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A PROFILE OF INVESTMENT AND PERFORMANCE OF SMALL
FARMERS IN PARAGUAY

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DECEMBER 1981

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The Research Bulletin Series

Bulletin of
The North Carolina Agricultural and Technical State University
Greensboro, NC 27411

ACKNOWLEDGEMENT

The author would like to express his appreciation to the Department of Agricultural Economics and Rural Sociology for providing the facilities and other assistance which contributed to the preparation and completion of this report. Particularly appreciated are the comments and encouragement of Dr. Richard Robbins, Professor of Agricultural Economics, and Director of the 211(d) Grant Program.

The assistance of Venetia Fisher and Jody Wiley, who typed the several drafts of the manuscript, and Azell Graves, who facilitated the many administrative details involved in this work, is sincerely appreciated. The paper is based on information obtained in connection with the author's assignment with the USAID assistance program in Paraguay from 1973 through 1977.

The preparation and publication of this paper was supported by the United States Agency for International Development under Contract No. AID/ta-G-1453, authorized under Section 211(d), Title III of the Foreign Assistance Act of 1966. The opinions and conclusions expressed in the paper are the author's and do not represent opinions or policies of USAID, or of North Carolina Agricultural and Technical State University. The author is responsible for any errors, and for accuracy of data and statements made in the paper.

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INVESTMENT AND PERFORMANCE OF SMALL FARMERS IN PARAGUAY

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A PROFILE OF
THE INVESTMENT AND PERFORMANCE OF SMALL FARMERS IN PARAGUAY

INTRODUCTION

Farm Management in Developing Countries

Because of the importance of agriculture in developing countries, together with the usual conditions of a large proportion of the population engaged in agriculture on small land holdings, there is a strong emphasis on development assistance efforts to improve the efficiency of operations and productivity of small farms in these countries. The characteristic poor economic condition of farmers is commonly associated with low productivity per hectare and per man-year, and there is frequently a further pressing need for increased production of agricultural products to meet domestic needs for food and fiber, and for export to earn foreign exchange. The focus of the efforts falls directly on the discipline of Farm Management, which examines the organization and operation of the farm as a business unit with the objectives of achieving the most efficient use of available resources, and achieving the highest possible continuous net income for the farmer.

Because of the pressing economic and social demands, and the usual scarcity of relevant data in developing countries, any bit of information which might be useful in improving, or evaluating the efficiency or productivity of small farms is immediately pressed into use. Consequently, a Farm Management effort in a developing country must necessarily include Farm Management Research, which concerns itself with the collection and analysis of Farm Management data, and Farm Management Extension, which involves working with

farmers in developing, organizing, and using Farm Management data to adopt changes, new practices, new varieties, etc. in the actual operation of individual farms. The principal objective of Farm Management research is to identify and evaluate alternative management practices which will yield greater returns to the use of productive resources, while the Extension worker's objective is the effective on-farm application of the improved practices.

In a broader perspective, net social benefits of Farm Management efforts may be perceived as increased production, higher income, or improved efficiency of operations of individual farmers, so that the real measure of the value of a Farm Management program is the observed impact of the results of changes in income from farm operations.

The importance of farm management data in planning and implementing agricultural development in developing countries frequently has been a topic of discussion by professionals involved in administration of development programs. In a paper which appeared in the Indian Journal of Agricultural Economics in 1966 Rainer Schickele gives an excellent summary of the needs and relationships of farm management data and agricultural development. The central emphasis of Schickele's paper is that: "The planning of agricultural development, and particularly the implementation of plans and programs, necessitate the closest cooperation between economic planners and farm management specialists."*

This paper deals principally with the collection of Farm Management data at the individual farm level, moving into the initial analysis of the data, and preparation for application of the farm management principles involved by individual farmers.

* Schickele, Rainer, "Farm Management Research for Planning Agricultural Development." Indian Journal of Agricultural Economics XXI (2) 1966. (Reprinted by the Agricultural Development Council.)

Farm Records and Farm Surveys

The basic difference between farm records data and regional farm survey data is determined on the basis of the use (and corresponding collection methods) of the data: farm records are used principally by the farmer for purposes of planning and evaluating operations, while survey data are used by decision-makers at the regional or national level. Regional or national data are informative and are useful in describing average characteristics of groups of farmers but are not very helpful for planning or operating a farm. On the other hand, while data from individual farms are basic material for surveys, to be used as representative of a region, or of a group of farmers, the farms must be selected according to statistically acceptable procedures. Thus, farm records data from farms selected on the basis of pragmatic or practical considerations, rather than statistically valid sampling procedures, cannot be used as survey data, although they may be useful as case studies to provide additional insight with respect to the relationship of survey data to actual farm operations.

The information on his own farm which the individual farmer accumulates in order to plan and evaluate his own farming operations is the same kind of information needed for farm management research, and the results of surveys and analyses carried out by the researcher are needed by farmers to help in evaluating results of operations and alternative practices. Since the extension worker is probably most closely involved in helping the individual farmer record, summarize, and utilize this information, close coordination between farm management research and extension is important to provide a means of maintaining the validity and effectiveness of farm management research to farmers, and at the same time provide a stream of basic current farm data to researchers, reflecting the actual conditions and problems facing farmers. Thus, the researcher has current farm information which is extremely useful in conducting an effective, relevant research program,

and extensionists have analyses they need in assisting farmers evaluate, plan and carry out their farming operations and plans.

Although accurate, detailed information on small farm operations can be obtained by surveys for use by managers and policy-makers, in developing countries the infrastructure for collecting, processing, analyzing, and assimilating these data in assisting small farmers to utilize the information to improve their operations is usually ineffective or nonexistent. The key elements of infrastructure involved are an effective agricultural extension service, together with supporting research and education, and a functionally literate group of farmers.

The term "effective extension service" is especially important: all the other elements may be present, including capable, trained professionals, but the system will not function if individuals do not work with each other for any reason. This is stressed, because in developing countries, it is common for small farmers to be in markedly different social, economic, and educational levels than the extension worker, researcher, or educator, who must have substantial training and education in order to function effectively in their field of responsibility. The impact of this difference is most critical at the level of the extension worker, since the interaction with the small farmer is most frequent and intense at this level. A wide difference in the education level of the extension worker and the farmer he is working with characteristically is associated with an attitude ranging from cautious reserve to active mistrust, or worse, and corresponding poor communication. This severely restricts the completeness and accuracy of the information the farmer will give to the extension worker, and the farmer's willingness to accept and adopt new ideas, practices, or technology of which the extension worker may have information.

