998)
Cooperativa Campesina Intercomunal Peumo Ltda.	1969	Citrus, vegetables, cereal grains	Marketing of products and agricultural inputs, gas station, technical assistance, investment projects	405	$ 4 million (1998)
Central Campesina Talagante	1982	Garlic, raspberries	Technical assistance, marketing (directly for export)	120	Unknown
Agrícola y Comercial Coyam Ltda.	1996	Milk	Milk collection and cold storage, marketing	44	$ 250,000 (1998)
Cooperativa Campesina El Arrayán Ltda.	1995	Milk	Milk collection and cold storage, marketing	74	$ 225,000 (1998)
Agrícola y Comercial Chirre Ltda.	1997	Milk	Milk collection and cold storage, marketing	47	$ 210,000 (1998)
Agrícola Santa Bárbara S.A.	1996	Milk, potatoes	Milk collection, cold storage and marketing (starting a new milk quality control laboratory)	40	$ 140,000 (1998)
Frutas de Guaico S.A.	1997	Raspberries	Storage, processing, marketing, technical assistance	44	$ 600,000 (1998)
Frutas de Romeral S.A.	1995	Raspberries	Storage, processing, marketing, technical assistance	48	$ 1.2 million (1998)
Sociedad Agroindustrial y Comercial Agrocamp S.A.	1995	Potatoes, milk	Technical assistance, marketing of inputs, supplies and products, supermarket	530	$ 1.1 million (1998)
Agrícola y Comercial Carahue Ltda	1997	Potatoes	Marketing	10	$ 8,500 (1998)
Cooperativa Campesina Pullallán Ltda	1996	Potatoes	Marketing, technical assistance	32	$ 17,000 (1998)

- staff from the INDAP office with close working relationships with the particular EAC

- staff from the intermediate agencies (NGO, extension consultant firms) who dealt directly with the EAC, and

- at least one, and often more, purchasing clients.

I personally conducted these interviews following a flexible checklist of open questions and topics, specific to the type of person being interviewed. There were six of these checklists: one for intermediate agency and INDAP staff, one for EAC board members, one for EAC members not on the board, one for non-member farmers, one for market agents, and one for the EAC's technical and management staff. Each interview lasted between 30 and 60 minutes. I conducted a total of 240 individual interviews for the 16 case studies.

(2) Half-day group meetings with the EAC board and with members who were not on the board. I facilitated these meetings, which focused on the salient points of the interviews.

(3) A survey of a random sample of EAC members and a random sample of non-members from the area (Case Study Survey - Table 3.3). The members were picked at random from the EAC membership list. I obtained the information to compile a list of non-member farmers at the end of the individual interviews with the member farmers. In several cases when I was in doubt about the 'representativeness'[23] of the non-members, I checked with some of the other sources (e.g., the local extensionist). My aim was to compile a list of all the small farmers who lived near the members, and to pick a random sample from this list. 'Near' was defined in each case by the people who helped to compile this list, but in general it meant the immediate area where the members lived, usually within a radius of perhaps 1 to 3 km.

I must emphasize that while the sampling method is likely to have resulted in reducing sampling bias, the result is *not* a statistically representative sample of the population of members and non-members of each particular EAC, much less of all EACs within a certain category (e.g., all Milk Collection Centers). Lack of resources meant I could not afford to have statistically representative samples in each case study. And more important than that, the choice of a case study approach meant that I did not have pre-established hypotheses that I wanted to test through statistical analyses. The surveys in this case are only a method of inquiry that helped me understand better and cross-check the information that I was receiving from the in-depth interviews and workshops. This seemed necessary because much of the conversation was focused on issues in which quantities are important. Hence, the interpretation of these quantitative data depends on the qualitative information I received from the persons I talked to, and not on a formal statistical analysis.

The survey included the following sections:

- relationship with the EAC

- household composition and characteristics of the individuals

- access to land and land markets

- access to irrigation

- roads

- farm management practices

- fixed and quasi-fixed capital assets

- animal production

- crop and forestry production

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[23] In the sense that with the information available, I had reason to suspect that these farmers would perhaps not be comparable to those who were EAC members (e.g., their farms were substantially larger or smaller, they were engaged in different crops or enterprises, etc.).

- manufactured and processed goods

- fixed costs

- direct costs for main crops or animal production systems

- access to credit

- access to technical assistance

- participation in organizations and collective action projects

- opinions about costs and benefits of organizations

- multiple choice questions on trust and reciprocity, changes in technology, off-farm and non-farm income and unearned income (i.e., income from social subsidies and remittances).