If there is poor communication between them, the extension worker will not have access to accurate information on the farmer's operations he needs to help the farmer evaluate his operations and make desirable changes, and the farmer continues to regard the extension agent with a suspicion and mistrust. Consequently, the classic stereotype of conditions in underdeveloped countries continues: the professionally-trained extensionists regards the farmer as "illiterate, ignorant, tradition-bound, and bull-headed," while the farmer is convinced that the extension worker is a "member of the corrupt ruling class who has no real interest in helping anyone except himself."

Development of the Farm Management Program in Paraguay

Conditions in Paraguay appeared to be an exception to the stereotype of conditions in developing countries. There was in Paraguay a functioning, reasonably effective extension service with well-trained local agents who generally were well-motivated toward helping small farmers, and had exceptionally good rapport with the farmers with whom they worked.

The Paraguayan Ministry of Agriculture's Extension Service (SEAG) had been providing technical assistance to small farmers, but this was largely in connection with programs to increase production of individual cash crops (corn, soybeans, cotton, wheat, tobacco, potatoes, etc.). Although this assistance was effective in improving production of these crops, there was no attempt to compare profitability of individual enterprises to the farm business. Surveys had been conducted to obtain information on characteristics and practices of farms and farmers in Paraguay, but little had been done which would help the individual farmer evaluate and/or improve operations on specific farms.

The farm management program, initiated as a part of the USAID effort in Paraguay, was conceived as a practical means of helping small farmers find and implement ways to improve their farming operations and increase their incomes.

Both extension agents and farmers with whom the idea was discussed expressed interest in participating in a project which would attempt to achieve this kind of evaluation and assistance. Some of the farmers volunteered expression of a desire to know more specifically how much they might improve their operations to earn more. The extension agents, having experienced a measure of success in increasing production of individual crops, were looking for a broader basis for working with the farmers than simply increasing production of a few crops; they had observed practices or unused resources which appeared to present potential for improvement, but did not know how to attempt to attack the problem.

In addition to a systematic approach to analysis, accurate information on existing resources and operations is necessary in order to have a sound basis for making an evaluation of present practices and proposed changes in individual farm operations. Since such information was practically non-existent, the initial step of the farm management programs was to make a complete inventory of these assets and resources of each participating farm, followed by a program of record-keeping. This served both to provide the data necessary for analysis, and also to directly involve the farmer in the process of data collection (recording) and evaluation of his actual operations. This was a major step for these farmers, probably none of whom had ever kept records of their farm income and expenses in a systematic manner. A few

farmers produced a notebook or booklet in which they had recorded their cash transactions, but apparently none had been able to summarize this information to arrive at an accurate estimate of net farm income.

To implement the project, the Director of Agricultural Research and Extension, of the Ministry of Agriculture, designated the extension agent at Caraguatay, a town about 100 kilometers East of Asuncion, to be directly responsible for farm management activities, with a Peace Corps Volunteer trained in agricultural economics assigned to work with him.

Concurrently with the farm records project the large scale survey of small farmers in the Eastern Region of Paraguay was being developed, in which the USAID advisor to the Farm Management project also participated. Consequently, a greater degree of coordination between the two projects was achieved than would have been possible otherwise. Identical or similar criteria were established for categories of data, so that parameters developed from both projects would have a better basis for comparison. For example, farms were stratified according to nearly identical size categories in both projects: 0-5 hectares; 5-10; 10-20; and 20-50 hectares.

Objectives and Constraints

The principal objective of this paper is to examine the structure of capital investment, and results of operations of small farmers in Paraguay, from the viewpoint of farm records data for a small group of cotton and tobacco farmers in the minifundia area around Caraguatay, evaluated in the context of similar data obtained in a nearly concurrent regional Small Farmer Survey. A second objective is to document the conditions, problems, procedures, and results of a farm records/farm management program as implemented in Paraguay

so that this experience will be available as a reference for the development of similar programs in other developing countries.

The major constraint to be considered in using Farm Records data, is that these results are not representative of any larger area or group of farmers, because the participating farmers were selected by purposive procedures, governed more by the farmer's interest, and willingness to participate in the program, than by conformance to criteria for a representative sample. Only the Survey data have a statistically representative basis. The Farm Records data are evaluated from the viewpoint of case studies of individual farms, and whether the data fall within the normal variance for the corresponding Survey values. Discussion of differences between Survey Data and Farm Records data is offered as hypotheses regarding possible sources of sampling or interviewer error, or as points of focus for further study.

Although Farm Records data normally are not statistically representative, and thus are not normally considered comparable with Survey data, conditions in developing countries prompt us to enter this questionable area: data in developing countries are normally extremely scarce, while the major international funding agencies currently place heavy emphasis on small farms. Consequently, any available data with a degree of objectivity are almost automatically accorded considerable importance regardless of the method by which they were obtained, and used as if they met all requirements for statistical reliability. The Paraguay situation presents an unusual opportunity to pragmatically compare results obtained by these two methods.

CONCEPTUAL FRAMEWORK

Selection of Participating Farmers

Since the Farm Records project was designed principally to analyze individual farm operations and to assist farmers to plan or change their operations, rather than to obtain a representative picture of small farmers in Paraguay, the data obtained must be regarded principally as case studies. The farmers were selected on the basis of their interest in the program, roughly similar cropping patterns, and size of farm. The total farm of participating farmers was determined pragmatically by the number of farmers which could be supervised effectively by the extension personnel at Caraguatay. Consequently, detailed data on farm investment and operations were obtained for an interested group of 20 farmers distributed among four size groups, whose principal cash crops were cotton and/or tobacco.

The initial contact with the individual farmers was made by the extension agent accompanied by the USAID Farm Management Advisor, who explained the farm management program, and the kind of information that farm records would show. After hearing the explanation, nearly all of the farmers agreed to participate in the program. (Later, some of the farmers admitted it was out of deference to the extension agent, rather than any real interest in the program, that they initially agreed to participate).

Few of the farmers had formal schooling beyond primary school, but most (about 80 percent) could read and/or write. Some farmers participated in the program who could not read or write, but in these cases, his wife or an older child provided the necessary literacy capability. This suggests that the lack of ability to read and write need not exclude a farmer from participation in a farm records program.

After several trial approaches, a system of farm records was designed and implemented in October 1976, which attempted to cover all economic activities of the farm family, including farm use of family labor. Of 28 farmers who indicated they would participate in the program, 20 actually completed the initial farm inventory, and began keeping records of farm family expenses, income, and labor use. Several of these were interested primarily in keeping detailed records of costs for one or two principal crops (usually cotton and tobacco), and neglected records of other activities. Eighteen of these twenty completed the final inventory in April 1977, and financial records sufficiently complete to give a picture of monthly income, expenses, and labor use, were kept by 14 farmers.

Crop Year

The usual time for "closing the books" for a farm business in order to summarize and evaluate annual results of operations is at the end of the crop year, after the principal crops have been harvested and before land preparation for the next crop year begins. This is also usually the period of least agricultural activity, when farmers formulate their final plans for the coming crop year, and need to have information of the current financial condition of the farm business and results of the preceding year's operations for sound planning. For Paraguay, a land-locked country located on the 25th parallel in the southern hemisphere where June, July, and August are the winter months. June 30 appeared to be the most appropriate date for the end of the crop year.

Harvest of the major cash crops (cotton, soybeans, and tobacco) is largely completed by the end of March, although marketing may continue through April.

Land preparation begins in September, and planting continues through October and November. Rainfall is distributed throughout the year, occurring mostly as afternoon thundershowers. Rainfall is generally heavier in the spring months (September, October, and November) and lighter in the fall and winter months (April through July), but there is no regularly occurring annual dry period.

Other crops vary somewhat from the crop year pattern for the major cash crops: Corn is planted in July and August, and harvested in December. Wheat is planted in April and May and harvested in the Spring (September, October). mandioca (manioc, or cassava), an ubiquitous staple crop, is planted in the Spring, and harvested as needed, beginning as soon as the roots develop to edible size, about six months, and continuing until the crop has all been harvested, which may be a year later.

Farm Inventories

Practical considerations in implementing the Paraguayan farm management program dictated that the beginning inventory date for the first year be delayed until October 1. Orientation and training of Paraguayan extension personnel in farm management concepts, and the preparation of working material appropriate for working with small farmers in Paraguay required more time than had been anticipated.

Completion of the initial farm inventory also required additional time than would be required for an ongoing program, because everything was a new, learning experience for the farmers, as well as the extension agents. The process could not be hurried because it was essential to gain and keep the confidence and rapport of the farmer, in order to get accurate information

on his assets, liabilities, and operations, and to achieve his active participation. The working relationship the extension agent had already established with the farmers provided a basis for a good beginning, but continued participation was dependent on the farmer's sustained interest and confidence in the integrity of the extension agent and other professionals working with them in the program.

A closing inventory earlier than June 30 was necessary for the first year in order to have results from the first year's experience for a Ministry of Agriculture (MAG) decision to continue or terminate the project. The decision to continue the program meant that Paraguayan farm data on inventories and income and expenses were needed in time for training extension agents, Peace Corps Volunteers and paraprofessionals who were to be assigned to the program the following year. Also, summarized data were desired by the participating farmers, who had developed a keen interest in seeing results of their record-keeping on their farming operations for the first time.

Consequently, the closing inventory for the initial year was taken in April, 1977, to allow time for completing the inventories and summarizing the farm income and expense records, to have the summarized results in time for use in preparing for the next year. Although this did not include an entire crop year, this period (October 1976 to April 1977) included substantially all of the farming operations for year; only those farm activities, and farm family consumption and expenses which occurred during the rest of the year were not covered. Land preparation labors performed prior to the initial inventory were included in the beginning inventory value of crops in the ground. Harvest of all principal crops substantially complete when the ending inventory was taken in April. Although not all of the products had been sold, these unsold at the time of the final inventory were counted as farm

income at current market value.

Income and Expense Records

After completing the farm inventory and calculating the farmer's net worth, each farmer was given a set of work sheets on which to write down all items of income and expense (including time worked on the farm crops) for the farm and the farm family, with enough information to permit classification according to farm enterprise or type of family expenditure. Initially, most farmers were reluctant to write on the prepared forms, but used ordinary notebook or paper to record their expenses. The extension agent then transcribed the information on the worksheet, when he visited the farmer periodically to supervise the record-keeping.

Frequent supervisory visits to each of the farmers were essential throughout this initial period of implementation of the farm records project. Some farmers were faithful in recording their expenses and farm labor (in their own notebook) but some did nothing until the extension agent's supervisory visit. By the end of the season, most of the farmers had become accustomed to recording the desired information, and a few were comfortable enough with the procedures to enter the items directly on the prepared worksheets.

This reluctance to go ahead unaided was characteristic at all levels at the beginning of the program including the extension agent as well as the farmers, probably reflecting the nearly complete absence of practical experience with the application of farm management principles. After an explanation of the principles and procedures involve, followed by practice in a few farm situations, the extension agents--and some of the better motivated

farmers--ventured to proceed on their own, with less frequent supervisory visits for guidance and encouragement. The greatest encouragement was provided by the results, when the farmer himself could see how much he earned from each enterprise and for the whole farm business, and what his major items of expenses were. This was also encouragement to the extension agent, who then had a more complete basis for evaluating the effectiveness of farming operations of the farmers in his area, and for developing and recommending changes for improvement.

Data-Collection Procedures: Farm Records vs. Survey

A review of the procedures used in collecting data in the two projects provides some insight which may help in evaluating the Farm Records and Survey data: In the Farm Records project, the Agricultural Extension Agent Management Advisors participated with the farmer in enumerating and valuing farm assets, and probably provided a major source of information with regard to current local values of various asset items. Generally, there were no standard values for asset items, except possible marketable items such as cattle. Consequently, there was considerable variation among values volunteered by individual farms for essentially the same items. After considering current values of new and/or used items in the area, each farmer made the final determination with regard to the value of his own assets.