The survey was conducted by two teams of consultants with more than five years of experience in this type of work. Each team was supervised by a RIMISP staff member. Each household was visited first to agree a convenient time and place for the survey. In each case, we explained that we would like to interview both the head of the household and his/her spouse, although usually only the head of the household was present during the interview. Each questionnaire took about two hours to answer. Each survey form was revised by the field supervisor to try to detect any apparent error before the team left the area; when there were doubts, the household was visited again. A computer program was prepared by a programmer using criteria defined by me, to check most answers for internal and external consistency against a set of rules (e.g., if question A = 102, then question Z cannot be less than 50). A total of 234 non-member and 223 member surveys were retained for data analysis out of 246 and 254 conducted in total.

(1) Analysis of available documentation. In all cases but one (which was subsequently dropped from my analysis), I had access to the EACs' accounting information, such as the balance sheets and the income statements, and, in a few cases, to external audits. In many cases I also obtained copies of reports prepared by consultants, INDAP staff, etc., which often contained useful information.

(2) I also interviewed other people who could provide specific information relevant to the case studies. For example, experts were interviewed about the milk, potato, fresh vegetable and raspberry markets. People knowledgeable about the policies and activities of INDAP in a certain region, or who had an external view of the EACs, were also interviewed.

All the field activities took place in the second semester of 1999 and the first semester of 2000. I analyzed the qualitative and quantitative information between March 2000 and February 2001.

3.6   Summary

For easy reference, Table 3.3 summarizes my research methodology.

Table 3.3 Summary of the methodology

Chapter	Hypothesis/aim	Methods / information source	Sample size
4	To describe EACs and to estimate their number and membership	Two postal questionnaires	Questionnaire 1 was directed at 1050 rural organizations and was completed by 407. Questionnaire 2 was sent out to 628 organizations and was completed by 534. Of those, 424 met the definition of an EAC and the data was used for the analysis in Chapter 4.
5	To describe and compare EAC members and non-members in terms of household and farm characteristics.	Survey of household and farm characteristics (General Survey).	3000 households and farms. Sample is statistically representative of the population of small farms in five regions of Chile (where 72% of all small farms in the country are located)
5	To compare EAC members and non-members' farm net margins and household annual income.	Farm production costs and household income composition survey (Costs Survey).	602 households and farms, sub-sampled from the sample of 3000 households and farms.
5	To identify factors that contribute to a small farmer being an EAC member.	Probit analysis using data from the General and Costs Surveys described above.	471 households and farms with complete information from the general and costs surveys.
5	To identify factors influencing the decision by farmers to set up an EAC.	Three-day workshop with farmers belonging to 27 EACs.	27 farmers from the same number of EACs.
6	To analyze the perception by farmers of the costs and benefits of EAC membership.	Multiple choice questions included in a survey applied to farmers during case studies of 16 EACs (Case Study Survey).	223 small farmers who are members of 16 EACs, and 234 neighboring non-member small farmers (control group).
6	To test whether EAC membership has a statistically significant effect on: (a) a farm's net margin, and, (b) the household's annual income; controlling for the EAC's product orientation.	Heckman's Two-Stage Procedure, using data from the General and Costs Surveys.	298 farms and households with complete information.
6	To test the impact of EAC membership on total household income and its composition by sources of income, specifically for farmers in poor and marginalized areas.	Survey in 1996 and again in 2000, applied to the same farms and households in the dryland areas of 51 municipalities in five regions (Drylands Panel Survey). T-test comparison of means between EAC members and non-members	193 households and farms with complete information for 1996 and 2000.
7	To analyze (1) EACs' operational performance, (2) EACs' financial performance, and (3) the relative importance of income generated from public programs. All these analyses were for 1999 fiscal year.	Un-audited balance sheets and income statements of EACs for 1999. Analysis by Certified Public Accountants of the information contained in these documents.	Balance sheets and income statements were requested from 1050 rural organizations. 410 of them provided complete information.
8 through 12	To understand the main factors conditioning the performance and sustainability of EACs, and to analyze the relationship between institutional and economic performance.	Qualitative case studies, using individual and group interviews with different stakeholders, half-day workshops, analysis of available documentation, and a survey of members and non-members (Case Study Survey).	16 case studies of EACs involved in milk (6 case studies), potato (3 case studies), vegetable (4 case studies) and raspberry production (3 case studies), processing and/or marketing. Results of 14 case studies are reported.