The Farm Records project presented an excellent opportunity for double-checking the inventory and income and expense figures, since the same farmers were visited repeatedly and the farmers participated actively in both the counting, valuation, and revaluation, if necessary of their farm assets and farming activities. It was observed that some farmers tended to be

reluctant to reveal all their assets or sales on the first visit; tended to overlook common tools and small implements; and to undervalue their buildings and used machinery, implements, and tools.

Survey data, on the other hand, were obtained by one-time interviews of farmers selected randomly from stratified probability samples of the entire small farm population of the Minifundio Zone of the Eastern Region of Paraguay. Caraguatay, located in the Departamento de la Cordillera, in the heart of the Minifundio Zone of the Eastern Region had been the focus of a number of previous studies. Having participated in one or more of these surveys, some farmers had become "survey wise". At least one farmer commented that he would 'give any figure' in answer to survey questions with little regard to whether the answer was correct, because the survey had no meaning to him: the immediate objective being to satisfy the interviewer. Data in both the Farm Records project and the survey were obtained for four farm size strata: 0-4.9; 5.0-9.9; 10.0-20.0; and 21.0-50.0 hectares. The average farm size in each stratum did not differ more than 1.3 hectares between the two projects. The average for all survey farms was 4.6 hectares less than the average for the farms participating in the Farm Records project, however, due to the proportionately larger number of farms in the smallest size stratum which were included in the Survey. Consequently, comparisons of data from the two projects for each stratum probably are more meaningful than the all farms averages. (Table 1).

Table 1. Farm Size Strata. Average and Proportionate Number of Farms by Stratum. Farm Records Data, Caraguatay, and Regional Small Farmer Survey Data, Minifundo Area, Eastern Region, Paraguay, 1976.

Stratum	Farm Size (Has.)	Average Farm Size		Number of Farms	
		Farm Records	Survey Data	Farm Records	Survey Data
		(hectares)		(percent)	
I	0 - 4.9	2.70	1.98	25	52
II	5.0 - 9.9	7.85	6.93	25	21
III	10.0 - 20.9	14.09	12.86	40	22
IV	21.0 - 50.9	32.00	33.03	10	5
All Farms		11.48	6.89	100	100

Land Tenure Patterns

Working in depth with small farmers in the Farm Records Project revealed a considerably complex pattern of land holding. Sixteen of the twenty participating farmers indicated they held clear title to some or all of the land they considered to be their farm. Six of these sixteen also farmed additional land to which they did not have title. Four additional farmers did not have clear title to any of the land they farmed. With few exceptions, the farmers who reported land they farmed as "occupants" (without clear title of ownership) had ownership rights to the land, usually through inheritance which had not been finalized. Payment of rent usually was not involved in the use of this land. In one instance, a farmer reported he owned 3.5 hectares, but farmed 1.75 hectares, most of which he rented. Upon further inquiry, he explained that the 3.5 hectares which he owned was his part of a 25 hectare family farm which had been divided among seven heirs, each resulting plot

being 3,000 meters long and 12 meters wide. Since it was impractical to farm the land he owned, the farmer rented land from his fellow heirs to make possible a farmable piece of land.

To account for these practices, land "occupied" but not owned was included in the farmer's assets, but land reported as rented was not.

PROFILE OF CAPITAL INVESTMENT

Total Capital Investment

The total value of capital investment in land, buildings, tools, livestock, and cash, products and other salable merchandise on hand averaged \$6,910 per farm for the 20 farmers participating in the farm records project, and \$2,074 obtained by the Survey of Minifundio Zone of the Eastern Region of Paraguay. (Table 2). Land represented the largest share of capital investment: Farm Records data show average land value of \$3,297 per farm; 48 percent of total capital. Survey data reflect an average value of \$1,452 per farm; 70 percent of total investment. Data from both projects showed the aggregate value of all real estate assets (land, fences, buildings, other structures, and permanent crops) constitutes about three-fourths of the total capital. Livestock represented the second largest share of capital investment, with about one-fifth of the total for Survey data, and one-seventh of the total for Farm Records. Current assets (cash, accounts receivable, merchandise or products on hand and crops in the ground) represented less than 8 percent of total capital; about the same relative share as tools and implements.

Each of the major categories of assets appears to have been undervalued in the Survey data relative to Farm Records data. The average values of livestock and land obtained by Survey were less than one-half as large as the respective values reported by farmers participating in the Farm Records project. Current assets, land improvements, and tools and implements were undervalued even more in the Survey data.

It is interesting that these percentage share of assets are roughly comparable with those of U.S. farmers (1977), except that the relative shares for livestock, and for machinery (tools and implements) are reversed; machinery represented about 11 percent of assets for U.S. farmers, and livestock only 5 percent.*

Table 2. Capital Investment of Small Farmers in Paraguay, by Categories of Assets. Farm Records Data, Caraguatay Area, and USAID Regional Small Farm Survey, Minifundio Zone, Eastern Region, October 1976. (U.S. Average Percentage distribution for comparison)

Item	Farm Records Data		Survey Data		U.S. Average * 1977 Percent
	Value	Percent	Value	Present	
Current Assets	\$ 524	7.6%	\$ 101	4.8%	8.5
Livestock	1,059	15.3	403	19.5	4.5
Tools and Implements	485	7.0	15	.7	11.1
Fences and Other Improvements	1,545	22.4	103	5.0	2.2
Land	3,297	47.7	1,452	70.0	73.7
Total Capital	\$6,910	100.0	2,074	100.0	100.0

These differences in values appear to be much greater than would be expected, even for a non-random sample group of farmers, compared with values for a random sample taken from the same population. In addition to apparent low Survey values for total and individual asset items, the Survey data undervaluation was greater for small farms than for larger farms: for Stratum I farms, the value of total farm assets obtained by Survey was less than one-fifth the value reported in the Farm Records, while in Stratum IV, the Survey value was only about 25 percent less than the Farm Records value. (Table 3).

*U.S. Department of Agriculture, Economics and Statistics Service, Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics. ESS Stat. Bul. 650 Dec. 1980.

The most likely cause for these wide differences in values between two projects appears to be related to the procedures used in collecting the data.

Table 3. Capital Investment of Small Farmers in Paraguay, by Farm Size Stratum. Farm Records Data, Caraguatay Area, and Regional Small Farmer Survey Data, Minifundo Zone of Eastern Region, Paraguay, October 1976.

Farm Stratum	Total Assets		Fences, Other Improvements		Land Value Per Farm		Land Value Per Hectare	
	Farm Records	Survey Data	Farm Records ^s	Survey Data	Farm Records ^s	Survey Data	Farm Records	Survey Data
	(Dollars)		(dollars)		(dollars)		(dollars)	
I	2,088	404	737	20	797	243	277	123
II	6,091	2,537	1,770	108	2,254	1,813	260	269
III	7,975	3,338	1,399	189	3,934	2,391	241	186
IV	16,746	12,257	3,585	574	9,610	8,594	271	260
All Farms	6,910	2,074	1,545	103	3,297	1,452	255	211

Land and Improvements

The value of land (including permanent crops on it) average \$3,297 per farm for the farms participating in the Farm Records project, and the value of buildings, fences and other improvements were an additional \$1,545. In the Small Farmer Survey, the value at land averaged \$1,452 per farm, and the value of improvements (only fences were mentioned) was only \$103. (Table 3).

The differences in land values obtained by Farm Records compared to Survey data for individual farm size strata generally were less than the all farms averages. The major part of the difference appears to be due to a slightly smaller average farm size in each stratum for Survey farms (See Table 1),

since the average values per hectare were of the same general magnitude for both projects and for all farm strata, except for the Survey value per hectare for Stratum I farms.

Farm Records data on land values by farm size strata ranged from \$241 to \$277, averaging \$255 per hectare, exclusive of crops or improvements. Survey values averaged slightly lower: averaging \$211 per hectare for all farms, ranging from \$136 to \$269 per hectare for Strata II, III, and IV farms, (approximating the corresponding Farm Records value for each of these size groups). Survey value per hectare of land (\$123) for the smallest farms (Stratum I) was substantially smaller, however; less than one-half the value obtained by farm records. The reasons for this apparent undervaluation is not clear.

The relatively uniform values per hectare gives the obvious result of land value per farm being directly related to farm size. Both Survey and Farm Records data for values of fences and other land improvements also reflect a direct relationship with farm size. The values of land improvements reported by Survey data are a small fraction of the Farm Records values, however. Farm Records values include fences, buildings and other structures, while Survey data apparently omitted real estate assets other than fences.

Tools, Implements, and Machinery

The data obtained in the two projects appears to indicate that farmers drastically underestimate the value of their tools, and implements and machinery in response to Survey question. (Table 4). Survey data showed an average value of all tools and implements of only \$15 per farm; ranging from a minimal \$10 for the smallest farm size stratum, to a barely less insignificant \$41.00 for the 20 to 50 hectare stratum. This low value does not appear reasonable in view of the general observation that most small farmers, except possible some in the smallest size group (0 - 5 hectares), own

a plow and an oxcart, in addition to hand tools. Many also have a sprayer, duster, cornsheller, wheelbarrow, etc. The current value of a new oxcart was between \$350 and \$400, and a functioning used one was generally considered worth at least \$100. An old but serviceable plow was considered worth \$65 to \$75. A value of \$10 to \$40, appropriate for a normal complement of commonly-used hand tools (hoe, machete, shovel, pick, etc), could not include any of the larger pieces of equipment.

The farm records data show an average value of \$485 for farm tools, implements, and machinery, ranging from \$88 for the smallest farms to \$1,254 for the largest. This appears to be consistent with generally observed conditions on small farms in the region, and is believed to be a reasonably accurate estimate of values for the farms at Caraguatay.

Table 4. Comparative Data on Capital Investments in Tools and Equipment Livestock, and Current Assets, by Farm Size Strata. Farm Records Data, Caraguatay Area, and Regional Small Farmer Survey, Minifundio Zone. Paraguay, 1976.

Farm Size Stratum	Tools and Implements		Livestock		Current Assets	
	Farm Records	Survey Data	Farm Records	Survey Data	Farm Records	Survey Data
	(dollars)		(dollars)		(dollars)	
I	\$ 88	\$ 10	\$ 287	\$ 101	\$ 179	\$ 30
II	303	16	1,238	514	526	86
III	653	23	1,381	603	608	132
IV	1,254	41	1,255	2,266	1,042	782
All Farms	485	15	1,059	403	524	101

Current Assets

The average value of current assets obtained in the Farm Records project (including cash on hand or in bank accounts, accounts receivable, products or merchandise on hand, and harvestable crops in the ground: was \$524, compared with \$101 reported in the Small Farmer Survey. (Table 4). In the Small Farmer Survey, anticipating that it would be difficult to obtain accurate responses to direct questions concerning current assets, they were estimated indirectly, as 50 percent of cash expenses. In the Farm Records project, however, an estimate was obtained for each individual item of current assets. Inventory figures were supplemented by subsequent summaries of income and expenses at the end of each month, permitting an ex post check on reported inventory figures for current assets.

In several instances, when balancing income and expense accounts in subsequent visits, the farmer admitted having had a sum of cash on hand which he had not reported when the inventory was taken. Thus, the experience with Farm Record supports the survey assumption that a one-time interview would not result in reporting of any significant amount of cash on hand.

Farm records also included the value of salable but unharvested crops in the ground (principally cassava), which was not estimated in the survey. In addition, current assets included the value of merchandise in the small country store (almacen, or despensa), a substantial number of which were observed in rural homes.

Livestock

As noted above, livestock represents the second largest item of capital investment of small farmers in Paraguay, after real estate (Land, buildings, or other land improvements); amounting to about 20 percent of capital assets

value. (See table 2). The average value of livestock inventory obtained by Survey was less than one half the value obtained from the Farm Records project. Of the four individual farm size strata, only Stratum IV was an exception to this general relationship (Table 4).

The role of livestock for the Paraguayan small farmers appeared to be primarily that of a subsistence activity for the purpose of providing meat, milk, eggs for family consumption. The average value of livestock per farmer (Farm Records data) was approximately the same for each of the farm size groups, except the 0-5 hectare stratum for which the value of livestock holdings was substantially smaller, possibly reflecting the lesser importance of farming activities for the farmers with less than 5 hectares.

Farm Records data on values of different classes of livestock owned by farmers in the Caraguatay area demonstrates the importance of cattle was a capital asset of small farmers, averaging about 70 percent of total livestock value (Table 5). Oxen, which are the primary source of traction and rural transportation in Paraguay, constituted an important part of the value of the small farmer's cattle.

Table 5. Value of Livestock Inventory, by Class of Livestock, and Farm Size Stratum for 20 Small Farms Participating in the Farm Records Project. Caraguatay, Paraguay. October, 1976.

Farm Size Stratum	Class of Livestock						All Livestock
	Horses	Cattle		Swine	Sheep & Goats	Fowl	
		Oxen	Other				
	Dollars						
I	\$ 24 (8%)	\$127 (44%)	\$ 67 (23%)	\$ 23 (8%)	\$ 0 (0%)	\$ 47 (16%)	\$ 287 (100%)
II	138 (11%)	397 (32%)	553 (45%)	43 (3%)	30 (2%)	77 (6%)	1,238 (100%)
III	213 (15%)	308 (22%)	713 (52%)	65 (5%)	6 (.4%)	76 (6%)	1,381 (100%)
IV	278 (19%)	210 (17%)	556 (44%)	87 (7%)	143 (11%)	111 (9%)	1,255 (100%)
All Farms	150 (14%)	275 (26%)	485 (46%)	51 (5%)	24 (2%)	73 (7%)	1,059 (100%)

Table 6. Number of Farms with Specified Kinds of Livestock.
Farm Records Project. Caraguatay, Paraguay. October, 1976.

Farm Size Stratum	Class of Livestock					All Kinds Livestock	Total Number of Farms
	Horses	Cattle	Swine	Sheep & Goats	Fowl		
I	1	3	4	0	4	5	5
II	4	5	5	2	5	5	5
III	7	8	8	1	8	8	8
IV	1	2	2	1	2	2	2
All Farms	13	18	19	4	19	20	20

The Farm Records data also show that all of the 20 participating farmers had at least one kind and four farms had all five classes of livestock. Cattle, swine, and fowl were found on nearly all farms. Horses, and sheep and goats were less popular however. (Table 6).

The average number of animals for those farms which had animals, which indicates somewhat more accurately the sale of individual livestock enterprise on each farm was only slightly larger. The presence of relatively small numbers of each kind of livestock per farm is consistent with the idea that for this group of small farmers, livestock are kept primarily to provide livestock products for family consumption, rather than as a commercial enterprise for cash income.

Table 7. Livestock Numbers Inventory of 20 Small Farms Participating in the Farm Records Project. Caraguatay, Paraguay. October 1976

Farm Size Stratum	Class of Livestock						
	Horses	Oxen	Cattle Other	All	Swine	Sheep & Goats	Fowl
	-- Number of animals per farm --						
<u>0 - 4.9 has.</u>							
All Farms	0.2	0.8	1.2	2.0	1.4	0	23.2
Farms w/ Animals	1.0	2.0	3.0	3.3	1.8	-	29.0
<u>5.0-9.9 has.</u>							
All Farms	2.0	2.6	8.4	11.0	2.8	3.4	43.8
Farms w/ Animals	2.5	2.6	8.4	11.0	2.8	8.5	43.8
<u>10.0-20.9 has.</u>							
All Farms	1.8	1.7	9.4	11.1	4.1	.2	42.1
Farms w/ Animals	2.0	2.0	9.4	11.1	4.1	2.0	42.1
<u>21.0-50.9 has.</u>							
All Farms	1.5	2.0	10.5	12.5	4.0	6.0	59.5
Farms w/ Animals	3.0	2.0	10.5	12.5	4.0	12.0	59.5
<u>All Farms</u>							
All Farms	1.4	1.8	7.2	9.0	3.1	1.5	39.6
Farms w/ Animals	2.2	2.2	8.5	9.9	3.3	7.3	41.6

Consistent with general observations, both Survey and Farm Record data showed that the number of cattle per farm increased with farm size, although not proportionately: farm farms 5 hectares and larger, the number of cattle increased only slightly as the farm size doubled and redoubled. (Table 7).

The cattle numbers included all bovine animals, whether used for animal traction (oxen), breeding purposes, milk, or meat, as well as young stock. Except for the farms under 5 hectares, nearly every farm had a yoke of oxen (two animals); only a few farms had more than two oxen, and those which

did, unexpectedly, were the 5 to 10 hectares units, rather than the larger farms. The cattle raised were largely treated as multiple-purpose animals, with the best-suited being selected and kept for use as oxen, and the remainder raised for meat, or held as an asset for possible later sale. Milk production occurred as a by-product rather than as a primary enterprise.

Results of Farming Operations

Although 20 farmers completed the beginning inventory and began keeping records on income and expenses, not all kept records on all of their farm activities for the entire period. At the end of the first season of record-keeping, 14 of the farmers had sufficiently complete records of their farming operations to permit a reasonably accurate accounting of gross and net farm income. Because of a hiatus in supervisory visits of four to six weeks, due to rainy weather and vehicle breakdown, it was not feasible to obtain complete records on all farming operations for all of the farmers; two dropped out of the record-keeping activities completely because they were too far behind to try to bring them up to date, and four others were interested primarily in accounting for income and expenses for their principal cash crops, cotton and tobacco.

The operating results for the 14 farms, by farm size strata are shown in Table 8, with average survey data also shown for comparison. Although the Farm Records were kept only during the six-month period from October 1976 through April 1977, this period comprised the principal agricultural production season, and the data represent a reasonably complete picture of income and expenses of the farming operations for the entire year. Except for the harvest of petitgrain (sour orange leaves, from which the essential oil of petitgrain is extracted), which tends to be a winter season activity,

all crops have been produced and harvested, or ready for harvest. The value of all production was included in income, either as cash income from sale of the crop, or as value of increased inventory which was considered available for sale or for family consumption. Since income from non-farm activities and non-farm expenses for family living items were covered only for the six month period covered by the record-keeping, these values were doubled to get an approximation of annual figures.

The Regional Farmer Survey was conducted during the period August - September, 1976, so that the Survey data represent annual income and expenses for the preceding crop year (July 1975 - June 1976). Although the Farm Records data and the Survey data are not for precisely the same crop year, growing conditions during the two crop years were generally similar, and there was no major differences in prices, markets, production or other economic factors which would suggest reasons for substantial differences in farm income or expenses for the two years. Consequently, comparisons of data obtained in the two studies would be valid, subject to other constraints already discussed.

Farm Income

The Survey data show average gross farm income of \$1,180, cash expenses of \$218 and net farm income of \$962. The Farm Records data showed cash expenses of \$213, nearly identical to the Survey value, but gross and net income somewhat higher (\$1,603 and \$1,390 respectively). (Table 8). Part of this apparent difference in farm income is a result of the implicit weights used in calculating the average figures. Calculating the All Farms average for the Farm Records data, using the proportional weights for each farm size stratum implicit in the Regional Small Farmer Survey gives (Farm Records)

gross income of \$1,343 and net income of \$1,140 both closely approximating the respective Survey values.

Both studies indicate that production for farm family consumption is an important part of the small farmer's income, but the relative value as a percent of gross income according to Survey data, (45 percent) was double that reported in the Farm Records (20 percent). Further study is needed to ascertain the apparent wide difference in values of home-consumption farm products reported in the two projects. A difference in estimates obtained from a one-time (ex post) estimate of annual consumption, as compared to daily or weekly recording would be expected, but not at this magnitude. Furthermore, it would be expected that Farm Records data would yield greater value than Survey data. The Farm Records data on farm products consumed by the family are believed to be reasonable complete and accurate for the six months period during which the data were actually recorded and special care was taken to separate products fed to animals. Doubling this value should give a fairly close approximation of the correct annual value. It is possible that the Survey estimate included products fed to animals as well as human consumption, but further study would be necessary for a more definitive explanation.

Although data were not obtained specifically on how farmers used the cash income they received when they sold their crops, from general observation of the Farm Records during visits in this period, payment of outstanding debts appear to be given first priority. Cash income in excess of these immediate obligations was then used for capital expenditures (building repairs and improvements, machinery, land, etc.) or purchase of animals, or staple consumption merchandise for family use and/or possible resale. Cattle, especially, were regarded as a semi-liquid asset, and served as a de facto

savings account. Few, if any, of the farmers admitted to having a savings account with the BNF (National Development Bank), Banco Ganadero (Livestock Bank) or the local Credit Cooperative.

Table 8. Summary of Income and Expenses by Farm Size Stratum. Farm Records Data, Caraguatay, and Small Farmer Survey, Minifundio Zone of Eastern Region, Paraguay, 1976-77.

Farm Size Stratum	Average Size (has.)	No. of Farms %	Products Sold ¹ \$	Products Consumed \$	% of Total	Total	Cash Expenses Dollars	Net Farm Income - - - -
<u>I</u>								
Records	3.25	21	\$ 910	\$ 152	14%	\$1,062	\$ 202	\$ 860
Survey	1.98	52	279	323	54	602	108	494
<u>II</u>								
Records	7.81	29	737	254	26	991	113	878
Survey	6.73	21	760	529	41	1,289	175	1,114
<u>III</u>								
Records	15.12	43	1,843	428	19	2,281	276	1,994
Survey	12.82	22	936	827	47	1,763	275	1,488
<u>IV</u>								
Records	38.00	7	1,252	408	25	1,660	268	1,392
Survey	33.00	5	2,885	1,368	32	4,253	1,332	2,921
<u>All Farms</u>								
Records ²	12.12	100	1,285	318	20	1,603	213	1,390
Records ³	8.56		1,096	247	18	1,343	203	1,140
Survey data	6.92	100	652	528	45	1,180	218	962

¹Includes products on hand available for sale or family use.

²Simple average of all farms in Farm Records project.

³ Average of Farm Records data by stratum weighted by proportionate number of farms of each stratum included in Regional Small Farmer Survey.

Expenses

Both studies showed cash expenses as a relatively minor deduction to gross farm receipts; about 13 percent calculated from Farm Records data, and 18 percent obtained by Survey. Further detail obtained in the Farm Records project shows that the major part (75 percent) of cash expenses were for hired labor; ranging from 67 percent for Stratum III farms (10 to 20 hectares) to 93 percent for Stratum II farms (5 to 10 hectares). (Table 9) The survey data were not summarized in comparable detail, but a review of the Survey data suggests a similarly important role of hired labor, compared with cash expenses for other purchased inputs (fertilizer, certified seed, insecticides, etc.) Survey data also showed that hired labor represented from 5 to 40 percent of total mandays labor for individual crops.

The relatively small magnitude of cash expenses (purchased inputs) is consistent with practices commonly observed and reported as associated with or characteristic of small farmer agriculture in developing countries. The relatively large proportion of cash expenses which were paid for hired labor is unexpected, however, especially for the under 5 hectare farms. Earlier studies had indicated that these smallest farms have more family labor available than can be economically utilized on the land variable (USAID Small Farmer Subsector Assessment, 1976).

The absence of statistical representativeness of the farms from which these data were obtained precludes any statement as to whether or not this is characteristic of all small farmers in Paraguay, but it may be observed that only one of the 14 farmers keeping detailed records of farm expenses did not report using hired labor. Three farmers reported no cash expenses except for hired labor.

Table 9. Cash Operating Expenses of Small Farmers in Paraguay.
Farm Records Data, Caraguatay, and Small Farmer Survey,
Minifundia Area of Western Zone. Paraguay, 1976

Farm Size Stratum	Gross Farm Income	Hired	Labor	Other Cash		Total Cash		Per cent of Income
				Expenses	Expenses	Expenses	Expenses	
	\$	\$	%	\$	%	\$	%	%
<u>I</u>								
Records	\$1,062	162	80%	\$ 40	20%	\$ 202	100%	19%
Survey	602	(n.a.)		(n.a.)		108		
<u>II</u>								
Records	991	105	93	8	7	113	100	11
Survey	1,289	(n.a.)		(n.a.)		175		14
<u>III</u>								
Records	2,271	105	67	91	33	276	100	12
Survey	1,763	(n.a.)		(n.a.)		275		
<u>IV</u>								
Records	1,160	212	79	56	21	268	100	16
Survey	4,253	(n.a.)		(n.a.)		1,332		31
<u>All Farms</u>								
Records	1,603	159	75	54	25	213	100	13
Survey	1,180	(n.a.)		(n.a.)		218		18

Figures for U.S. farmers in 1977 (not shown here) indicate that the smallest U.S. farms (less than \$10,000 gross sales) realized net incomes from farming operations ranging from \$1,400 to \$2,500, approximating net income for Strata III and IV farms in Paraguay. The major differences appeared to be the substantially greater cash production expenses, and the greater importance of off-farm income for U.S. farmers.*

*U.S.D.A., E.S.S. "Economic Indicators of the Farm Sector". ESS Stat. Bul. 650. Dec. 1980.

A further observation with respect to the farmers participating in the Farm Records project, is that labor trading was a common practice. Some of the farmers stated that they worked more effectively when working with a friend or neighbor, even though the work being done did not require two men. Trading labor is an obvious response to the motive of making field or other farm labor more effective--or at least more pleasant. It was suspected that at least part of the labor hired may have been due to the same motive; if there was no neighbor or friend with whom it was convenient to trade labor, the farmer may simply have hired someone so that he would not have to work alone.

These labor practices raises the question as to whether these farmers are using their limited cash operating capital to obtain presumably small economic returns through increasing their labor efficiency, while foregoing possible greater returns which could be realized by purchasing and using more fertilizer, better (and more expensive) seed, etc.

If, however, the farmer himself worked for hire for another farmer, his additional labor income would compensate dollar wise for the possible loss in crop productivity. Further study of these practices is necessary to clarify their social and economic implications.

SUMMARY AND CONCLUSIONS

The nearly concurrent implementation of a Farm Records/Farm Management project, and a Regional Small Farmer Survey in Paraguay, both with USAID support, presented an unusual opportunity for comparison of data obtained from farm records with similar data obtained in a regional survey. Normally, data obtained in farm records projects are not considered to be comparable with survey data, principally because the selection of farmers participating in farm records projects rarely conform to the criteria for statistically defensible sampling procedures. However, in developing countries, because of the usual scarcity of data on small farmers, and the current emphasis on small farms by foreign assistance funding agencies, any information which reflects any degree of objectivity is almost automatically accorded considerable importance.

Although the two projects in Paraguay were not designed specifically for mutual corroboration of results, the farmers participating in the Farm Records projects were selected from the area near the town of Caraguatay, which is located in the minifundio zone of the Eastern region on Paraguay covered by the Regional Small Farmer Survey. Furthermore, the concurrent development of the two projects permitted adoption of a substantial degree of communality of parameters and categories.

In the Farm Records project, the objective was to use the data obtained to help individual farmers evaluate results of practices on their own farms, and to implement improvements. Consequently, considerable care was taken to assure that the information obtained was complete and accurate for each farm. The

Small Farmer Survey was designed to obtain data which would give a representative composite picture of characteristics of small farmers in the Eastern region of Paraguay.

The farmers interviewed in the Small Farmer Survey were selected by stratified sample, area frame procedures. The Farm Records farms were selected on the basis of accessibility and willingness of the farmer to participate in the project, with each of the strata designated in the Small Farmer Survey represented.

Generally, the data obtained by Survey on capital investment appears to be substantially undervalued, compared with that obtained in the Farm Records project, except for land. The value of land, exclusive of improvements reported by farmers participating in the Farm Records project was generally of the same magnitude as that obtained by Survey methods. On the other hand, the values for buildings, other land improvements, and farm tools, implements, and machinery obtained by survey were minimal, while Farm Records data showed values which appeared to be consistent with items commonly observed to be present on farms.

An outstanding feature of the capital structure of small farmers in Paraguay, indicated by both farm records and survey data, is the predominance of real assets--land and land improvements--(about 70 percent of total capital) and the small share represented by tools, implements, and machinery (less than ten percent). Livestock, principally bovine species, constituted the second most important capital asset (around 20 percent). Since capital value was heavily weighted by the value of land, total capital investment was closely related to size of farm. Similarly, since these are all small farms, mostly

between 5 and 20 hectares, located in the same socio-economic region, farming methods and equipment used are similar for nearly all farmers, and the values for investment in tools and machinery per farm do not vary greatly among farms.

Net income per farm from farming operations varied widely among farms, and there was no consistent bias for either study. Net income did not appear to be closely associated with farm size: Although average net income was somewhat greater for farms over ten hectares, compared with averages for smaller farms, the highest income for the farm records group was realized on a farm of 6.5 hectares, and the largest farm--over 30 hectares--realized less than average income.

Farm Records data show that cash expenses for agricultural production characteristically were less than 20 percent of gross farm income, and hired labor constituted the major share--over 75 percent--of these expenses. Hired labor appeared as the major cash expense item even on the smallest farms (under 5 hectares), and on those with low cash sales.

Although livestock represented an important part of capital investment for nearly all farms, sales of livestock products were a minor contribution to cash farm income. Livestock were kept principally for the purposes of transportation and traction, and for providing meat, milk, and eggs for family consumption. A yoke of oxen was the standard possession on nearly all farms, with an additional yoke or two on some of the larger farms. Additional cattle were kept for meat, milk, replacement oxen, and as a de facto savings account. Nearly all the farmers reported using credit, but none admitted to having a savings account in a bank or credit cooperative.

A general observation from working with the same group of farmers over the initial six month period of the Farm Records project suggest that these farmers were basically conservative in their aspirations with respect to what they hoped to earn from their farming operations. After several months of keeping records of income and expenses on their own operations, most expressed increased interest in knowing more about their net earnings from their farming operations, especially the relative earnings from individual cash crops for the purpose of planning their operations. Although specific information on aspirations was not obtained, comments by some of the farmers suggested that more complete information on earnings from their farming operations had a positive impact on their aspirations with regard to increasing their income.

Although data obtained by Farm Records are not mutually interchangeable with Regional Farm Survey data, additional insight into day-to-day operations on small farms, made possible by repeated visits to the same farms in a Farm Records project, together with recording of actual farm information on income, expenses, labor use, etc., can be useful in designing and conducting Surveys to obtain more accurate, representative data. Survey data, on the other hand, is often useful as a standard against which individual farm performance data can be compared. Consequently, it is concluded that Regional Survey data and Farm Records data, although obtained by different procedures and for different purposes, can be mutually useful in working with small farmers in developing countries.